

Which of the following hereditary cancer syndromes is associated with an increased risk of ovarian cancer?

(Please select 1 option)

<input type="radio"/>	Hereditary non-polyposis colorectal cancer
<input type="radio"/>	Multiple endocrine neoplasia
<input type="radio"/>	Peutz-Jeghers syndrome
<input type="radio"/>	von Hippel-Lindau syndrome
<input type="radio"/>	Xeroderma pigmentosa

<input type="radio"/>	Hereditary non-polyposis colorectal cancer	This is the correct answer
<input type="radio"/>	Multiple endocrine neoplasia	
<input type="radio"/>	Peutz-Jeghers syndrome	
<input type="radio"/>	von Hippel-Lindau syndrome	
<input checked="" type="radio"/>	Xeroderma pigmentosa	Incorrect answer selected

Key Learning Points

Oncology

- HNPCC is relatively commonly associated with ovarian carcinoma, although colorectal carcinoma is the most common malignancy.

Explanation

All of the above hereditary cancer syndromes cause a patient to be at an increased risk of developing various cancers, but HNPCC is the condition which most increases the risk of ovarian cancer. This is due to inherited mutations with DNA mismatch repair, which most commonly results in colorectal carcinomas.

Peutz-Jeghers syndrome is also associated with an increased risk of ovarian carcinoma, but to a lesser extent than HNPCC. More classically associated with Peutz-Jeghers are stomach, small intestine and pancreatic-biliary tumours.

Ovarian carcinomas have been associated with MEN and von Hippel-Lindau syndrome but this is rare. They are not commonly associated with xeroderma pigmentosa, which results in multiple skin malignancies.

A 25-year-old woman presents with oligomenorrhoea. On examination she has a large pelvic mass and is referred for further investigation.

Prior to a planned biopsy of her pelvic mass, she complains of a dry cough. A subsequent chest x ray reveals multiple rounded opacities throughout both lung fields.

What is the best test for monitoring her condition after optimal treatment?

(Please select 1 option)

<input type="radio"/>	Alpha-fetoprotein (AFP)
<input type="radio"/>	CA-125
<input type="radio"/>	None
<input type="radio"/>	Regular abdominal ultrasound
<input type="radio"/>	Regular pelvic examination

<input checked="" type="radio"/>	Alpha-fetoprotein (AFP)	This is the correct answer
<input type="radio"/>	CA-125	
<input type="radio"/>	None	
<input type="radio"/>	Regular abdominal ultrasound	
<input checked="" type="radio"/>	Regular pelvic examination	Incorrect answer selected

Key Learning Points

Oncology

- This patient has a germ cell tumour of her ovary, the monitoring marker is AFP.

Explanation

Patients with germ cell tumours are usually young and present in a variety of ways. The diagnosis is usually made on biopsy in the case of ovarian tumours and treatment usually consists of surgery followed by chemotherapy (BEP). The fact that this lady is young, and has early pulmonary metastases, make a germ cell tumour much more likely. Epithelial cell tumours usually disseminate through the abdomen and peritoneum prior to metastasising to the lungs.

Markers such as AFP, β -human chorionic gonadotropin (HCG) and lactate dehydrogenase (LDH) may be raised but the most sensitive marker used for monitoring treatment efficacy and risk of relapse is AFP.

A 62-year-old man presents to the Emergency Department with difficulty mobilising and passing urine, which has developed over the past 12 hours. He reports a chronic cough for the past six months and lower back pain which has become increasingly severe during the past four weeks. He smokes 25 cigarettes per day and has done for 48 years. On examination his BP is 135/85, pulse is 75 and regular. Chest exam reveals bilateral wheeze and decreased air entry at the right base. There is a palpable bladder on abdominal exam and pain over the lumbar spine. There is 3/5 power weakness affecting both lower limbs, he has perianal anaesthesia and decreased tone.

Investigations:

Hb	108g/l	135-180
WCC	$9.0 \times 10^9/L$	6-10
PLT	$162 \times 10^9/L$	150-400
Na	132 mmol/l	135-145
K	3.8 mmol/l	3.5-5.5
Cr	122 μ mol/l	60-110
ESR	75 mm/hr	<10
CXR	right hilar mass with right lower lobe collapse	
MRI spine	lumbar vertebral metastases with evidence of cauda equina compression	

Which of the following is the most appropriate next step?

(Please select 1 option)

<input type="radio"/>	Chemotherapy
<input type="radio"/>	Corticosteroids
<input type="radio"/>	Fine needle aspiration biopsy
<input type="radio"/>	Radiotherapy
<input type="radio"/>	Surgical decompression

Please select 1 option

<input type="radio"/>	Chemotherapy	
<input type="radio"/>	Corticosteroids	This is the correct answer
<input type="radio"/>	Fine needle aspiration biopsy	
<input type="radio"/>	Radiotherapy	
<input checked="" type="radio"/>	Surgical decompression	Incorrect answer selected

Key Learning Points

Oncology

- Corticosteroids, typically 16mg dexamethasone STAT, should be given in all cases of suspected metastatic spinal cord compression whilst the diagnosis is being confirmed and definitive treatment planned.

Explanation

The answer is corticosteroids. The most likely diagnosis here is cauda equina compression, which has presented with significant neurological deficit. Given the history, the most likely case is metastatic cord compression, possibly from a lung carcinoma. Metastatic spinal cord compression is a medical emergency. Corticosteroids should be started immediately, even before the diagnosis is confirmed radiologically, and this is usually with dexamethasone 16mg STAT followed by 8mg BD (either oral or IV is acceptable). This should at least temporarily reduce oedema related to the underlying tumour and thus have a positive impact on neurological deficit, and the response to steroids predicts neurological response to subsequent definitive treatment which should be started within 24 hours. Surgery is the optimal definitive treatment in patients who are fit enough, and have a good enough prognosis, with radiotherapy given to the majority of those unsuitable for surgery. Chemotherapy can be given if the causative malignancy is known to be extremely chemo-sensitive, for example lymphoma or sometimes small cell lung carcinoma.

Fine needle aspiration or core biopsy is usually only needed if the underlying oncological diagnosis is unknown, and there is no other accessible lesion. If the patient is undergoing surgery, it might be possible to send histology at the time of operation but this depends on the approach taken and this should be clarified with the surgical team. If lymphoma is strongly suspected, a biopsy should ideally be attempted prior to starting corticosteroids and therefore you must immediately liaise with the Interventional Radiology team to get this done as a matter of priority.

A patient who is listed for excision of his operable squamous cell lung cancer, suffers a life threatening haemoptysis on the ward.

Which of the following is the most appropriate treatment?

(Please select 1 option)

<input type="radio"/>	Antibiotics
<input type="radio"/>	Bronchial embolisation
<input type="radio"/>	Conservative care
<input type="radio"/>	Radiotherapy
<input type="radio"/>	Tranexamic acid

<input type="radio"/>	Antibiotics	
<input type="radio"/>	Bronchial embolisation	This is the correct answer
<input type="radio"/>	Conservative care	
<input type="radio"/>	Radiotherapy	
<input checked="" type="radio"/>	Tranexamic acid	Incorrect answer selected

Key Learning Points

Oncology, Respiratory Medicine

- Life threatening haemoptysis is a medical emergency often associated with lung malignancy; embolisation of this vessel(s) will immediately stem the bleeding when performed by interventional radiology.

Explanation

Life threatening haemoptysis is a medical emergency that requires prompt action.

Pulmonary angiography will identify the blood supply to the tumour and embolisation of this vessel(s) will immediately stem the bleeding.

The other options are also important in the long term management.

Antibiotics are used to prevent secondary bacterial infection.

A 75-year-old man presents with irritative and obstructive urinary symptoms of six months duration. He has noticed occasional haematuria and associated nocturia five times a night.

PR examination and subsequent prostate biopsy confirms prostate cancer.

What histological grading system is used to grade prostate cancer?

(Please select 1 option)

<input type="radio"/>	Ann Arbor
<input type="radio"/>	Breslow's depth
<input type="radio"/>	Duke's
<input type="radio"/>	Gleason
<input type="radio"/>	TNM staging

Please select 1 option.

<input type="radio"/>	Ann Arbor
<input type="radio"/>	Breslow's depth
<input type="radio"/>	Duke's
<input checked="" type="radio"/>	Gleason This is the correct answer
<input type="radio"/>	TNM staging Incorrect answer selected

Key Learning Points

Oncology

- Prostate cancer is graded by the Gleason grading system.

Explanation

TNM staging is used for the majority of cancers but it is a staging system, not a grading system.

Ann Arbor is used to stage lymphoma.

Duke's staging is historically used for colon cancer but is less used in modern practice.

Breslow's depth is used in melanoma.

Gleason grading takes account of the most prevalent tumour pattern in the pathological system (1-5) and the second most prevalent tumour pattern (1-5).

It is presented as, for example, Gleason 3+4 = 7. This is important as a Gleason 4+3 = 7 obviously has a worse prognosis than a Gleason 3+4 = 7 even though they both have the same total score.

An elderly lady with breast cancer is starting diamorphine elixir for painful bony metastases.

Which of the following is the most appropriate comment to make to her caregiver?

(Please select 1 option)

- | | |
|-----------------------|--|
| <input type="radio"/> | A laxative will need to be used |
| <input type="radio"/> | Dependence on diamorphine is likely and could cause problems |
| <input type="radio"/> | If pain relief is not adequate cocaine may need to be introduced |
| <input type="radio"/> | Sedation is likely to be an ongoing problem with diamorphine |
| <input type="radio"/> | The same dose could be given IM to achieve the same effect |

<input type="radio"/>	A laxative will need to be used	This is the correct answer
<input type="radio"/>	Dependence on diamorphine is likely and could cause problems	
<input type="radio"/>	If pain relief is not adequate cocaine may need to be introduced	
<input type="radio"/>	Sedation is likely to be an ongoing problem with diamorphine	
<input checked="" type="radio"/>	The same dose could be given IM to achieve the same effect	Incorrect answer selected

Key Learning Points

Oncology

- A laxative should always be started in conjunction with narcotics to avoid distressing constipation.

Explanation

A laxative should always be started in conjunction with narcotics to avoid distressing constipation.

Sedation occurring in the first few days typically wears off.

If pain relief is inadequate the dose should be increased; cocaine may produce hallucinations.

Addiction is not an issue in the terminally ill.

IM is three times more effective than the same oral dose.

A 64-year-old man has terminal cancer with hepatic metastases. He is treated with oral morphine (Oramorph) solution for pain relief.

Which is the most important pharmacokinetic factor in determining the appropriate timing between doses?

(Please select 1 option)

- | | |
|-----------------------|-----------------------|
| <input type="radio"/> | Bioavailability |
| <input type="radio"/> | First pass metabolism |
| <input type="radio"/> | Gastric emptying |
| <input type="radio"/> | Plasma half-life |
| <input type="radio"/> | Renal clearance |

Please select 1 option

<input type="radio"/>	Bioavailability
<input checked="" type="radio"/>	First pass metabolism
<input type="radio"/>	Gastric emptying
<input checked="" type="radio"/>	Plasma half-life Correct
<input type="radio"/>	Renal clearance

Key Learning Points

Oncology, Palliative Care, Pharmacology

- Morphine undergoes extensive first pass metabolism in the liver. However, it is the plasma half-life which defines the timing of the doses.

Explanation

Morphine undergoes extensive first pass metabolism in the liver. However, it is the plasma half-life which defines the timing of the doses.

An increased dose may be required if the patient develops tolerance to the morphine dose.

Dr Assem

Which of the following tumour markers are used to assess disease activity in metastatic breast cancer?

(Please select 1 option)

☐ AFP

☐ CA125

☐ CA19-9

☐ CA15-3

☐ PSA

<input type="radio"/>	AFP
<input type="radio"/>	CA125
<input type="radio"/>	CA19-9
<input checked="" type="radio"/>	CA15-3 Correct
<input type="radio"/>	PSA

Key Learning Points

Oncology

- The only marker given here which is used in monitoring metastatic breast cancer is CA15-3

Explanation

While all the markers given above are used to monitor disease activity, only CA15-3 is used routinely to monitor metastatic breast cancer.

- CA125 is monitored in ovarian cancer
- CA19-9 in pancreatic cancer
- AFP in teratoma and liver cancer with
- PSA measured in prostate cancer.

Which one of the following is in keeping with a diagnosis of myeloma induced hypercalcaemia?

(Please select 1 option)

<input type="radio"/>	Acute hepatic failure
<input type="radio"/>	Colitis
<input type="radio"/>	Polyuria and polydipsia
<input type="radio"/>	Prolonged Q-T interval on ECG
<input type="radio"/>	Tetany

Please select 1 option

<input type="radio"/>	Acute hepatic failure	
<input type="radio"/>	Colitis	
<input type="radio"/>	Polyuria and polydipsia	This is the correct answer
<input type="radio"/>	Prolonged Q-T interval on ECG	
<input checked="" type="radio"/>	Tetany	Incorrect answer selected

Key Learning Points

Oncology

- Hypercalcaemia causes acute renal failure, a shortened Q-T interval on ECG as well as polyuria and polydipsia.

Explanation

Hypercalcaemia causes acute renal failure, a shortened Q-T interval on ECG as well as polyuria and polydipsia.

The abdominal symptoms include:

- constipation
- nausea and vomiting
- peptic ulceration (due to increased gastrin secretion)
- abdominal pain, and
- pancreatitis.

Tetany is caused by hypocalcaemia.

A 46-year-old woman presents with a rapidly increasing mass on the left side of her neck over her thyroid gland. She has noticed some problems with dysphagia over the past few months, but no other symptoms of note apart from perhaps a slow increase in her weight and some tiredness.

On examination her BP is 122/72 mmHg. Her pulse is 72 and regular. Her BMI is 31. Respiratory and abdominal examination is unremarkable. Palpation of the left side of her neck reveals thyroid enlargement with associated lymphadenopathy.

Investigations show:

Haemoglobin	115 g/L	(115-165)
White cells	$8.3 \times 10^9/L$	(4-11)
Platelets	$185 \times 10^9/L$	(150-400)
Sodium	138 mmol/L	(135-146)
Potassium	4.4 mmol/L	(3.5-5)
Creatinine	96 $\mu\text{mol/L}$	(79-118)
Thyroid stimulating hormone	7.6 mu/L	(0.5-5.0)
Lactate dehydrogenase	640 U/L	(240-280)
Erythrocyte sedimentation rate	82 mm/hr	(<20)

Which of the following is the most likely diagnosis?

(Please select 1 option)

<input type="radio"/>	Follicular thyroid carcinoma
<input type="radio"/>	Graves' disease
<input type="radio"/>	Hashimoto's disease
<input type="radio"/>	Hodgkin's lymphoma
<input type="radio"/>	Thyroid lymphoma

<input type="radio"/>	Follicular thyroid carcinoma
<input type="radio"/>	Graves' disease
<input type="radio"/>	Hashimoto's disease
<input type="radio"/>	Hodgkin's lymphoma
<input checked="" type="radio"/>	Thyroid lymphoma Correct

Key Learning Points

Oncology

- Thyroid lymphoma is frequently associated with Hashimoto's thyroiditis.

Explanation

This rare lymphoma is frequently associated with Hashimoto's thyroiditis. Hypothyroidism is observed in 30-40% and that suspicion is raised by the gradual weight gain and raised TSH seen here.

Her raised ESR, haemoglobin at the lower end of the normal range, and her raised LDH all raise the possibility of lymphoma. Hoarseness, respiratory difficulty and cough can also occur as presenting symptoms.

Biopsy is the investigation of choice, but the sample obtained from fine needle aspiration (FNA) alone may not be sufficient to come to a conclusion on architecture.

The commonest types of thyroid lymphoma are:

- Large cell
- Follicular, and
- MALT.

A 69-year-old woman presents to the medical admission unit with a two month history of increasing lethargy and confusion. She also complains of headaches, and on the day of admission her husband reports her speech has become slurred.

An urgent CT head is performed, and is reported as showing several cerebral metastases with surrounding oedema. She is started on high dose dexamethasone with some improvement in her symptoms.

Which of the following investigations has the greatest chance of identifying the primary tumour?

(Please select 1 option)



Chest x ray



Cystoscopy



Mammography of the breast



Sigmoidoscopy



Ultrasound of the kidneys

(Please select 1 option)

<input type="radio"/>	Chest x ray This is the correct answer
<input type="radio"/>	Cystoscopy
<input type="radio"/>	Mammography of the breast
<input checked="" type="radio"/>	Sigmoidoscopy Incorrect answer selected
<input type="radio"/>	Ultrasound of the kidneys

Key Learning Points

Oncology

- An understanding of the most common primary tumour sites of cerebral metastases is essential knowledge.

Explanation

Approximately 20% of people who die from cancer have brain metastases. These can be solitary or multiple.

The most common sites that metastasise to the brain are:

- lung (44%)
- breast (10%)
- kidney (7%)
- gastrointestinal tract (6%), and
- melanoma (skin 3%).

Therefore a chest x ray would be the initial investigation of choice, with the greatest chance of finding the primary.

A 38-year-old man presents with a two week history of recurrent haemoptysis which he has noted over the last 18 months. He is unaware of any chest pain and is a smoker of five cigarettes daily.

A chest x ray reveals collapse of the left lower lobe.

What is the most likely diagnosis?

(Please select 1 option)

<input type="radio"/>	Bronchial carcinoid
<input type="radio"/>	Bronchial carcinoma
<input type="radio"/>	Brochiectasis
<input type="radio"/>	Inhaled foreign body
<input type="radio"/>	Pulmonary embolism

Please select 1 option)

<input type="radio"/>	Bronchial carcinoid This is the correct answer
<input type="radio"/>	Bronchial carcinoma
<input type="radio"/>	Brochiectasis
<input checked="" type="radio"/>	Inhaled foreign body Incorrect answer selected
<input type="radio"/>	Pulmonary embolism

Key Learning Points

Oncology, Respiratory Medicine

- Carcinoid tumour usually occur in the major bronchi, 85% can be seen bronchoscopically.

Explanation

The most likely diagnosis is of a carcinoid tumour.

These are slow growing tumours of the lung that occur in younger patients than do bronchial carcinoma, the peak incidence is when patients are in their 40s. They account for between 1-5% of all lung tumours.

They are not linked with smoking. The incidence is equal between men and women.

They usually present with recurrent haemoptysis or infections. Chest pain, breathlessness, wheeze and cough are less common.

They usually occur in the major bronchi, 85% can be seen bronchoscopically.

A carcinoid tumour in the left lower lobe bronchus could cause distal collapse of the left lower lobe.

Dr. Assem

At which point in the cell cycle is the cell most sensitive to radiation-induced apoptosis?

(Please select 1 option)

<input type="radio"/>	G ₀
<input type="radio"/>	G ₁
<input type="radio"/>	G ₂ -M
<input type="radio"/>	S
<input type="radio"/>	S-G ₂

<input type="radio"/>	G ₀	
<input type="radio"/>	G ₁	
<input checked="" type="radio"/>	G ₂ -M	This is the correct answer
<input type="radio"/>	S	
<input checked="" type="radio"/>	S-G ₂	Incorrect answer selected

Key Learning Points

Oncology

- Cells are most sensitive in G₂-M phase.

Explanation

Normal and cancerous cells exhibit different radiosensitivities during different phases of the cell cycle.

They are most sensitive in G₂-M phase when the cell is preparing to and actively dividing due to the fragile nature of the intracellular structure during this event.

Which malignancy is most associated with the Lambert-Eaton myasthenic para-neoplastic syndrome (LEMS)?

(Please select 1 option)

<input type="radio"/>	Adenocarcinoma lung cancer
<input type="radio"/>	Metastatic bowel cancer
<input type="radio"/>	Metastatic melanoma
<input type="radio"/>	Small cell lung cancer
<input type="radio"/>	Squamous cell lung cancer

(Please select 1 option)

<input type="radio"/>	Adenocarcinoma lung cancer	
<input type="radio"/>	Metastatic bowel cancer	
<input type="radio"/>	Metastatic melanoma	
<input checked="" type="radio"/>	Small cell lung cancer	This is the correct answer
<input type="radio"/>	Squamous cell lung cancer	Incorrect answer selected

Key Learning Points

Oncology

- Fifty to 70% of all presentations of LEMS are due to an underlying small cell lung cancer with the vast majority linked to smoking tobacco.

Explanation

Lambert-Eaton myasthenic syndrome is a rare paraneoplastic disorder associated with antibodies directed against voltage-gated calcium channels.

Approximately 60% of patients with LEMS will have an underlying malignancy.

Dr. Assem

A patient is seen in the oncology clinic with chronic myeloid leukaemia (CML).

What reciprocal chromosomal translocation is he likely to have?

(Please select 1 option)

<input type="radio"/>	2 and 9
<input type="radio"/>	8 and 14
<input type="radio"/>	9 and 12
<input type="radio"/>	9 and 22
<input type="radio"/>	12 and 22

Please select 1 option.



2 and 9



8 and 14



9 and 12



9 and 22

Correct



12 and 22

Key Learning Points

Oncology

- CML is associated with a reciprocal translocation of chromosomes 9 and 22.

Explanation

CML is associated with the Philadelphia chromosome, a reciprocal translocation of chromosomes 9 and 22 designated as t(9;22)(q34;q11).

This translocation fuses the bcr and abl genes creating the bcr-abl fusion protein which is constitutively active within the nucleus leading to increased cell proliferation and reduced DNA repair.

Dr Assem

What is the most effective bisphosphonate for use in reducing bone pain and preventing pathological fractures in patients with metastatic breast cancer?

(Please select 1 option)

<input type="radio"/>	Alendronic acid
<input type="radio"/>	Ibandronic acid
<input type="radio"/>	Olapadronate
<input type="radio"/>	Pamidronate
<input type="radio"/>	Zoledronic acid

Please select 1 option)

<input type="radio"/>	Alendronic acid
<input type="radio"/>	Ibandronic acid
<input type="radio"/>	Olpadronate
<input type="radio"/>	Pamidronate
<input checked="" type="radio"/>	Zoledronic acid Correct

Key Learning Points

Oncology

- Zoledronic acid (Zometa) has been proven to be the most effective bisphosphonate for breast cancer metastasis.

Explanation

Multiple randomised control studies have proven the efficacy of Zometa in treatment of bone metastasis from breast cancer.

It is commonly given for six months and if the patient responds then they can be switched to daily ibandronic acid to prevent repeat visits to hospital.

Zometa has a risk of osteonecrosis of the jaw which must be explained to patients before they are treated.

Dr. Assem

A 62-year-old female with colonic carcinoma is treated with chemotherapy and is receiving ondansetron for intractable nausea and vomiting.

Which of the following best describes the pharmacological actions of ondansetron?

(Please select 1 option)

- | | |
|-----------------------|------------------------------|
| <input type="radio"/> | Anticholinergic |
| <input type="radio"/> | Cannabinoid |
| <input type="radio"/> | Dopaminergic antagonists |
| <input type="radio"/> | H1 antihistamine |
| <input type="radio"/> | 5-HT ₃ antagonist |

(Please select 1 option)

<input type="radio"/>	Anticholinergic
<input type="radio"/>	Cannabinoid
<input type="radio"/>	Dopaminergic antagonists
<input type="radio"/>	H1 antihistamine
<input checked="" type="radio"/>	5-HT3 antagonist Correct

Key Learning Points

Oncology, Pharmacology, Therapeutics

- Ondansetron is a selective 5-HT3 antagonist both centrally and peripherally and as such is a potent antiemetic.

Explanation

Ondansetron is a selective 5-HT3 antagonist both centrally and peripherally and as such is a potent antiemetic.

Dr Assem

A 67-year-old man presents with a five week history of pain and swelling affecting left knee, both ankles and his right wrist.

He has had three episodes of right basal pneumonia in the last year and has lost 6 kg in weight.

His investigations are as follows:

WCC	12.1 $\times 10^9$ /L	(4-11)
Hb	98 g/L	(13.0-18.0)
MCV	79 fL	(80-96)
Platelets	543 $\times 10^9$ /L	(150-400)
ESR	43 mm/1st hour	(0-20)
CRP	21 mg/L	(<10)
CPK	110U	
RF	1/80	
ANA	Negative	
ENA	Negative	
Radiographs of hands and feet	Normal	

What is the most likely diagnosis?

(Please select 1 option)

<input type="radio"/>	Mixed connective tissue disease
<input type="radio"/>	Paraneoplastic syndrome
<input type="radio"/>	Polyarteritis nodosa
<input type="radio"/>	Polymyalgia rheumatica
<input type="radio"/>	Rheumatoid arthritis

<input type="radio"/>	Mixed connective tissue disease	
<input type="radio"/>	Paraneoplastic syndrome	This is the correct answer
<input type="radio"/>	Polyarteritis nodosa	
<input type="radio"/>	Polymyalgia rheumatica	
<input checked="" type="radio"/>	Rheumatoid arthritis	Incorrect answer selected

Key Learning Points

Oncology

- Paraneoplastic syndrome can present with an asymmetrical arthralgia which more commonly affects the lower limbs.

Explanation

The suggestion here is lung malignancy with an associated paraneoplastic syndrome.

Paraneoplastic syndrome can present with an asymmetrical arthralgia which more commonly affects the lower limbs.

False positive rheumatoid factors can occur but should be of low titre.

The age of onset is usually lower than that for rheumatoid arthritis or polymyalgia rheumatica.

Upregulation of which of the following proteins is associated with multi-drug chemotherapy resistance?

(Please select 1 option)

- | | |
|-----------------------|-----------------|
| <input type="radio"/> | BCL-2 |
| <input type="radio"/> | CYP2D6 |
| <input type="radio"/> | Cytochrome P450 |
| <input type="radio"/> | p53 |
| <input type="radio"/> | P-glycoprotein |

<input type="radio"/>	BCL-2
<input type="radio"/>	CYP2D6
<input type="radio"/>	Cytochrome P450
<input type="radio"/>	p53
<input checked="" type="radio"/>	P-glycoprotein Correct

Key Learning Points

Oncology

- P-glycoprotein is involved in the efflux of drugs from cells.

Explanation

P-glycoprotein, which is also known as multidrug resistance protein 1, is a member of the adenosine triphosphate (ATP)-binding cassette transporters which actively remove harmful substances from the cytoplasm.

If upregulated these proteins can pump chemotherapeutic agents out of tumour cells leading to drug resistance.

A 40-year-old male, with disseminated malignancy and unknown primary, presents with oedema of the arms and face, with dilated neck veins.

You suspect superior vena cava obstruction (SVCO).

Which of the following statements is correct?

(Please select 1 option)

<input type="radio"/>	IV dexamethasone is of no benefit
<input type="radio"/>	Loss of pulsation in the venous system of the neck is of no clinical use in the diagnosis of SVCO
<input type="radio"/>	Mediastinal radiotherapy relieves symptoms in 80% of patients
<input type="radio"/>	Palliative treatment alone is indicated
<input type="radio"/>	Small cell lung cancer is unlikely to be the cause

Please select 1 option

<input type="radio"/>	IV dexamethasone is of no benefit	
<input type="radio"/>	Loss of pulsation in the venous system of the neck is of no clinical use in the diagnosis of SVCO	
<input type="radio"/>	Mediastinal radiotherapy relieves symptoms in 80% of patients	This is the correct answer
<input checked="" type="radio"/>	Palliative treatment alone is indicated	Incorrect answer selected
<input type="radio"/>	Small cell lung cancer is unlikely to be the cause	

Key Learning Points

Oncology, Respiratory Medicine

- Mediastinal radiotherapy leads to symptomatic relief in 80% of patients with superior vena cava obstruction (SVCO), although case studies have shown this does not always correlate to patency of the superior vena cava.

Explanation

This is an oncological emergency.

Mediastinal radiotherapy leads to symptomatic relief in 80% of patients, although case studies have shown this does not always correlate to patency of the superior vena cava.

If possible, an attempt should be made to obtain a tissue diagnosis, as some tumours respond to radiotherapy whereas others are more sensitive to chemotherapy. Tumours which are very chemosensitive, such as germ cell and lymphoma, can cause superior vena cava obstruction.

Therefore the active pursuit of a diagnosis with active treatment of the SVCO is indicated and not merely palliative measures, especially in a patient this young.

Non-small cell cancer and small cell malignancy may both cause SVCO.

Intravenous dexamethasone at high dose is of benefit in severe cases of SVCO.

It is important to note that in 2004 NICE recommended considering stenting in the majority of cases of SVCO. This is a minimally invasive procedure which relieves symptoms quicker than chemotherapy or radiotherapy.

Dr. Assem

A 49-year-old woman is receiving therapy for non-hodgkin's lymphoma. She has had regression of her lymph nodes and is also improving in her performance status. But during a follow-up visit, she complained of numbness of her feet. She said that the numbness started from the sole and has progressed up to the knees within two months. There is also mild swelling of the feet.

On examination, there was decreased sensation to all modalities in both lower limbs up to mid-calf.

What is the most likely cause for this complaint?

(Please select 1 option)

<input type="radio"/>	Cisplatin
<input type="radio"/>	Critical illness polyneuropathy
<input type="radio"/>	Cyclophosphamide
<input type="radio"/>	Lymphomatous infiltration of nerves
<input type="radio"/>	Vincristine

<input type="radio"/>	Cisplatin
<input type="radio"/>	Critical illness polyneuropathy
<input type="radio"/>	Cyclophosphamide
<input type="radio"/>	Lymphomatous infiltration of nerves
<input checked="" type="radio"/>	Vincristine Correct

Key Learning Points

Oncology

- Chemotherapeutic agents like vincristine, cisplatin, taxanes and bortezomib may cause peripheral neuropathy.

Explanation

Therapy for non-Hodgkin's lymphoma (NHL) usually consists of R-CHOP: rituximab, cyclophosphamide, doxorubicin, vincristine and prednisolone. Of these, vincristine is notorious for causing peripheral neuropathy. It is predominantly a sensory neuropathy, although motor components may also be found. It starts distally and progresses proximally. It is very difficult to treat this neuropathy unless alternative drugs can be used.

Cisplatin is also another chemotherapeutic agent which causes peripheral neuropathy. But it is not used in NHL. It is mainly used in solid tumours.

Critical illness polyneuropathy occurs in patients admitted to the ICU with multi-organ failure. So, this is not the clinical setting for critical illness polyneuropathy.

Cyclophosphamide is not known to cause peripheral neuropathy. It causes infertility and cystitis.

In NHL, lymphomatous infiltration of the nerves may occur and it may lead to neuropathy. This is very rare and it can improve after therapy. So, in this clinical setting, vincristine is more likely an answer than lymphomatous neuropathy.

A 29-year-old man is starting a chemotherapy regime that includes cisplatin.

Which of the following is the mechanism of action of cisplatin?

(Please select 1 option)

- | | |
|-----------------------|---|
| <input type="radio"/> | Causes crosslinking in DNA |
| <input type="radio"/> | Degrades preformed DNA |
| <input type="radio"/> | Inhibits purine synthesis |
| <input type="radio"/> | Reduces the formation of microtubules |
| <input type="radio"/> | Stabilises DNA-topoisomerase II complex |



Causes crosslinking in DNA

This is the correct answer



Degrades preformed DNA



Inhibits purine synthesis



Reduces the formation of microtubules



Stabilises DNA-topoisomerase II complex

Incorrect answer selected

Key Learning Points

Oncology, Pharmacology, Therapeutics

- By crosslinking DNA in various ways, Cisplatin makes it impossible for rapidly dividing cells to duplicate their DNA for mitosis.

Explanation

By crosslinking DNA in various ways, Cisplatin makes it impossible for rapidly dividing cells to duplicate their DNA for mitosis.

A 35-year-old woman presents to the emergency medical unit with an acutely swollen, tense left calf. A subsequent ultrasound scan reveals a deep vein thrombosis (DVT).

She has been treated for the past two years with an endocrine agent to prevent recurrence of a breast cancer.

With which endocrine agent is she likely to have been treated?

(Please select 1 option)

<input type="radio"/>	Anastrozole
<input type="radio"/>	Exemestane
<input type="radio"/>	Fulvestrant
<input type="radio"/>	Letrozole
<input type="radio"/>	Tamoxifen

<input type="radio"/>	Anastrozole
<input type="radio"/>	Exemestane
<input type="radio"/>	Fulvestrant
<input type="radio"/>	Letrozole
<input checked="" type="radio"/>	Tamoxifen Correct

Key Learning Points

Oncology

- Of all the endocrine agents used to treat primary breast cancer only tamoxifen significantly increases the risk of DVT.

Explanation

Of all the endocrine agents used to treat primary breast cancer only tamoxifen significantly increases the risk of DVT.

Patients must be consented for the increased risk of DVT when taking tamoxifen.

Although this is only a small increase in risk per person, due to the large numbers of patients treated with this agent it will be linked to a significant number of DVT cases seen.

In asbestos related disorders which of the following statements is correct?

(Please select 1 option)

- | | |
|-----------------------|--|
| <input type="radio"/> | Basal fibrotic shadowing on CXR suggests coincidental idiopathic pulmonary fibrosis |
| <input type="radio"/> | Increased incidence of primary lung cancer |
| <input type="radio"/> | Pleural effusion develops more than 20 years after causative asbestos exposure |
| <input type="radio"/> | Pleural plaques are recognised precursors of mesothelioma |
| <input type="radio"/> | The risk of malignant mesothelioma not associated with asbestos exposure is greatly increased in smokers compared with non-smokers |

Please select 1 option

<input type="radio"/>	Basal fibrotic shadowing on CXR suggests coincidental idiopathic pulmonary fibrosis	
<input type="radio"/>	Increased incidence of primary lung cancer	This is the correct answer
<input type="radio"/>	Pleural effusion develops more than 20 years after causative asbestos exposure	
<input type="radio"/>	Pleural plaques are recognised precursors of mesothelioma	
<input checked="" type="radio"/>	The risk of malignant mesothelioma not associated with asbestos exposure is greatly increased in smokers compared with non-smokers	Incorrect answer selected

Key Learning Points

Oncology, Respiratory Medicine

- The risk of mesothelioma is not affected by smoking but smoking and asbestos exposure greatly increase the risk of lung cancer.

Explanation

The risk of mesothelioma is not affected by smoking but smoking and asbestos exposure greatly increase the risk of lung cancer.

It is pleural plaques which do not become apparent until 20 years or more after exposure.

Pleural effusions may result from acute asbestos pleurisy.

Pleural plaques are not precursors of malignant change, but they reflect previous asbestos exposure.

Basal fibrotic changes suggest the presence of asbestosis as the fibres are fibrogenic.

Dr Assem

A 70-year-old man presents with weight loss and dyspnoea and is diagnosed with small cell lung cancer.

Which one of the following is an adverse prognostic feature?

(Please select 1 option)

<input type="radio"/>	Cavitation on x ray
<input type="radio"/>	Finger clubbing
<input type="radio"/>	Hypernatraemia
<input type="radio"/>	Hypertrophic pulmonary osteoarthropathy
<input type="radio"/>	Increased alkaline phosphatase

- | | |
|----------------------------------|---|
| <input type="radio"/> | Cavitation on x ray |
| <input type="radio"/> | Finger clubbing |
| <input type="radio"/> | Hypernatraemia |
| <input type="radio"/> | Hypertrophic pulmonary osteoarthropathy |
| <input checked="" type="radio"/> | Increased alkaline phosphatase Correct |

Key Learning Points

Oncology, Respiratory Medicine

- Increased alkaline phosphatase is an adverse prognostic feature in cases of small cell lung cancer.

Explanation

The following are adverse prognostic factors in small cell lung cancer:

- Serum sodium < 132 mmol/l
- Weight loss $> 10\%$
- WHO performance status > 2
- Alkaline phosphatase > 1.5 times upper limit of normal
- Lactate dehydrogenase (LDH) > 1.5 times upper limit of normal
- Extensive disease (disease occurring outside one hemithorax and ipsilateral supraclavicular fossa nodes).

By what mechanism does topoisomerase catalyse DNA replication?

(Please select 1 option)

- | | |
|-----------------------|----------------------------|
| <input type="radio"/> | Acts as a promoter |
| <input type="radio"/> | DNA synthesis |
| <input type="radio"/> | Helix torsion release |
| <input type="radio"/> | Homologous repair |
| <input type="radio"/> | Non-homologous end joining |

<input type="radio"/>	Acts as a promoter	
<input type="radio"/>	DNA synthesis	
<input type="radio"/>	Helix torsion release	This is the correct answer
<input type="radio"/>	Homologous repair	
<input checked="" type="radio"/>	Non-homologous end joining	Incorrect answer selected

Key Learning Points

Oncology

- Topoisomerase releases torsion in the DNA helix during replication.

Explanation

Topoisomerase releases torsion in the DNA helix during replication.

It accomplishes this by cutting the DNA helix at specific points to allow it to unravel and then ligates the ends together again. This allows large proteins such as DNA polymerase to replicate DNA along the sequence.

Topoisomerase is therefore an important target for chemotherapeutic agents such as topotecan which can arrest cells in S-phase and induce apoptosis.

In which of the following cases of lung cancer would surgical resection of the tumour be a reasonable therapeutic option?

(Please select 1 option)

- ☐ A 56-year-old woman with an adenocarcinoma of the right lung. CT scan shows enlarged lymph nodes in the right and left hilum. PFTs show an FEV1 of 2.25 L. (55% predicted).
- ☐ A 59-year-old man who is found at bronchoscopy to have a tumour in the right mainstem bronchus extending to within 1 cm of the carina. Pulmonary function tests (PFTs) show an FEV1 of 2.1 litres (65% of predicted normal).
- ☐ A 62-year-old lady with a small peripheral mass who has elevated liver enzymes and a computed tomography (CT) scan showing probable metastatic deposits in the liver. Lung function tests show an FEV1 of 3.5 litres (80% of predicted normal).
- ☐ A 70-year-old man with a right lower lobe tumour 2 cm in diameter with no evidence of regional adenopathy or distant spread of disease. Lung function studies show an FEV1 of 0.8 litres (28% predicted).
- ☐ A 71-year-old man with a 3 cm tumour obstructing the right lower lobe bronchus. Lung function tests show an FEV1 of 2.1 L. (60% predicted).

(Please select 1 option)

<input type="radio"/>	A 56-year-old woman with an adenocarcinoma of the right lung. CT scan shows enlarged lymph nodes in the right and left hilum. PFTs show an FEV1 of 2.25 L (55% predicted).
<input type="radio"/>	A 59-year-old man who is found at bronchoscopy to have a tumour in the right mainstem bronchus extending to within 1 cm of the carina. Pulmonary function tests (PFTs) show an FEV1 of 2.1 litres (65% of predicted normal).
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<input type="radio"/>	A 70-year-old man with a right lower lobe tumour 2 cm in diameter with no evidence of regional adenopathy or distant spread of disease. Lung function studies show an FEV1 of 0.8 litres (28% predicted).
<input checked="" type="radio"/>	A 71-year-old man with a 3 cm tumour obstructing the right lower lobe bronchus. Lung function tests show an FEV1 of 2.1 L (60% predicted). Correct

Key Learning Points

Oncology, Respiratory Medicine

- Surgical resection of a lung tumour may be expected to have increased success with limitation of disease spread.

Explanation

Surgical resection of a lung tumour may be expected to have increased success with limitation of disease spread.

In the first case with hilar LAP and reduced lung function surgery would be futile.

In the second case the tumour is too close to the bifurcation of the bronchi to permit resection.

The third case has metastatic disease and would clearly be unsuitable for surgery. Generally a positron emission tomography (PET) scan would confirm this.

The fourth case has a tumour that would be potentially resectable but lung function is too poor.

The final case has a tumour that would be suitable for resection and has good lung function.

Which of the following genes encoding oncoproteins is associated with follicular lymphoma?

(Please select 1 option)

☐ ATM

☐ Bcl-2

☐ BRCA-1

☐ BRCA-2

☐ p53

<input type="radio"/>	ATM	
<input type="radio"/>	Bcl-2	This is the correct answer
<input type="radio"/>	BRCA-1	
<input type="radio"/>	BRCA-2	
<input checked="" type="radio"/>	p53	Incorrect answer selected

Key Learning Points

Oncology

- Bcl-2 is associated with follicular lymphoma.

Explanation

BRCA-1 and 2 are associated with early breast cancer and are involved in repair of double strand DNA breaks by homologous recombination.

ATM is inherited in a recessive fashion and is also involved in repair of DNA double strand breaks.

p53 is also referred to as the 'guardian of the genome' and is mutated in at least 50% of all breast cancers.

A 73-year-old male smoker presents with haemoptysis of three weeks duration.

Examination reveals left supraclavicular lymphadenopathy. A chest radiograph reveals a left sided hilar mass.

Which of the following would be an appropriate next step in the investigation of this patient?

(Please select 1 option)

- | | |
|-----------------------|-----------------------------|
| <input type="radio"/> | Bronchoscopy |
| <input type="radio"/> | CT thorax and upper abdomen |
| <input type="radio"/> | Lymph node biopsy |
| <input type="radio"/> | PET scanning |
| <input type="radio"/> | Sputum cytology |

<input type="radio"/>	Bronchoscopy	
<input checked="" type="radio"/>	CT thorax and upper abdomen	This is the correct answer
<input type="radio"/>	Lymph node biopsy	
<input type="radio"/>	PET scanning	
<input checked="" type="radio"/>	Sputum cytology	Incorrect answer selected

Key Learning Points

Oncology, Respiratory Medicine

- In cases of suspected lung carcinoma following chest radiograph, contrast-enhanced CT chest (including the liver and adrenals) should be carried out. If the CT demonstrates a peripheral lung lesion, CT or ultrasound-guided transthoracic needle biopsy should be offered.

Explanation

This patient is likely to have lung carcinoma, which is the case for 39,000 people each year in the UK. Unfortunately only 5.5% of these are currently cured, and emphasis is currently on recognising the disease in its early stages to allow for treatment when it can still be controlled.

NICE guidelines recommend urgent chest radiograph in patients with haemoptysis or unexplained, persistent (>3 weeks) cough, chest or shoulder pain, dyspnoea, weight loss, chest signs, hoarseness, finger clubbing, cervical or supraclavicular lymphadenopathy. If this suggests lung carcinoma, as in this case, patients should be referred urgently to the lung cancer multidisciplinary team (MDT).

Patients should then be offered a contrast-enhanced CT chest (including the liver and adrenals). This should be performed before bronchoscopy or any other biopsy procedure. If the CT demonstrates a peripheral lung lesion, CT or ultrasound-guided transthoracic needle biopsy should be offered.

Endobronchial ultrasound guided biopsy is recommended for paratracheal and peri-bronchial intra-parenchymal lung lesions.

Enlarged mediastinal lymph nodes (>10 mm maximum short axis on CT) or other lesions should be biopsied in preference to the primary lesion if determination of stage affects treatment.

Other techniques (such as ultrasound) should be considered if there is suspicion of mediastinal or chest wall invasion in patients otherwise thought to be surgical candidates. Patients potentially suitable for treatment with curative intent should be offered PET-CT prior to this.

MRI is not routinely used, but can give helpful information in superior sulcus tumours.

Sputum cytology is rarely indicated and should be reserved for the investigation of patients who have centrally placed masses and are unable to tolerate, or unwilling to undergo, bronchoscopy or other invasive tests.

An x ray should be performed in the first instance for patients with localised signs suggestive of bone metastases. If the results are negative or inconclusive, a bone scan or MRI should be offered. Bone scintigraphy should be avoided if PET-CT has not shown bone metastases.

In which of the following do mutations of the p53 gene frequently occur?

(Please select 1 option)

- | | |
|-----------------------|--------------------------|
| <input type="radio"/> | Bronchial carcinoma |
| <input type="radio"/> | Colonic polyps |
| <input type="radio"/> | Cystic fibrosis |
| <input type="radio"/> | Huntington's disease |
| <input type="radio"/> | Type 2 diabetes mellitus |

Please select 1 option

☐ Bronchial carcinoma **This is the correct answer**

☐ Colonic polyps

☐ Cystic fibrosis

☐ Huntington's disease

☒ Type 2 diabetes mellitus **Incorrect answer selected**

Key Learning Points

Oncology

- p53 is a tumour suppressor gene and inactivating mutations of this gene occur in a large proportion of human cancers.

Explanation

p53 is a tumour suppressor gene and inactivating mutations of this gene occur in a large proportion of human cancers.

Dr Assem

A 65-year-old female is receiving treatment for colon cancer with a combination chemotherapy regime that includes irinotecan.

Which of the following best describes the action of irinotecan?

(Please select 1 option)

<input type="radio"/>	Alkylating agent
<input type="radio"/>	DNA antimetabolites
<input type="radio"/>	Inhibition of protein synthesis
<input type="radio"/>	RNA/DNA antimetabolites
<input type="radio"/>	Topoisomerase inhibitor

Dr Assem

<input type="radio"/>	Alkylating agent
<input type="radio"/>	DNA antimetabolites
<input type="radio"/>	Inhibition of protein synthesis
<input type="radio"/>	RNA/DNA antimetabolites
<input checked="" type="radio"/>	Topoisomerase inhibitor Correct

Key Learning Points

Oncology

- Irinotecan is a chemotherapy agent that is a topoisomerase 1 inhibitor. Chemically, it is a semisynthetic analogue of the natural alkaloid Camptothecin.

Explanation

Irinotecan is a chemotherapy agent that is a topoisomerase 1 inhibitor. Chemically, it is a semisynthetic analogue of the natural alkaloid Camptothecin.

Its main use is in colon cancer, particularly in combination with other chemotherapy agents. This includes the regimen FOLFIRI which consists of infusional 5-fluorouracil, leucovorin, and irinotecan.

What is the five year survival rate of stage 4 breast cancer?

(Please select 1 option)

<input type="radio"/>	10%
<input type="radio"/>	15%
<input type="radio"/>	20%
<input type="radio"/>	25%
<input type="radio"/>	30%

Please select 1 option



10%



15%



20%



25%

This is the correct answer



30%

Incorrect answer selected

Key Learning Points

Oncology

- Stage 4 breast cancer is defined as a any breast cancer of any size which has spread outside the body.

Explanation

Stage 4 breast cancer is defined as a any breast cancer of any size which has spread outside the body.

It's 5 year net survival rate is 26%

The different stages of cancers and their survival rates can be found in the resource below

Dr Assem

At which point in the cell cycle is the cell most resistant to radiation-induced apoptosis?

(Please select 1 option)

☐ Throughout G₁

☐ Late G₁

☐ G₂-M

☐ Late S

☐ S



Throughout G₁



Late G₁



G₂-M



Late S

This is the correct answer



S

Incorrect answer selected

Key Learning Points

Oncology

- Cells are most resistant to radiation-induced apoptosis in G₀, early G₁ and the late S phase of the cell cycle. Resistance in S phase is thought to be due to elevated levels of glutathione, as well as rapid DNA synthesis and repair enzymes.

Explanation

Normal and cancerous cells exhibit different radiosensitivities during different phases of the cell cycle.

They are most sensitive in G₂-M phase when the cell is preparing to and actively dividing due to the fragile nature of the intracellular structure during this event.

Cells are most resistant in G₀, early G₁ and the late S phase of the cell cycle. Resistance in S phase is thought to be due to elevated levels of glutathione, as well as rapid DNA synthesis and repair enzymes.

A 59-year-old lifelong smoker presents to her GP complaining of increasing shortness of breath and ptosis and constriction of her pupil.

She is referred by her GP for a chest x ray that is reported as showing an apical mass.

What is the name given to the origin of this lady's condition?

(Please select 1 option)

<input type="radio"/>	Horner's syndrome
<input type="radio"/>	Pancoast tumour
<input type="radio"/>	Peyronie's disease
<input type="radio"/>	Pott's cancer
<input type="radio"/>	Wilms' tumour

<input type="radio"/>	Horner's syndrome
<input type="radio"/>	Pancoast tumour This is the correct answer
<input type="radio"/>	Peyronie's disease
<input checked="" type="radio"/>	Pott's cancer Incorrect answer selected
<input type="radio"/>	Wilms' tumour

Key Learning Points

Oncology, Respiratory Medicine

- Remember that ptosis and constriction of the pupil can arise as a consequence of a pulmonary lesion.

Explanation

This lady almost certainly has a Pancoast tumour: a neoplasm of the apex of the lung that typically invades the chest wall and brachial plexus and is causing a Horner's syndrome.

The ptosis and constriction of her pupil is suggestive of a Horner's syndrome but this is a consequence of her Pancoast tumour.

Peyronie's disease is hardening of the corpora cavernosa of the penis caused by scar tissue.

Pott's cancer is a scrotal cancer caused by coal tar exposure.

A Wilms' tumour is a malignant tumour of the kidney that usually occurs in childhood.

A firm 2-3 cm mass is palpable in the upper outer quadrant of the right breast of a 52-year-old woman. There are no palpable axillary lymph nodes.

A wide local excision with axillary node dissection is performed and the breast lesion is found to have positive immunohistochemical staining for HER2/neu (c-erb B2). Staining for oestrogen and progesterone receptors is negative.

Which of the following additional treatment options is most appropriate, based upon these findings?

(Please select 1 option)

<input type="radio"/>	Radical mastectomy
<input type="radio"/>	St John's wort
<input type="radio"/>	Tamoxifen
<input type="radio"/>	Trastuzumab
<input type="radio"/>	Vancomycin

- | | | |
|----------------------------------|--------------------|----------------------------|
| <input type="radio"/> | Radical mastectomy | |
| <input type="radio"/> | St John's wort | |
| <input type="radio"/> | Tamoxifen | |
| <input type="radio"/> | Trastuzumab | This is the correct answer |
| <input checked="" type="radio"/> | Vancomycin | Incorrect answer selected |

Key Learning Points

Oncology, Pharmacology, Therapeutics

- Trastuzumab (Herceptin) may be used to treat HER-2 positive breast cancers

Explanation

This is an infiltrating ductal carcinoma.

The lack of oestrogen receptor staining suggests a poor response to hormonal therapy with tamoxifen.

The positive C-erb B2 (HER2/neu) staining suggests that trastuzumab (Herceptin) may be effective.

A patient with Hodgkin's lymphoma undergoes mantle field radiotherapy.

Several months later the patient complains that when they flex or extend their neck they feel an electric shock phenomenon down their back and into their limbs.

What is the patient describing?

(Please select 1 option)

<input type="radio"/>	Cervical arthritis
<input type="radio"/>	Cervical spine stenosis
<input type="radio"/>	Lhermitte's sign
<input type="radio"/>	Malignant spinal cord compression
<input type="radio"/>	Uhthoff's phenomenon

(Please select 1 option)

<input type="radio"/>	Cervical arthritis	
<input type="radio"/>	Cervical spine stenosis	
<input checked="" type="radio"/>	Lhermitte's sign	This is the correct answer
<input type="radio"/>	Malignant spinal cord compression	
<input type="radio"/>	Uhthoff's phenomenon	Incorrect answer selected

Key Learning Points

Oncology

- This patient has classical Lhermitte's sign.

Explanation

Lhermitte's sign is classically associated with multiple sclerosis and suggests a lesion of the dorsal columns of the cervical cord or of the caudal medulla.

Radiation myelopathy is a potential cause of this but it can also be present in many other conditions, for example vitamin B₁₂ deficiency.

If following radiotherapy it usually resolves in two to three months.

A 65-year-old lady presents with weight loss, lethargy and lower limb weakness. She is now unable to mobilise without assistance and complains of some urinary incontinence.

On examination she is cachectic and there is a fungating mass in her left breast. She is able to move her hips but has quadriceps wasting and fasciculation bilaterally. Knee jerks are normal but ankle reflexes are increased. She has power 3/5 for dorsiflexion and extension of the knee and ankles with evidence of clonus and positive Babinski sign. She has reduced anal tone and saddle paraesthesia.

What is the diagnosis?

(Please select 1 option)

- | | |
|-----------------------|--|
| <input type="radio"/> | Amyotrophic lateral sclerosis |
| <input type="radio"/> | Brown-Sequard syndrome |
| <input type="radio"/> | Cauda equina syndrome |
| <input type="radio"/> | Conus medullaris syndrome |
| <input type="radio"/> | Subacute combined degeneration of the cord |

<input type="radio"/>	Amyotrophic lateral sclerosis	
<input type="radio"/>	Brown-Sequard syndrome	
<input type="radio"/>	Cauda equina syndrome	
<input type="radio"/>	Conus medullaris syndrome	This is the correct answer
<input checked="" type="radio"/>	Subacute combined degeneration of the cord	Incorrect answer selected

Key Learning Points

Oncology

- Conus medullaris syndrome is caused by compression of the T12-L2 cord and nerve roots, and therefore results in a mix of upper and lower motor neuron signs.

Explanation

This lady has breast cancer which is disseminated and gone to her spine to cause compression.

There is compression of the conus medullaris to give her a mixture of upper and lower motor signs (LMN). Because of the anatomy of the spinal cord if there is compression at the level of the conus medullaris some of the cord is compressed to cause upper motor (UMN) signs and some of the nerves are compressed to give lower motor signs.

Cauda equina would give just LMN signs, and so she would not have positive Babinski sign and clonus.

Amyotrophic lateral sclerosis is the commonest form of motor neurone disease. There would be a mixture of UMN and LMN signs; however they do not have any sensory signs or incontinence.

Brown-Sequard syndrome is due to hemisection of the cord and so the patient will have UMN signs in one leg and loss of pain and temperature sensation in the contralateral leg.

Subacute combined degeneration of the cord is due to degeneration of the posterior and lateral spinal columns. It can cause bilateral spastic paresis with loss of vibration sensation, tingling and positive Babinski's sign. It is due to B vitamin deficiency or Friedrich's ataxia.

A 68-year-old male is admitted with a two month history of difficulty raising his arms, ascending stairs, and is also aware of a dry mouth. He smokes 15 cigarettes daily and admits to heavy alcohol consumption.

On examination he has proximal weakness affecting all four limbs with absent tendon reflexes. His chest x ray shows a right pleural effusion.

What is the most likely diagnosis?

(Please select 1 option)

<input type="radio"/>	Alcohol induced myopathy
<input type="radio"/>	Eaton-Lambert syndrome
<input type="radio"/>	Myasthenia gravis
<input type="radio"/>	Polymyalgia rheumatica
<input type="radio"/>	Polymyositis

<input type="radio"/>	Alcohol induced myopathy	
<input type="radio"/>	Eaton-Lambert syndrome	This is the correct answer
<input type="radio"/>	Myasthenia gravis	
<input checked="" type="radio"/>	Polymyalgia rheumatica	Incorrect answer selected
<input type="radio"/>	Polymyositis	

Key Learning Points

Oncology, Respiratory Medicine

- Eaton-Lambert syndrome is characterised by proximal muscle weakness, depressed or absent tendon reflexes, and autonomic features.

Explanation

Eaton-Lambert syndrome is characterised by

- Proximal muscle weakness (the cranial nerves and respiratory muscles are usually spared)
- Depressed or absent tendon reflexes and
- Autonomic features (for example, dry mouth, impotence, etc).

Seventy percent of cases are due to small cell lung cancer.

Unlike myasthenia gravis exercise is associated with increasing muscle strength and there is a negative response to Tensilon. Electromyography is useful in confirming the diagnosis where repeated nerve stimulations cause a progressive increase in the size of the muscle action potential.

There is no obvious indication to suspect Polymyositis from the clinical history.

PMR would not present with autonomic symptoms such as a dry mouth.

Alcohol induced myopathy typically presents with proximal muscle weakness as well as fasciculations and pain.

Eaton (1905-1958) U.S. neurologist at Mayo Clinic. Lambert (1915-2003) U.S neuro-physiologist at Mayo Clinic and Prof. of physiology at University of Minnesota.

A 65-year-old man has locally advanced pancreatic cancer and has been paying privately for treatment with erlotinib (Tarceva) for the past nine months. It has worked effectively for that period but a recent CT scan showed further growth in the tumour.

Which of the following mechanisms best explains this resistance to treatment with erlotinib?

(Please select 1 option)

<input type="radio"/>	Development of antibodies to erlotinib
<input type="radio"/>	Lack of autophosphorylation at binding site
<input type="radio"/>	Malabsorption
<input type="radio"/>	Mutation in the ATP binding pocket of the EGFR kinase domain
<input type="radio"/>	Reduced expression of EGFR

Dr. Assem

(Please select 1 option)

<input type="radio"/>	Development of antibodies to erlotinib	
<input type="radio"/>	Lack of autophosphorylation at binding site.	
<input type="radio"/>	Malabsorption	
<input checked="" type="radio"/>	Mutation in the ATP binding pocket of the EGFR kinase domain	This is the correct answer
<input type="radio"/>	Reduced expression of EGFR	Incorrect answer selected

Key Learning Points

New Therapies, Oncology, Pharmacology, Therapeutics

- Erlotinib specifically targets the epidermal growth factor receptor (EGFR) tyrosine kinase (which is required for the conformational change) and binds in a reversible fashion to the adenosine triphosphate binding site.

Explanation

Erlotinib specifically targets the epidermal growth factor receptor (EGFR) tyrosine kinase (which is required for the conformational change) and binds in a reversible fashion to the adenosine triphosphate binding site.

For the signal to be transmitted, two members of the EGFR family need to come together to form a homodimer. These then use the molecule of adenosine triphosphate (ATP) to autophosphorylate each other, which causes a conformational change in their intracellular structure, exposing a further binding site for binding proteins that cause a signal cascade to the nucleus. By inhibiting the ATP, autophosphorylation is not possible and the signal is stopped.

A key issue with EGFR-directed treatments is that after a period of 8-12 months, the cancer cells become resistant to the treatment. This most commonly occurs due to a mutation in the ATP binding pocket of the EGFR kinase domain. This prevents the binding of erlotinib (Tarceva).

Some IGR-1R inhibitors are in various stages of development (based either around tyrphostins such as AG1024 or AG538 or pyrrolo[2,3-d]-pyrimidine derivatives such as NVP-AEW541).

A 35-year-old woman presents to the oncology clinic with post-coital bleeding. A cervical biopsy confirmed a squamous cell carcinoma of the cervix.

With which of the following strain variations of human papillomavirus (HPV) is she likely to be infected?

(Please select 1 option)

<input type="radio"/>	1 and 2
<input type="radio"/>	2 and 8
<input type="radio"/>	8 and 16
<input type="radio"/>	16 and 18
<input type="radio"/>	18 and 22

<input type="radio"/>	1 and 2	
<input type="radio"/>	2 and 8	
<input type="radio"/>	8 and 16	
<input checked="" type="radio"/>	16 and 18	This is the correct answer
<input type="radio"/>	18 and 22	Incorrect answer selected

Key Learning Points

Oncology

- Cervical cancer is associated with strain types 16 and 18.

Explanation

Cervical cancer is the most common cancer worldwide and is associated with HPV 16 and 18 in approximately 70% of cases.

New vaccines are currently available in the United Kingdom to help immunise against this virus and hopefully prevent future cases of cervical cancer.

Which one of the following vaccinations should not be given to patients undergoing chemotherapy?

(Please select 1 option)

<input type="radio"/>	Hepatitis A
<input type="radio"/>	Influenza
<input type="radio"/>	Pneumococcus
<input type="radio"/>	Rubella
<input type="radio"/>	Tetanus

Dr. Assem

(Please select 1 option)

<input type="radio"/>	Hepatitis A
<input type="radio"/>	Influenza
<input type="radio"/>	Pneumococcus
<input checked="" type="radio"/>	Rubella Correct
<input type="radio"/>	Tetanus

Key Learning Points

Oncology

- Live vaccines including the rubella vaccine, should not be given whilst having chemotherapy and for six months afterwards.

Explanation

Live vaccines should not be given whilst having chemotherapy and for six months afterwards. These include:

- Rubella
- Mumps
- Measles
- MMR (the triple vaccine for measles, mumps and rubella)
- BCG (for tuberculosis)
- Yellow fever

Non-live vaccines are safe, but until the immune system is back to normal, they may not give as much protection against infection as they usually would.

Further patient information and resources can be found on the [Cancer Help UK](#) website from Cancer Research UK.

Which of the following statements regarding prognosis in lung cancer is true?

(Please select 1 option)

- ☐ Combined modality therapy (chemotherapy, radiation therapy and surgery) has improved overall lung cancer survival to 40% at five years
- ☐ Overall lung cancer survival is less than 15% at five years
- ☐ Patients undergoing radiation therapy have a five year survival of 40%
- ☐ Patients who qualify for surgery have a 50% five year survival
- ☐ With chemotherapy, overall survival in small cell carcinomas has risen to 60% at five years

- ☐ Combined modality therapy (chemotherapy, radiation therapy and surgery) has improved overall lung cancer survival to 40% at five years
- ☐ Overall lung cancer survival is less than 15% at five years **This is the correct answer**
- ☐ Patients undergoing radiation therapy have a five year survival of 40%
- ☐ Patients who qualify for surgery have a 50% five year survival
- ☒ With chemotherapy, overall survival in small cell carcinomas has risen to 60% at five years

Incorrect answer selected

Key Learning Points

Oncology, Respiratory Medicine

- Overall 5 year survival of lung carcinoma is approximately 14%

Explanation

Prognosis is related to staging and tumour type. It is higher with a lesion that is confined and resectable (no LAP with no distant metastases) and is not of the small cell type. However, overall five year survival for patients is still of the order of 14%. (American Cancer Society 1998). This contrasts with approximately 50% for cancer of the breast and around 70% for cancer of the cervix.

Overall, only about 20% of cases of non-small cell lung cancer (NSCLC) are regarded as suitable candidates for resection at presentation. Surgery can be used to treat patients with stage 1A-3A NSCLC (surgery is not indicated in SCLC routinely). The prognosis for patients with stage 1A NSCLC is ~60-70% 5 year survival, whereas that for patients with stage 3A disease is 20-25%. Therefore it is inaccurate to say all patients who are suitable for surgical treatment have a 50% 5 year survival.

Prognosis for small cell cancer despite treatment is still poor, despite it being very chemo and radiosensitive - 10% at five years.

Next Question

In which of the following chemotherapeutic agents is the cumulative dose limited due to cardiotoxicity?

(Please select 1 option)



Cisplatin



Epirubicin



Etoposide



Herceptin (trastuzumab)



Methotrexate

<input type="radio"/>	Cisplatin	
<input type="radio"/>	Epirubicin	This is the correct answer
<input type="radio"/>	Etoposide	
<input type="radio"/>	Herceptin (trastuzumab)	
<input checked="" type="radio"/>	Methotrexate	Incorrect answer selected

Key Learning Points

Oncology

- Epirubicin is limited to a lifetime maximum dose of 900 mg/m².

Explanation

Epirubicin and the other anthracycline chemotherapeutic agents are extremely potent but are limited by dose constraints.

Cumulative doses of over 900 mg/m² can lead to significant cardiac toxicity and heart failure.

Herceptin can cause direct myocardial damage and must be monitored with regular echocardiograms but it is not limited to a maximum lifetime dose.

Dr. Asim

A 45-year-old man presents with a couple of weeks history of facial swelling and breathlessness.

His chest x ray reveals marked mediastinal lymphadenopathy, and a mass in the right lower lobe. Subsequent CT chest confirms these findings, and diagnoses superior vena caval obstruction (SVCO).

Which of the following statements is most accurate regarding SVCO?

(Please select 1 option)

<input type="radio"/>	It may be associated with voice hoarseness
<input type="radio"/>	It is associated with Kussmaul's sign
<input type="radio"/>	The commonest symptom is stridor
<input type="radio"/>	The most common cause is small cell carcinoma of the lung
<input type="radio"/>	The treatment of choice is always radiotherapy

<input type="radio"/>	It may be associated with voice hoarseness	This is the correct answer
<input type="radio"/>	It is associated with Kussmaul's sign	
<input type="radio"/>	The commonest symptom is stridor	
<input type="radio"/>	The most common cause is small cell carcinoma of the lung	
<input checked="" type="radio"/>	The treatment of choice is always radiotherapy	Incorrect answer selected

Key Learning Points

Oncology, Respiratory Medicine

- SVCO can result in hoarseness, due to recurrent laryngeal nerve palsy, Horner's syndrome, facial and periorbital oedema and distended chest wall veins. Treatment is dependent on the underlying cause.

Explanation

SVCO is most commonly caused by mediastinal lymphadenopathy, typically due to lung carcinoma (of which non-small cell is more common than small cell). It can also occur secondary to lymphoma and germ cell tumours. Non-malignant causes include aortic aneurysm, mediastinal fibrosis and a large goitre.

The lymphadenopathy can result in a recurrent laryngeal nerve palsy, which presents as a hoarse voice. There may also be Horner's syndrome due to involvement of sympathetic chain.

SVCO itself typically presents with insidious onset shortness of breath, which is worse on lying flat. The patients may also have cough and chest pain, due to the distortion of mediastinal anatomy. Physical signs are often absent or minimal, but classically these are facial and periorbital oedema, chemosis and distended chest wall veins. It is associated with an elevated non-pulsatile jugular venous pressure (JVP). Kussmaul's sign is the paradoxical rise in JVP on inspiration due to constrictive **pericarditis** or significant pericardial effusion.

Treatment depends on the underlying cause. If malignant, it also depends on the underlying chemosensitivity of the primary tumour and how unwell the patient is. Steroids (typically dexamethasone) can be given to reduce symptoms whilst specific treatments are commenced. Lymphoma and small cell carcinoma are relatively chemo-sensitive and therefore SVCO can be treated with chemotherapy alone in these settings, but radiotherapy is usually required if the underlying cause is non-small cell lung carcinoma (depending on the extent of disease and the symptoms).

What is the best initial investigation for a patient with suspected malignant spinal cord compression?

(Please select 1 option)

☐ CT chest, abdomen and pelvis

☐ MRI brain

☐ MRI spine

☐ Nerve conduction studies

☐ Spinal x ray

(Please select 1 option)

<input type="radio"/>	CT chest, abdomen and pelvis	
<input type="radio"/>	MRI brain	
<input type="radio"/>	MRI spine	This is the correct answer
<input type="radio"/>	Nerve conduction studies	
<input checked="" type="radio"/>	Spinal x ray	Incorrect answer selected

Key Learning Points

Oncology

- An MRI spine is the investigation of choice for malignant spinal cord stenosis.

Explanation

Due to the spine being compressed by a soft tissue lesion MRI gives the best image quality to identify the site of disease accurately and to allow prompt treatment with either radiotherapy or surgical decompression.

A 44-year-old woman presents to the clinic with increasing lethargy and fatigue. She has been treated previously with interferon alpha and has a diagnosis of chronic myeloid leukaemia.

Her white blood cell count has risen to 22×10^3 cells per microlitre, and she is anaemic with a recent haemoglobin of 89 g/L.

You decide to start her on imatinib.

Which of the following correctly describes the mode of action of imatinib?

(Please select 1 option)

- | | |
|-----------------------|--|
| <input type="radio"/> | Bcr-abl tyrosine kinase inhibitor |
| <input type="radio"/> | Epidermal growth factor receptor (EGFR) kinase inhibitor |
| <input type="radio"/> | Fibroblast growth factor receptor inhibitor |
| <input type="radio"/> | HER2 receptor inhibitor |
| <input type="radio"/> | Vascular endothelial growth factor (VEGF) inhibitor |

☐ Bcr-abl tyrosine kinase inhibitor **This is the correct answer**

☐ Epidermal growth factor receptor (EGFR) kinase inhibitor

☐ Fibroblast growth factor receptor inhibitor

☐ HER2 receptor inhibitor

☒ Vascular endothelial growth factor (VEGF) inhibitor **Incorrect answer selected**

Key Learning Points

Oncology

- Imatinib is a Bcr-abl tyrosine kinase inhibitor which is first line in the treatment of CML.

Explanation

The answer is Bcr-abl tyrosine kinase inhibitor.

In chronic myeloid leukaemia (CML) this particular kinase is stuck chronically in the "on" position.

By targeting the kinase, imatinib inhibits the unregulated cell division which occurs in CML and can maintain many patients in remission for a number of years.

There is also a role for imatinib in the treatment of gastrointestinal stromal tumours, where targeting of Bcr-abl tyrosine kinase has been shown to impact on progression of tumour size.

Other small molecules used in the treatment of cancer include trastuzumab which targets the human epidermal growth factor 2, used in the treatment of breast cancer, and sunitinib, which inhibits multiple kinases which are stimulated by agonism of a number of receptors including VEGF receptors, RET and platelet-derived growth factor (PDGF) receptors.

A 65-year-old female presents with a three week history of malaise and blood in her sputum.

Bronchoscopy reveals a mass in the right main bronchus, and histology demonstrates it to be a small cell carcinoma. Further investigation fails to show any metastases.

What is the most appropriate initial step in management?

(Please select 1 option)

- | | |
|-----------------------|-----------------------------|
| <input type="radio"/> | Chemotherapy |
| <input type="radio"/> | Endobronchial laser therapy |
| <input type="radio"/> | Symptom control only |
| <input type="radio"/> | Radiotherapy |
| <input type="radio"/> | Surgery |

☐ Chemotherapy **This is the correct answer**

☐ Endobronchial laser therapy

☐ Symptom control only

☐ Radiotherapy

☒ Surgery **Incorrect answer selected**

Key Learning Points

Oncology, Respiratory Medicine

- Combination chemo-radiotherapy is the recommended first-line treatment for limited stage SCLC.

Explanation

This patient appears to have limited stage small cell lung carcinoma. These tumours are aggressive, and can metastasise quickly, but are very sensitive to chemotherapy and radiotherapy. The standard treatment in the UK is combination chemo-radiation.

Patients with a performance status of 0-1, with disease that can be encompassed in a radical thoracic radiotherapy volume, should be offered concurrent chemoradiotherapy. The chemotherapy should be initiated immediately, whilst the radiotherapy is being planned, and the radiotherapy should be started during either the first or second cycle of chemotherapy.

Patients who are not fit enough for concurrent chemoradiotherapy should be offered sequential chemo-radiation: 4 to 6 cycles of platinum-etoposide chemotherapy with consolidative radiotherapy for those who respond to chemotherapy.

Current programmes yield overall objective response rates of 65% to 90% and complete response rates of 45% to 75%.

Because of the frequent presence of occult metastatic disease, chemotherapy is the cornerstone of treatment for patients with limited-stage small cell lung cancer. Surgery is therefore not recommended as first-line treatment in the UK.

Endobronchial laser therapy is not indicated in this situation.

Symptom control (best supportive care) is only indicated for patients in whom chemotherapy is absolutely contraindicated.

Which non-gastrointestinal tumour is frequently associated with Lynch syndrome?

(Please select 1 option)

<input type="radio"/>	Endometrial
<input type="radio"/>	Lung
<input type="radio"/>	Prostate
<input type="radio"/>	Renal
<input type="radio"/>	Sarcoma

Dr Assem

<input type="radio"/>	Endometrial	This is the correct answer
<input type="radio"/>	Lung	
<input type="radio"/>	Prostate	
<input type="radio"/>	Renal	
<input checked="" type="radio"/>	Sarcoma	Incorrect answer selected

Key Learning Points

Oncology

- Lynch syndrome predisposes patients to development of many cancers including endometrial cancer.

Explanation

Lynch syndrome (HNPCC or hereditary nonpolyposis colorectal cancer) is an autosomal dominant genetic condition which has a high risk of colon cancer as well as other cancers including

- Endometrial
- Ovary
- Stomach
- Small intestine
- Hepatobiliary tract
- Upper urinary tract
- Brain and
- Skin.

The increased risk for these cancers is due to inherited mutations that impair DNA mismatch repair.

A 65-year-old woman presents to the oncology clinic with a two month history of cough and haemoptysis.

A suspicious lesion on a recent chest x ray was biopsied and confirms a bronchogenic adenocarcinoma.

Currently the patient is short of breath causing her to be in bed for about three hours every day. She can manage the stairs but is markedly breathless when she reaches the top. She is currently unable to work. Her husband helps around the house but she does not need help with her activities of daily living.

What is the patient's performance status, as measured on the World Health Organization scale?

(Please select 1 option)

<input type="radio"/>	0
<input type="radio"/>	1
<input type="radio"/>	2
<input type="radio"/>	3
<input type="radio"/>	4

Dr Assem

Please select 1 option)

<input type="radio"/>	0
<input type="radio"/>	1
<input type="radio"/>	2 This is the correct answer
<input type="radio"/>	3
<input checked="" type="radio"/>	4 Incorrect answer selected

Key Learning Points

Oncology

- This patient is in bed less than 50% of the day and self-caring but unable to work. She is performance status 2.

Explanation

0. Asymptomatic. (Fully active, able to carry on all pre-disease activities without restriction).

1. Symptomatic but completely ambulatory. (Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature. For example, light housework, office work).

2. Symptomatic, less than 50% in bed during the day. (Ambulatory and capable of all self-care but unable to carry out any work activities. Up and about more than 50% of waking hours).

3. Symptomatic, more than 50% in bed, but not bedbound. (Capable of only limited self-care, confined to bed or chair 50% or more of waking hours).

4. Bedbound. (Completely disabled. Cannot carry on any self-care. Totally confined to bed or chair).

5. Death.

A 45-year-old woman presents with a screen detected left sided breast lump. This is confirmed on biopsy to be an invasive carcinoma, grade 2.

She undergoes a wide local excision and axillary node sampling with intra-operative radiotherapy to the tumour bed via MammoSite.

Post-operatively, what radiation precautions need to be taken with this patient?

(Please select 1 option)

- | | |
|-----------------------|---|
| <input type="radio"/> | Apply a zone of exclusion of 2 metres around the patient for 24 hours |
| <input type="radio"/> | Isolate in a lead lined side room for 24 hours |
| <input type="radio"/> | Isolate in a side room for 24 hours |
| <input type="radio"/> | None |
| <input type="radio"/> | The patient needs to wear a standard lead-lined apron for 24 hours |

<input type="radio"/>	Apply a zone of exclusion of 2 metres around the patient for 24 hours
<input type="radio"/>	Isolate in a lead lined side room for 24 hours
<input type="radio"/>	Isolate in a side room for 24 hours
<input type="radio"/>	None This is the correct answer
<input checked="" type="radio"/>	The patient needs to wear a standard lead-lined apron for 24 hours Incorrect answer selected

Key Learning Points

Oncology

- This patient has received a single dose of targeted radiotherapy to the tumour bed, she is not radioactive.

Explanation

Much confusion surrounds the use of radiotherapy, especially how patients are cared for on the ward.

It is critical to distinguish between whether the patient has had external beam radiotherapy, brachytherapy or use of an unsealed source.

External beam radiotherapy or use of targeted intraoperative radiotherapy does not render the patient radioactive.

Use of brachytherapy methods can involve insertion of radioactive seeds or beads which may require some radiation protection precautions depending on the site.

Use of an unsealed source, for example radio-iodine treatment of thyroid cancer, has substantial need for precautions and patients need to be isolated in a lead-lined side room, often for several days.

A 65-year-old woman is seen in the oncology clinic following a diagnosis of a strongly oestrogen/progesterone receptor positive breast cancer.

She is considered for adjuvant treatment with anastrozole, an endocrine agent.

What further investigation does this patient require?

(Please select 1 option)

- | | |
|-----------------------|------------------------------|
| <input type="radio"/> | Bone scan |
| <input type="radio"/> | Chest x ray |
| <input type="radio"/> | CT chest, abdomen and pelvis |
| <input type="radio"/> | DEXA scan |
| <input type="radio"/> | Urine dip |

<input type="radio"/>	Bone scan
<input type="radio"/>	Chest x ray
<input type="radio"/>	CT chest, abdomen and pelvis
<input checked="" type="radio"/>	DEXA scan Correct
<input type="radio"/>	Urine dip

Key Learning Points

Oncology

- Aromatase inhibitors cause oestrogen deprivation which can lead to osteoporosis.

Explanation

Aromatase inhibitors work by preventing peripheral conversion of oestrogen and therefore cause profound oestrogen deprivation in a post-menopausal woman.

This increases the risk of osteoporosis and fragility fractures.

A DEXA scan must be done at the start of treatment to identify those patients in whom a bisphosphonate must be considered for bone protection.

A 58-year-old Italian man visits your surgery. He has noticed 'bruises' on his right foot which have been gradually increasing in number and size over the last six months.

On examination there are several small, purple, non-tender lesions on the dorsum of his right foot and ankle. They have the appearance of Kaposi's sarcoma.

Kaposi's sarcoma is caused by infection with which organism?

(Please select 1 option)

<input type="radio"/>	Herpes simplex virus 2 (HSV-2)
<input type="radio"/>	Human cytomegalovirus
<input type="radio"/>	Human Herpesvirus 8 (HHV8)
<input type="radio"/>	Human immunodeficiency virus (HIV)
<input type="radio"/>	<i>Pneumocystis jirovecii</i>

Please select 1 option

- | | | |
|----------------------------------|------------------------------------|----------------------------|
| <input type="radio"/> | Herpes simplex virus 2 (HSV-2) | |
| <input type="radio"/> | Human cytomegalovirus | |
| <input type="radio"/> | Human Herpesvirus 8 (HHV8) | This is the correct answer |
| <input type="radio"/> | Human immunodeficiency virus (HIV) | |
| <input checked="" type="radio"/> | <i>Pneumocystis jirovecii</i> | Incorrect answer selected |

Key Learning Points

Oncology

- Kaposi's sarcoma is caused by infection with human Herpesvirus 8 (HHV8).

Explanation

Kaposi's sarcoma is a tumour caused by infection with human Herpesvirus 8 (HHV8) also known as Kaposi's sarcoma-associated Herpesvirus (KSHV).

It became known as one of the AIDS-defining illnesses in the 1980s.

The viral cause for this cancer was discovered in 1994. There is a lack of awareness of its viral causation even among people at risk of infection with KSHV/HHV8.

There are four subtypes of Kaposi's sarcoma affecting susceptible groups of people:

- Classic Kaposi's sarcoma (affecting middle aged men of Mediterranean or Ashkenasi Jewish descent)
- African endemic Kaposi's sarcoma
- Kaposi's sarcoma in iatrogenically immunosuppressed patients (for example, transplant-related), and
- AIDS related Kaposi's sarcoma.

Which of the following cytotoxic agents acts by inhibiting purine synthesis?

(Please select 1 option)

<input type="radio"/>	Bleomycin
<input type="radio"/>	Cisplatin
<input type="radio"/>	Doxorubicin
<input type="radio"/>	Methotrexate
<input type="radio"/>	Vincristine

- | | |
|----------------------------------|--|
| <input type="radio"/> | Bleomycin |
| <input type="radio"/> | Cisplatin |
| <input type="radio"/> | Doxorubicin |
| <input checked="" type="radio"/> | Methotrexate This is the correct answer |
| <input type="radio"/> | Vincristine Incorrect answer selected |

Key Learning Points

Oncology, Pharmacology, Therapeutics

- Methotrexate is an inhibitor of dihydrofolate reductase.

Explanation

Methotrexate inhibits dihydrofolate reductase, thereby inhibiting the production of tetrahydrofolate required for thymidine and purine synthesis. It is therefore cytotoxic during the S-phase of the cell cycle, and has a greater toxic effect on rapidly dividing cells.

Bleomycin acts by inducing DNA strand breaks.

Cisplatin crosslinks DNA, initiating DNA repair mechanisms and subsequently apoptosis.

Doxorubicin inhibits the action of topoisomerase II, which is required for DNA transcription.

Vincristine is a vinca alkaloid, which disrupts microtubules and thereby arrests mitosis in metaphase.

A 62-year-old man with non-small cell lung cancer is being considered for surgical resection.

Which of the following would be regarded as a contraindication to surgery?

(Please select 1 option)

<input type="radio"/>	FEV ₁ 1.2 L
<input type="radio"/>	Horner's syndrome
<input type="radio"/>	Hypercalcaemia
<input type="radio"/>	Peripheral neuropathy
<input type="radio"/>	Previous history of myocardial infarction

FEV ₁ 1.2 L	This is the correct answer
Hunter's syndrome	
Hypertacemia	
Peripheral neuropathy	
Previous history of myocardial infarction	This answer is incorrect

Key Learning Points

Oncology, Respiratory Medicine

- A post-bronchodilator FEV₁ of ≥ 1.5 litres is sufficient if a lobectomy is all that is required. If the tumour necessitates a pneumorectomy, the post-bronchodilator FEV should be more than 2 litres.

Explanation

Non-small cell lung cancer (NSCLC) is a heterogeneous aggregate of at least three distinct histologies of lung cancer including epidermoid or squamous carcinoma, adenocarcinoma, and large cell carcinoma. These histologies are often classified together because, when localised, all have the potential for cure with surgical resection.

Assessing fitness for surgery in cases of lung carcinoma can be difficult, and requires consideration of a number of factors.

Lung function needs to be assessed prior to referral to the thoracic surgical team. A post-bronchodilator FEV₁ of ≥ 1.5 litres is sufficient if a lobectomy is all that is required. If the tumour necessitates a pneumorectomy, the post-bronchodilator FEV should be more than 2 litres.

Below these values, further investigation in the form of estimation of transfer factor, oxygen saturations at rest and quantitative radonze perfusion should be undertaken. These values can be used to calculate estimated postoperative FEV₁ and postoperative transfer factor.

Patients with an estimated postoperative FEV₁ less than 40% predicted, transfer factor more than 40% predicted and oxygen saturations of more than 90% on air are considered to be average risk. Those with an FEV₁ and transfer factor of less than 40% are thought to be high risk. All other combinations are indications for exercise testing (shuttle walk tests or formal cardiopulmonary exercise tests).

High-risk patients identified by this slow-flow testing should be discussed at a formal multidisciplinary meeting, and should be considered for more limited resection or non-surgical management.

Postoperative morbidity increases with advancing age, and more elderly patients typically require more intensive perioperative support. However, surgery for clinically stage I and II disease can be as effective in patients over the age of 70 and should be considered regardless of age. Age over 80 alone is not a contraindication to lobectomy or wedge resection for stage I disease, but may be a contraindication to pneumorectomy and each case should be assessed individually.

Cardiovascular fitness should be assessed with a preoperative ECG. Those with an audible murmur should have an echocardiogram. A recent MI (within 6 months) is an indication for cardiology opinion prior to surgery, but not an absolute contraindication. In general, surgery should be delayed until 6 weeks following myocardial infarct if possible.

All patients with a history of previous stroke, transient ischaemic attacks, or carotid bruits should be assessed with carotid Doppler studies. Those with significant stenosis should be assessed by a vascular surgeon or stroke physician.

Patients presenting with preoperative weight loss of more than 10% and/or performance status of WHO 2 or worse should have their BUN and albumin measured, and metabolic disease carefully excluded.

Patients who are anatomically suited to resection but have more than one adverse medical factor should have their management discussed formally at a multidisciplinary meeting.

In addition to the above patient factors, there are characteristics of the tumour which will help determine operability. All patients being considered for surgery should have a plain chest radiograph and CT scan of the thorax, liver and adrenal glands. Confirmatory percutaneous biopsy in patients presenting with peripheral lesions is not mandatory, particularly if the lesion was not present on previous chest radiographs.

Patients with mediastinal nodes greater than 1 cm in diameter on CT should undergo biopsy.

Patients with stage I cT1N0 and cT2N0 and stage II cT1N1, cT2N1 and cT3N0 tumours should be considered operable.

Patients with stage IIIA cT3N1 and cT1-3N2 tumours have a low chance of being cured by surgery alone, but it can be used in the context of a trial in combination with adjuvant chemotherapy. Stage IIB and IV tumours should generally be considered inoperable.

Whilst most pleural effusions associated with lung carcinoma are due to the tumour (and results in classification as a T4 tumour), in some patients cytological examination of the fluid is negative. If this is confirmed on more than one occasion, and clinical judgement dictates that the effusion is not related to the tumour, the effusion should be excluded as a staging element. This may mean they are suitable for surgery.

Whilst in most cases the presence of a Hunter's syndrome indicates extrapulmonary spread, it may be caused by external compression. It is therefore not an immediate absolute contraindication to surgery – it indicates the need for further investigation.

Hypocalcaemia and peripheral neuropathy may be paraneoplastic phenomena and are not of themselves contraindications to surgery. Nor would a previous myocardial infarction be a contraindication to surgery.

Which of the following statements is true of sarcoidosis?

(Please select 1 option)

- | | |
|-----------------------|---|
| <input type="radio"/> | Central caseation occurs in the sarcoid granuloma |
| <input type="radio"/> | Hypercalcaemia due to increased renal synthesis of 1-hydroxylase |
| <input type="radio"/> | It can produce Lofgren's syndrome |
| <input type="radio"/> | Prognosis is poor when sarcoidosis presents acutely with bilateral hilar lymphadenopathy and erythema nodosum |
| <input type="radio"/> | Serum angiotensin converting enzyme (ACE) is useful for diagnosis of sarcoidosis |

<input type="radio"/>	Central caseation occurs in the sarcoid granuloma	
<input type="radio"/>	Hypercalcaemia due to increased renal synthesis of 1-hydroxylase	
<input type="radio"/>	It can produce Lofgren's syndrome	This is the correct answer
<input type="radio"/>	Prognosis is poor when sarcoidosis presents acutely with bilateral hilar lymphadenopathy and erythema nodosum	
<input checked="" type="radio"/>	Serum angiotensin converting enzyme (ACE) is useful for diagnosis of sarcoidosis	Incorrect answer selected

Key Learning Points

Oncology

- Lofgren's syndrome is a subtype of acute sarcoidosis which involves the combination of erythema nodosum and bilateral hilar lymphadenopathy (stage 1 radiograph).

Explanation

Lofgren's syndrome is a subtype of acute sarcoidosis which involves the combination of erythema nodosum and bilateral hilar lymphadenopathy (stage 1 radiograph). The prognosis is good with 80% resolving spontaneously, and have a normal CXR after one year.

Hypercalcaemia (2-10%) and hypercalciuria (up to 50%) are well recognised in sarcoidosis. The pattern resembles hypervitaminosis D, with:

- Elevated serum calcium
- Normal serum phosphate and
- Normal/slightly raised alkaline phosphatase.

There is elevated 1,25-dihydroxycholecalciferol due to increased production by alveolar pulmonary macrophages and macrophages in granulomata.

Treat with rehydration and corticosteroids.

Serum ACE is produced by sarcoid granulomata from activation and differentiation of monocyte-macrophage system. It is a membrane bound glycoprotein, found mainly in the lung capillary endothelium.

ACE has poor diagnostic sensitivity (ability to detect disease) and specificity (ability to exclude disease), but is raised in active sarcoidosis. It is useful in monitoring of disease activity.

Sarcoidosis is chronic multisystem non-caseating granulomatous disease. Central fibrinoid necrosis may occur, but tends to be focal and limited unlike the purulent necrosis/caseation seen in tuberculosis.

A 65-year-old woman is diagnosed with primary breast cancer and is seen in the oncology clinic.

As part of her adjuvant treatment she is recommended to start treatment with anastrozole to prevent recurrence of her cancer.

A DEXA scan organised at the time of prescription reveals a T score of -2.6 although she has suffered no fragility fractures to date.

What is the next correct step in endocrine management of this patient?

(Please select 1 option)

<input type="radio"/>	Continue anastrozole
<input type="radio"/>	Continue anastrozole and prescribe a bisphosphonate.
<input type="radio"/>	Stop anastrozole
<input type="radio"/>	Stop anastrozole and convert to exemestane
<input type="radio"/>	Stop anastrozole and start tamoxifen

Please select 1 option

<input type="radio"/>	Continue anastrozole	
<input checked="" type="radio"/>	Continue anastrozole and prescribe a bisphosphonate.	This is the correct answer
<input type="radio"/>	Stop anastrozole	
<input checked="" type="radio"/>	Stop anastrozole and convert to exemestane	Incorrect answer selected
<input type="radio"/>	Stop anastrozole and start tamoxifen	

Key Learning Points

Oncology

- Endocrine treatment with an aromatase inhibitor is essential to prevent this patient's cancer recurrence. It can be continued in patients without fragility fractures providing a bisphosphonate is prescribed.

Explanation

In a post-menopausal woman the endocrine treatment of choice for preventing recurrence of her primary breast cancer is an aromatase inhibitor.

Aromatase inhibitors work by causing severe oestrogen deprivation which increases the risk of osteoporosis. Aromatase inhibitors can be continued in a patient who has suffered no fragility fractures providing adequate measures are taken for bone protection, for example, prescribing a bisphosphonate.

In patients who suffer a fragility fracture tamoxifen must be considered as this does have a partial oestrogen agonist action on bone, reducing the risk of osteoporosis.

A 65-year-old man has recently been diagnosed with non-small cell lung cancer. His management plan is discussed at the regional multi-disciplinary meeting.

Which of the following would not preclude him from being offered surgery?

(Please select 1 option)

<input type="radio"/>	FEV ₁ 0.4 L
<input type="radio"/>	Malignant pleural effusion
<input type="radio"/>	Mediastinal lymphadenopathy
<input type="radio"/>	Sclerotic vertebral lesion on x ray
<input type="radio"/>	Tumour size of 3 cm

<input type="radio"/>	FEV ₁ 0.4 L
<input type="radio"/>	Malignant pleural effusion
<input type="radio"/>	Mediastinal lymphadenopathy
<input type="radio"/>	Sclerotic vertebral lesion on x ray
<input checked="" type="radio"/>	Tumour size of 3 cm Correct

Key Learning Points

Oncology, Respiratory Medicine

- A tumour size of greater than 3 cm (providing there is no lymphadenopathy or evidence of distant spread) may still be amenable to surgery as it may fall within stages IB and IIB.

Explanation

A tumour size of greater than 3 cm (providing there is no lymphadenopathy or evidence of distant spread) may still be amenable to surgery as it may fall within stages IB and IIB.

A FEV₁ of less than 0.5 is a contraindication for surgical management.

The remaining answer options indicate metastatic spread of the disease, and as such surgery would be inappropriate.

A 65-year-old woman is seen in the oncology clinic following a diagnosis of a grade 3, 14 mm invasive breast cancer with no vascular invasion.

0 of 4 axillary lymph nodes were involved and excision margins were complete.

Staining for oestrogen receptors and progesterone receptors is strongly positive, HER-2 staining is negative.

She is considered for adjuvant chemotherapy and hormone treatments.

Which of the following endocrine agents would be prescribed for this patient?

(Please select 1 option)

<input type="radio"/>	Anastrozole
<input type="radio"/>	Exemestane
<input type="radio"/>	Fulvestrant
<input type="radio"/>	Tamoxifen
<input type="radio"/>	Trastuzumab

<input type="radio"/>	Anastrozole	This is the correct answer
<input type="radio"/>	Exemestane	
<input type="radio"/>	Fulvestrant	
<input type="radio"/>	Tamoxifen	
<input checked="" type="radio"/>	Trastuzumab	Incorrect answer selected

Key Learning Points

Oncology

- Aromatase inhibitors are the first line treatment option in early locally advanced breast cancer in post-menopausal women.

Explanation

Hormonal treatment is used to remove the proliferative stimulus of oestrogen from tumour cells. In the UK tamoxifen for 5 years was the standard adjuvant hormonal treatment for postmenopausal women with early oestrogen-receptor-positive breast carcinoma. Tamoxifen acts by blocking the binding of oestrogen to its receptor within the nucleus. However, long-term use is associated with vaginal bleeding, endometrial thickening and increased risk of endometrial cancer and thromboembolism.

More recently aromatase inhibitors have been developed. These block the production of oestrogen from androgens in peripheral tissues, such as muscle and fat, which continues in post-menopausal women. Three such drugs are licensed for treatment of early oestrogen-receptor-positive breast cancer, as in this case. These are anastrozole, exemestane and letrozole. A common side-effect is reduced bone mineral density, and bone densitometry is therefore often carried out prior to and during treatment.

Anastrozole is currently indicated for early oestrogen-receptor-positive breast carcinoma at a dose of 1 mg daily for 5 years. It can also be used in advanced breast cancer in post-menopausal women.

Exemestane is licensed for women with oestrogen-receptor-positive invasive early breast carcinoma who have already received 2-3 years of tamoxifen, and those who have evidence of disease progression despite oestrogen therapy.

Trastuzumab can be used for early and late breast cancer but in HER-2 positive patients.

Randomised controlled trials have shown that, relative to tamoxifen, aromatase inhibitors improve clinical outcomes. Anastrozole is therefore now first-line for primary hormonal adjuvant therapy in early oestrogen-receptor-positive invasive breast cancer in postmenopausal women.

Fulvestrant is a new pure anti-oestrogen agent which appears to be as effective as anastrozole; it is given by sub-cutaneous injection once every three weeks. NICE does not currently recommend its use for postmenopausal women ahead of aromatase inhibitors.

Which of the following malignancies is associated with HTLV-1 infection?

(Please select 1 option)



Adult T cell leukaemia



Burkitt's lymphoma



Chronic lymphocytic leukaemia



Pancreatic cancer



Transitional cell carcinoma

(Please select 1 option)

- | | | |
|----------------------------------|-------------------------------|----------------------------|
| <input type="radio"/> | Adult T cell leukaemia | This is the correct answer |
| <input type="radio"/> | Burkitt's lymphoma | |
| <input type="radio"/> | Chronic lymphocytic leukaemia | |
| <input type="radio"/> | Pancreatic cancer | |
| <input checked="" type="radio"/> | Transitional cell carcinoma | Incorrect answer selected |

Key Learning Points

Oncology

- Adult T cell leukaemia is associated with HTLV-1 infection.

Explanation

Between 1:10 and 1:20 are believed to develop malignancy associated with HTLV-1; adult T cell leukaemia/lymphoma.

Dr Assem

Which of the following histopathological subtypes is essential for successful treatment with cetuximab?

(Please select 1 option)

<input type="radio"/>	Her-2/neu negative
<input type="radio"/>	Her-2/neu positive
<input type="radio"/>	K-ras mutated
<input type="radio"/>	K-ras wild-type
<input type="radio"/>	VEGF overexpression

Please select 1 option

☐ Her-2/neu negative

☐ Her-2/neu positive

☐ K-ras mutated

☒ K-ras wild-type

This is the correct answer

☐ VEGF overexpression

Incorrect answer selected

Key Learning Points

Oncology

- Cetuximab works by blocking the extracellular domain of EGFR preventing ligand binding and therefore preventing downstream signal transduction. The patient's tumour must express k-ras wild-type as k-ras mutated is constitutively active regardless of whether a ligand is attached or not.

Explanation

Cetuximab works by blocking the extracellular domain of EGFR preventing ligand binding and therefore preventing downstream signal transduction. The patient's tumour must express k-ras wild-type as k-ras mutated is constitutively active regardless of whether a ligand is attached or not.

Cetuximab is licensed by NICE in metastatic colorectal cancer for k-ras wild-type proven patients who require downstaging prior to surgical resection of liver metastatic disease. This is always given in combination with chemotherapy and causes an acne type rash as its major side effect.

Her-2 status is currently only required in breast cancer patients for consideration of treatment with Herceptin; there are trials currently underway researching its role in treatment of other cancers such as gastric cancer.

A 30-year-old woman with a strong family history of breast cancer is referred to the genetics service for counselling.

What is the DNA repair mechanism by which the BRCA1 and BRCA2 proteins act?

(Please select 1 option)

- | | |
|-----------------------|--------------------------------|
| <input type="radio"/> | Base excision repair |
| <input type="radio"/> | Double strand DNA break repair |
| <input type="radio"/> | Non-homologous end joining |
| <input type="radio"/> | Nucleotide excision repair |
| <input type="radio"/> | Single strand DNA break repair |

<input type="radio"/>	Base excision repair	
<input type="radio"/>	Double strand DNA break repair	This is the correct answer
<input type="radio"/>	Non-homologous end joining	
<input type="radio"/>	Nucleotide excision repair	
<input checked="" type="radio"/>	Single strand DNA break repair	Incorrect answer selected

Key Learning Points

Oncology

- The BRCA proteins 1 and 2 are involved in the repair of DNA double strand breaks.

Explanation

The BRCA proteins are involved in homologous recombination to repair DNA double strand breaks.

Mutations in either of the genes encoding these proteins puts the patient at significantly higher risk of developing breast and ovarian cancers, so that some women opt for prophylactic surgery to prevent this.

Future treatment options with PARP inhibitors take advantage of this deficiency in DNA repair to kill cancer cells via synthetic lethality.

A 68-year-old female with terminal bowel cancer is receiving optimal doses of morphine sulphate therapy.

Which of the following effects may be expected with the addition of a partial opioid agonist?

(Please select 1 option)



Increased analgesic effect



Increased respiratory depression



Increased sedation



No change



Reduced analgesic effect

- ☐ Increased analgesic effect
- ☐ Increased respiratory depression
- ☐ Increased sedation
- ☐ No change
- ☒ Reduced analgesic effect **Correct**

Key Learning Points

Oncology, Pharmacology

- Combining opiates with partial opioid antagonists, such as buprenorphine, may lead to reduced overall analgesic effect.

Explanation

Partial opioid agonists (for example, buprenorphine), when used in association with morphine, may produce a reduction in the analgesic effect due to partial antagonism.

Partial agonists are those compounds which can activate receptors but are unable to elicit the maximal response.

Buprenorphine acts as one by having high affinity for, but low activity at, mu receptors. Its high affinity means it can displace full opioid agonists (such as morphine) from the mu receptor, and therefore they cannot exert their fully opioid effect (i.e. buprenorphine is acting as an antagonist in this sense).

This is an aspect of pain management that needs to be considered when using combination therapies.

A 58-year-old man presents with weight loss and haemoptysis. He has smoked most of his life.

On examination he is clubbed and has clinical evidence of right pleural effusion. His serum calcium is 3.2 mM (2.2-2.6 mmol/L). A bone scan is normal.

From which of the following histological types of lung cancer is he most likely to suffer?

(Please select 1 option)

<input type="radio"/>	Adenocarcinoma
<input type="radio"/>	Large cell carcinoma
<input type="radio"/>	Mesothelioma
<input type="radio"/>	Small cell carcinoma
<input type="radio"/>	Squamous cell carcinoma

<input type="radio"/>	Adenocarcinoma
<input type="radio"/>	Large cell carcinoma
<input type="radio"/>	Mesothelioma
<input type="radio"/>	Small cell carcinoma
<input checked="" type="radio"/>	Squamous cell carcinoma Correct

Key Learning Points

Oncology, Respiratory Medicine

- Hypercalcaemia in absence of bony metastases occurs in about 15% of squamous cell lung carcinoma from parathyroid hormone related protein (PTHrP) production.

Explanation

Hypercalcaemia in absence of bony metastases occurs in about 15% of squamous cell lung carcinoma from parathyroid hormone related protein (PTHrP) production. This is a feature of non-metastatic manifestation of malignancy.

Inappropriate antidiuretic hormone (ADH) secretion (hyponatraemia) and ectopic adrenocorticotrophic hormone (ACTH) production (Cushing's syndrome) occur with small cell lung cancer.

Clubbing is predominantly associated with squamous cell cancers and occasionally adenocarcinoma.

What is the mechanism by which patients with testicular cancer develop gynaecomastia?

(Please select 1 option)

- | | |
|-----------------------|-------------------------------------|
| <input type="radio"/> | Altered fat metabolism |
| <input type="radio"/> | Metastatic disease to breast tissue |
| <input type="radio"/> | Paraneoplastic phenomenon |
| <input type="radio"/> | Raised oestrogen levels |
| <input type="radio"/> | Raised testosterone levels |

Please select 1 option



Altered fat metabolism



Metastatic disease to breast tissue



Paraneoplastic phenomenon



Raised oestrogen levels

This is the correct answer



Raised testosterone levels

Incorrect answer selected

Key Learning Points

Oncology

- High β -HCG levels cause increased oestrogen production leading to gynaecomastia.

Explanation

High levels of β -HCG in patients with testicular cancers cause increased production of oestrogen which in turn stimulates hypertrophy of breast tissue. This usually resolves with treatment of the underlying cancer.

Rarely gynaecomastia can be the trigger by which a young man will seek medical attention; testicular examination should therefore be done in every case.

Dr. Assem

A 35-year-old woman is admitted to the emergency medical unit with a painful mouth.

She is currently undergoing combination chemo-radiotherapy with cisplatin for a squamous cell carcinoma of her right tonsil.

The patient tells you she has been unable to eat or drink anything for the past four days.

On examination she has multiple confluent ulcers throughout her oral cavity.

What is the best course of action?

(Please select 1 option)

<input type="radio"/>	Admit the patient for IV antibiotics
<input type="radio"/>	Admit the patient for IV anti-fungal treatment
<input type="radio"/>	Admit the patient for IV fluids and nutritional support
<input type="radio"/>	Discharge the patient and encourage oral hygiene
<input type="radio"/>	Discharge the patient and prescribe chlorhexidine mouthwash

- | | | |
|----------------------------------|---|----------------------------|
| <input type="radio"/> | Admit the patient for IV antibiotics | |
| <input type="radio"/> | Admit the patient for IV anti-fungal treatment | |
| <input type="radio"/> | Admit the patient for IV fluids and nutritional support | This is the correct answer |
| <input type="radio"/> | Discharge the patient and encourage oral hygiene | |
| <input checked="" type="radio"/> | Discharge the patient and prescribe chlorhexidine mouthwash | Incorrect answer selected |

Key Learning Points

Oncology

- This patient has a severe grade 3 or 4 mucositis and needs to be admitted.

Explanation

Severe mucositis is common with head and neck cancer treatment due to the combination of chemotherapy and external beam radiotherapy. Often patients require a PEG or RIG to provide adequate nutritional support during their potentially curative treatment.

Oral hygiene is the mainstay of treatment in prevention of mucositis however it will not treat an existing mucositis. Chlorhexidine mouthwash can improve a grade 1-2 mucositis.

Occasionally a patient may suffer an infected mouth ulcer and require IV antibiotics or antifungals.

A 62-year-old man is found to have squamous cell carcinoma of the lung after being investigated for haemoptysis.

Which one of the following would be a contraindication to surgical resection?

(Please select 1 option)

<input type="radio"/>	Finger clubbing
<input type="radio"/>	Hypercalcaemia
<input type="radio"/>	Hypertrophic pulmonary osteoarthropathy
<input type="radio"/>	Pleural effusion
<input type="radio"/>	Superior vena cava obstruction

(Please select 1 option)

<input type="radio"/>	Finger clubbing
<input type="radio"/>	Hypercalcaemia
<input type="radio"/>	Hypertrophic pulmonary osteoarthropathy
<input type="radio"/>	Pleural effusion
<input checked="" type="radio"/>	Superior vena cava obstruction Correct

Key Learning Points

Oncology, Respiratory Medicine

- Sometimes patients require stenting of the SVC for symptomatic relief prior to more definitive treatment.

Explanation

Superior vena cava obstruction (SVC) interrupts venous return from the head, arms and thorax to the right atrium resulting in facial swelling, stridor, cough, breathlessness, hoarseness, headache, etc. It was first described by William Hunter in 1757 in a case of syphilitic aortic aneurysm but these days the commonest cause is malignancy and in particular bronchial carcinoma and lymphoma.

Treatment is of the underlying condition, chemotherapy for small cell lung cancer and lymphoma and radiotherapy for non-small cell lung cancer. Sometimes patients require stenting of the SVC for symptomatic relief prior to more definitive treatment.

Pleural effusions are a contraindication to surgery if they are malignant but effusions in patients with squamous cell carcinoma may be reactive.

Absolute contraindications to surgery include:

- Patient refusal
- Metastases.

Relative contraindications include:

- Cell type: small cell carcinoma are usually inoperable
- Poor respiratory reserve - FEV1 > 1.2L is necessary for lobectomy, and > 1.8L for pneumonectomy
- Raised PaCO₂ is a contraindication for surgery
- Other disease - especially myocardial
- Mediastinal involvement
- Age - in patients over 70, surgery is usually inadvisable because the benefits are outweighed by operative morbidity and mortality.

A 20-year-old man is referred to the oncology clinic with a three week history of weight loss and a dry cough.

A chest x ray shows a large mediastinal mass which is subsequently biopsied showing a poorly differentiated carcinoma.

Which of the following tumour markers confers the best prognosis?

(Please select 1 option)

☐ CA125

☐ CA15.3

☐ CA19.9

☐ CEA

☐ β -HCG

Please select 1 option

<input type="radio"/>	CA125
<input type="radio"/>	CA15.3
<input type="radio"/>	CA19.9
<input type="radio"/>	CEA
<input checked="" type="radio"/>	β -HCG Correct

Key Learning Points

Oncology

- Raised β -HCG levels are associated with germ cell tumours which confer a good prognosis.

Explanation

A young man with a germ cell tumour (raised β -HCG) can expect a greater than 95% cure rate, especially with seminomas.

The patient should also have his alpha-fetoprotein level checked.

The other tumour markers listed here are raised in a variety of other cancer such as

- CA125 - Ovarian
- CA15.3 - Breast
- CEA - Colorectal
- CA19.9 - Pancreatic

although they can be raised in other cancers and therefore are only useful in assessing response to treatment or monitoring for early evidence of relapse.

A 31-year-old male is receiving treatment for testicular carcinoma with cisplatin based chemotherapy.

Which of the following best describes the action of cisplatin?

(Please select 1 option)

<input type="radio"/>	DNA cross-linking
<input type="radio"/>	DNA antimetabolites
<input type="radio"/>	Inhibition of protein synthesis
<input type="radio"/>	Alkylating agent
<input type="radio"/>	Topoisomerase inhibitor

<input type="radio"/>	DNA cross-linking	This is the correct answer
<input type="radio"/>	DNA antimetabolites	
<input type="radio"/>	Inhibition of protein synthesis	
<input type="radio"/>	Alkylating agent	
<input checked="" type="radio"/>	Topoisomerase inhibitor	Incorrect answer selected

Key Learning Points

Oncology

- Cisplatin covalently binds DNA, resulting in intra-strand and inter-strand crosslinks, thereby preventing DNA, RNA and protein synthesis.

Explanation

Cisplatin enters cells and undergoes chemical reaction in which the chloride ligands are replaced by water molecules, resulting in the formation of positively charge platinum complexes. These react with nucleophilic sites on DNA, and covalently bind resulting in intra-strand and inter-strand cross-links. These cisplatin-DNA adducts prevent DNA, RNA and protein synthesis.

Because its action is similar to the bifunctional alkylating agents, it is sometimes grouped as an alkylating agent but this does not describe its mode of action.

What is the approximate five year survival for a Dukes' C adenocarcinoma of the colon?

(Please select 1 option)

<input type="radio"/>	10%
<input type="radio"/>	25%
<input type="radio"/>	35%
<input type="radio"/>	80%
<input type="radio"/>	95%

☐ 10%

☐ 25%

☒ 35% **This is the correct answer**

☐ 80%

☒ 95% **Incorrect answer selected**

Key Learning Points

Oncology

- The Dukes' staging system has been proven to correlate well with a patient's chance of survival. Dukes' C colon cancer has a 30-40% 5 year survival rate.

Explanation

The Dukes' staging system has now largely been replaced with the TNM system, however it is still used and referred to in follow up of patients diagnosed and treated recently.

The Dukes' staging system has been proven to correlate well with a patient's chance of survival, a Dukes' C colon cancer has a 30-40% 5 year survival.

It is classified as following

- Dukes' A: Invasion into but not through the bowel wall, 80%+ 5 year survival
- Dukes' B: Invasion through the bowel wall but not involving lymph nodes, 60-70% 5 year survival
- Dukes' C: Involvement of lymph nodes, 30-40% 5 year survival
- Dukes' D: Widespread metastases, 0% 5 year survival

Chemotherapy is often given after the cancer has been completely removed by surgery rather than prior to surgery.

What is the reason for this?

(Please select 1 option)

- | | |
|-----------------------|---|
| <input type="radio"/> | Because chemotherapy prior to surgery is unproven clinically |
| <input type="radio"/> | Because the patient cannot tolerate chemotherapy before surgery |
| <input type="radio"/> | To ensure all the cancer cells are in the most sensitive cell cycle phase |
| <input type="radio"/> | To reduce the chance of chemotherapy resistance |
| <input type="radio"/> | To reduce the chance of micrometastasis |

- | | |
|----------------------------------|---|
| <input type="radio"/> | Because chemotherapy prior to surgery is unproven clinically |
| <input type="radio"/> | Because the patient cannot tolerate chemotherapy before surgery |
| <input type="radio"/> | To ensure all the cancer cells are in the most sensitive cell cycle phase |
| <input type="radio"/> | To reduce the chance of chemotherapy resistance |
| <input checked="" type="radio"/> | To reduce the chance of micrometastasis Correct |

Key Learning Points

Oncology

- Adjuvant chemotherapy reduces the risk of micrometastatic disease.

Explanation

Adjuvant chemotherapy is commonly given in many cancers to reduce the risk of local or distant recurrence or metastasis.

This confers a survival benefit to the patient but is not without risks which should be explained to the patient during consenting. One of the most serious complications is neutropenic sepsis, which if untreated, could result in a patient's death.

Neoadjuvant chemotherapy is commonly given to downstage a cancer to make it either operable or to reduce the need for radical surgery. It is often followed by adjuvant chemotherapy or radiotherapy.

A 56-year-old woman is recently diagnosed with small cell carcinoma of the lung.

Which of the following non-metastatic manifestations is she most likely to develop?

(Please select 1 option)

<input type="radio"/>	Eaton-Lambert syndrome
<input type="radio"/>	Ectopic PTH-related peptide secretion
<input type="radio"/>	Erythema gyratum repens
<input type="radio"/>	Hypertrophic pulmonary osteoarthropathy (HPOA)
<input type="radio"/>	Myasthenia gravis

Dr. Assem

(Please select 1 option)

<input type="radio"/>	Eaton-Lambert syndrome	This is the correct answer
<input type="radio"/>	Ectopic PTH-related peptide secretion	
<input type="radio"/>	Erythema gyratum repens	
<input type="radio"/>	Hypertrophic pulmonary osteoarthropathy (HPOA)	
<input checked="" type="radio"/>	Myasthenia gravis	Incorrect answer selected

Key Learning Points

Oncology, Respiratory Medicine

- Eaton-Lambert syndrome is a paraneoplastic syndrome with seventy percent of cases occurring in association with small cell carcinoma.

Explanation

Non-metastatic paramalignant manifestations for small cell carcinoma include:

- Inappropriate ADH and ectopic ACTH secretion
- Polymyositis
- Dementia
- Cerebellar syndrome, and
- Peripheral neuropathy.

Eaton-Lambert syndrome is also a non-metastatic paramalignant manifestations. Seventy percent occur in association with small cell carcinoma. It is an autoimmune disorder affecting release of acetylcholine at neuromuscular junction causing proximal muscle weakness, fatigability, and muscle wasting. Often, power is increased initially by exercise (reversed myasthenia effect). Weakness and fatigability can be improved with guanidine hydrochloride.

Cutaneous lesions (dermatomyositis, thrombophlebitis migrans, acanthosis nigricans, and erythema gyratum repens) are rare.

HPOA and ectopic parathyroid hormone (PTH)-related peptide secretion relates particularly to squamous cell carcinoma.

Which virus is commonly associated with nasopharyngeal carcinoma?

(Please select 1 option)

<input type="radio"/>	Epstein-Barr virus
<input type="radio"/>	Hepatitis B
<input type="radio"/>	Human papilloma virus 16
<input type="radio"/>	Human papilloma virus 18
<input type="radio"/>	Human T-lymphotrophic virus

(Please select 1 option)

<input type="radio"/>	Epstein-Barr virus	This is the correct answer
<input type="radio"/>	Hepatitis B	
<input type="radio"/>	Human papilloma virus 16	
<input type="radio"/>	Human papilloma virus 18	
<input checked="" type="radio"/>	Human T-lymphotrophic virus	Incorrect answer selected

Key Learning Points

Oncology

- Epstein-Barr virus is commonly associated with undifferentiated nasopharyngeal carcinoma.

Explanation

Epstein-Barr virus is detectable in over 90% of nasopharyngeal cancers of which the most common type is the undifferentiated form.

A 45-year-old woman presents to the oncology clinic with a screen detected left sided breast lump.

The final histology following excision is a grade 3, 14 mm invasive carcinoma with clear vascular invasion. Oestrogen and progesterone receptor status is positive, HER-2/neu overexpression is also strongly positive.

The patient is considered for adjuvant treatment with Herceptin (trastuzumab).

What is the best test for monitoring the patient while she is receiving Herceptin (trastuzumab)?

(Please select 1 option)

☐ Monthly CA-15.3 measurement

☐ Regular clinical examination

☐ Three monthly ECG

☐ Three monthly echocardiogram

☐ Three monthly mammogram

<input type="radio"/>	Monthly CA-15.3 measurement	
<input type="radio"/>	Regular clinical examination	
<input type="radio"/>	Three monthly ECG	
<input checked="" type="radio"/>	Three monthly echocardiogram	This is the correct answer
<input type="radio"/>	Three monthly mammogram	Incorrect answer selected

Key Learning Points

Oncology

- Herceptin is known to be cardiotoxic in approximately 5-10% of cases with a reduction in ejection fraction.

Explanation

Herceptin has revolutionised the treatment of Her-2/neu positive patients, however it has been linked with the development of moderate to severe heart failure in a very small minority of patients.

Herceptin appears to be directly toxic to the cardiac muscle itself with relative sparing of the electrical conductivity of the heart.

As such regular echocardiograms are the best test to assess treatment safety, a reduction of greater than 10% in ejection fraction indicating the need to stop treatment.

A 65-year-old man, with a history of smoking presents with chronic cough, haemoptysis and weight loss. His chest x ray shows a cavitating lesion.

Which of the following is the likely diagnosis?

(Please select 1 option)

<input type="radio"/>	Adenocarcinoma
<input type="radio"/>	Alveolar cell carcinoma
<input type="radio"/>	Small cell carcinoma
<input type="radio"/>	Squamous cell carcinoma
<input type="radio"/>	Undifferentiated large cell carcinoma

(Please select 1 option)

<input type="radio"/>	Adenocarcinoma	
<input type="radio"/>	Alveolar cell carcinoma	
<input type="radio"/>	Small cell carcinoma	
<input type="radio"/>	Squamous cell carcinoma	This is the correct answer
<input checked="" type="radio"/>	Undifferentiated large cell carcinoma	Incorrect answer selected

Key Learning Points

Oncology, Radiology, Respiratory Medicine

- Causes of cavitating lung lesions include malignancy (of which squamous cell carcinoma is the most common), infection (*S. aureus*, TB, *Klebsiella*, PCP), infarction, granulomatosis with polyangiitis and rheumatoid nodules.

Explanation

The combination of cough, haemoptysis, and weight loss in a smoker should lead you to consider lung carcinoma as a possible diagnosis. A lifelong smoker has a 20 to 30 times increased risk of lung carcinoma compared to a non-smoker. Haemoptysis in particular is one of the common presenting symptoms of carcinoma.

The two major forms of lung carcinoma are non-small cell lung carcinoma (85%) and small cell lung carcinoma (15%). Non-small cell lung carcinomas are further divided into squamous cell (35%), adenocarcinoma (30%), undifferentiated large cell (10%) and bronchioalveolar cell (5%).

Squamous cell carcinomas usually arise from a central airway, and cavitate. Small cell carcinomas arise in the central airways and grow rapidly. Adenocarcinomas may be peripheral and slow-growing; they are the commonest lung carcinomas in non-smokers. Smoking is associated with all forms but is most strongly linked with small-cell and squamous cell carcinoma.

Other causes of cavitating lung lesions include:

- Infection (*Staphylococcus aureus*, tuberculosis, *Klebsiella*, *Pneumocystis jirovecii*)
- Pulmonary infarcts
- Granulomatosis with polyangiitis, and
- Rheumatoid nodules.

Dr. Arjun

Which of the following bacteria confer a decreased risk of developing an oesophageal adenocarcinoma?

(Please select 1 option)

☐ *Escherichia coli*

☐ *Helicobacter pylori*

☐ *Streptococcus bovis*

☐ *Streptococcus pneumoniae*

☐ *Streptococcus viridans*

Please select 1 option

<input type="radio"/>	<i>Escherichia coli</i>	
<input checked="" type="radio"/>	<i>Helicobacter pylori</i>	This is the correct answer
<input type="radio"/>	<i>Streptococcus bovis</i>	
<input type="radio"/>	<i>Streptococcus pneumoniae</i>	
<input checked="" type="radio"/>	<i>Streptococcus viridans</i>	Incorrect answer selected

Key Learning Points

Oncology

- *H. pylori* has been shown in population studies to decrease the risk of oesophageal cancer.

Explanation

Although the mechanism of action is unclear population studies have shown a lower incidence of oesophageal cancer in patients infected with *H. pylori*.

Colon carcinoma has been associated with increased risk of streptococcus bovis invasive infection, and *Escherichia coli* to a lesser extent, but there is no evidence of a protective effect against oesophageal carcinoma.

There is no evidence for a protective effect of either *Streptococcus pneumoniae* or viridans.

Dr. Assem

What is the mode of inheritance of hereditary non-polyposis colorectal cancer (Lynch syndrome)?

(Please select 1 option)

☐ Autosomal dominant

☐ Autosomal recessive

☐ Co-dominance

☐ Incomplete penetrance

☐ X linked

Dr. Assen

(Please select 1 option)

<input type="radio"/>	Autosomal dominant	This is the correct answer
<input type="radio"/>	Autosomal recessive	
<input type="radio"/>	Co-dominance	
<input type="radio"/>	Incomplete penetrance	
<input checked="" type="radio"/>	X linked	Incorrect answer selected

Key Learning Points

Oncology

- HNPCC is inherited in an autosomal dominant manner.

Explanation

Lynch syndrome (HNPCC or hereditary non-polyposis colorectal cancer) is an autosomal dominant genetic condition which has a high risk of colon cancer as well as other cancers including:

- Endometrial
- Ovary
- Stomach
- Small intestine
- Hepatobiliary tract
- Upper urinary tract
- Brain and
- Skin.

The increased risk for these cancers is due to inherited mutations that impair DNA mismatch repair.

A 45-year-old male is being treated with imatinib for chronic myeloid leukaemia (CML).

To which of the following classes does imatinib belong?

(Please select 1 option)

<input type="radio"/>	Angiogenesis inhibitor
<input type="radio"/>	Epidermal growth factor inhibitor
<input type="radio"/>	Interferon
<input type="radio"/>	Proteasome inhibitor
<input type="radio"/>	Signal transduction inhibitor

<input type="radio"/>	Angiogenesis inhibitor	
<input type="radio"/>	Epidermal growth factor inhibitor	
<input type="radio"/>	Interferon	
<input type="radio"/>	Proteasome inhibitor	
<input checked="" type="radio"/>	Signal transduction inhibitor	Correct

Key Learning Points

Oncology, Pharmacology

- Imatinib is a tyrosine kinase inhibitor which blocks the active site of the BCR-Abl protein, resulting in reduced cell proliferation and motility, and increased apoptosis.

Explanation

Imatinib is a tyrosine kinase inhibitor which is fairly specific for the bcr/abl protein. It blocks the active site, which has a number of downstream effects. The result is reduced cell proliferation, reduced cell motility, decreased adhesion and increased apoptosis.

NICE recommend that imatinib should be used to treat people in the accelerated or **blast crisis** phase of CML. It is also indicated in the treatment of gastrointestinal stromal tumours.

Which of the following chemotherapeutic agents inhibits topoisomerase?

(Please select 1 option)

☐ Bleomycin

☐ Cisplatin

☐ Docetaxel

☐ Etoposide

☐ Vincristine

<input type="radio"/>	Bleomycin	
<input type="radio"/>	Cisplatin	
<input type="radio"/>	Docetaxel	
<input type="radio"/>	Etoposide	This is the correct answer
<input checked="" type="radio"/>	Vincristine	Incorrect answer selected

Key Learning Points

Oncology

- Etoposide is an inhibitor of topoisomerase 2.

Explanation

The topoisomerase inhibitors are a major class of chemotherapeutic agents and work by arresting the cell in S phase, and thereby inducing apoptosis.

Etoposide inhibits DNA topoisomerase II, thereby inducing errors in DNA synthesis at the pre-mitotic stage of cell division.

Bleomycin binds directly to DNA, inducing strand breaks and therefore degradation.

Cisplatin cross-links DNA, activating several signal transduction pathways which culminate in cell apoptosis.

Docetaxel prevents microtubule disassembly, and therefore limits the amount of free tubulin available for cell replication.

Vincristine is a vinca alkaloid, which inhibits microtubule formation during metaphase of mitosis.

A 75-year-old woman presents with rapidly deteriorating mobility over the past two months and is referred to the Emergency department by her GP for review. She had recently been investigated for anaemia, and has had an upper GI endoscopy, which was unremarkable. The patient has a past history of hypertension and an inferior MI but is otherwise well. Medications include ramipril, low-dose aspirin, and simvastatin.

Examination reveals a BP of 115/80 mmHg, with no significant postural drop. There is nystagmus, past-pointing, dysidiadochokinesis, dysarthria, and truncal ataxia when you ask her to get up and walk across the room. Respiratory and abdominal systems appear normal.

Investigations:

Haemoglobin	102 g/L	(115-160)
White cell count	$6.2 \times 10^9/L$	(6-10)
Platelet count	$201 \times 10^9/L$	(150-400)
Na	136 mmol/L	(135-145)
K	3.9 mmol/L	(3.5-5.5)
Creatinine	112 $\mu\text{mol/L}$	(60-90)
Anti-GAD antibody	positive	
Anti-Yo antibody	positive	

CT head is unremarkable.

USS abdomen and pelvis shows bulky uterus, no ovarian masses.

What is the most likely diagnosis?

(Please select 1 option)

<input type="radio"/>	Cerebellar infarct
<input type="radio"/>	Multisystem atrophy
<input type="radio"/>	Normal pressure hydrocephalus
<input type="radio"/>	Paraneoplastic cerebellar degeneration
<input type="radio"/>	Stiff person syndrome

(Please select 1 option)

<input type="radio"/>	Cerebellar infarct	
<input type="radio"/>	Multisystem atrophy	
<input type="radio"/>	Normal pressure hydrocephalus	
<input type="radio"/>	Paraneoplastic cerebellar degeneration	This is the correct answer
<input checked="" type="radio"/>	Stiff person syndrome	Incorrect answer selected

Key Learning Points

Oncology

- Endometrial cancer is increasingly recognised as a cause of paraneoplastic cerebellar degeneration, which is associated with anti-Yo antibodies.

Explanation

Paraneoplastic cerebellar degeneration (PCD) has been described in association with endometrial cancer, and presents with the features of severe, progressive cerebellar dysfunction seen here. The disease is recognised to be associated with Yo, Ri, and Tr antibodies, Yo being seen most often when the disease is associated with gynaecological cancer. Removal of the primary lesion often results in improved symptoms, and immunoglobulin infusions can also be used to moderate the autoimmunity seen.

An MRI and biopsy would be required to confirm the diagnosis, but the autoantibodies together with the USS make this the most likely diagnosis here.

Multisystem atrophy is associated with autonomic dysfunction, which is not described in this case; normal pressure hydrocephalus would be associated with memory loss, gait disturbance, and incontinence. Stiff person syndrome results in progressive largely proximal rigidity, rather than the cerebellar dysfunction seen here.

What is the best initial treatment for superior vena cava obstruction (SVCO)?

(Please select 1 option)

<input type="radio"/>	CT scan of the chest
<input type="radio"/>	High dose dexamethasone prescription
<input type="radio"/>	Referral for urgent radiotherapy to the superior vena cava
<input type="radio"/>	Referral for urgent stenting of the superior vena cava
<input type="radio"/>	Therapeutic enoxaparin administration

Dr. Assen

Please select 1 option

<input type="radio"/>	CT scan of the chest	
<input type="radio"/>	High dose dexamethasone prescription	This is the correct answer
<input type="radio"/>	Referral for urgent radiotherapy to the superior vena cava	
<input type="radio"/>	Referral for urgent stenting of the superior vena cava	
<input checked="" type="radio"/>	Therapeutic enoxaparin administration	Incorrect answer selected

Key Learning Points

Oncology

- Initial treatment for superior vena cava obstruction is with steroids, which will reduce the oedema and improve venous return.

Explanation

Superior vena cava obstruction is an oncological emergency.

Initial treatment with steroids will reduce the surrounding oedema and improve venous return from the head and neck, improving symptoms and providing extra time to ensure the correct diagnosis and subsequent treatment. If possible, an attempt should be made to obtain a tissue diagnosis, as some tumours respond to radiotherapy whereas others are more sensitive to chemotherapy. Tumours which are very chemosensitive, such as germ cell and lymphoma, can cause superior vena cava obstruction.

Mediastinal radiotherapy leads to symptomatic relief in 80% of patients, although case studies have shown this does not always correlate to patency of the superior vena cava.

It is important to note that in 2004 NICE recommended considering stenting in the majority of cases of SVCO. This is a minimally invasive procedure which relieves symptoms quicker than chemotherapy or radiotherapy.

Whilst a CT scan may be useful if determining the cause of obstruction, it has no therapeutic benefit.

Enoxaparin will be of no benefit as the cause of the obstruction is extrinsic, rather than clot within the SVC itself.

Dr. Assem

A 35-year-old woman is seen in the oncology clinic following a diagnosis of a grade 3, 14 mm invasive breast cancer with no vascular invasion.

0 of 4 axillary lymph nodes were involved and excision margins were complete.

She is considered for adjuvant chemotherapy and hormone treatments.

Which of the following endocrine agents would be prescribed for this patient?

(Please select 1 option)

☐ Anastrozole

☐ Exemestane

☐ Fulvestrant

☐ Letrozole

☐ Tamoxifen

<input type="radio"/>	Anastrozole
<input type="radio"/>	Exemestane
<input checked="" type="radio"/>	Fulvestrant Incorrect answer selected
<input type="radio"/>	Letrozole
<input type="radio"/>	Tamoxifen This is the correct answer

Key Learning Points

Oncology

- Tamoxifen is used for adjuvant hormone treatment in pre-menopausal women first line. Anastrozole is used for adjuvant hormone treatment in post-menopausal women first line.

Explanation

Tamoxifen is the first line adjuvant hormone treatment in pre-menopausal women with ER-positive invasive breast cancer. Aromatase inhibitors such as anastrozole are used first line for adjuvant hormone treatment in post-menopausal women with ER-positive invasive breast cancer who are at medium or high risk of disease recurrence. Tamoxifen should be offered to women who are at low risk of disease recurrence, or if aromatase inhibitors are not tolerated or are contraindicated.

In this patient, it is not appropriate to use an aromatase inhibitor as the patient's ovaries will be producing oestrogen, which could drive further cancer development.

Fulvestrant is a new pure anti-oestrogen agent which appears to be as effective as anastrozole. It is given by sub-cutaneous injection once every three weeks. Fulvestrant is not currently given first line in post-menopausal women but this may change in the near future.

A 64-year-old man presents with haematuria.

Cystoscopy discovers a transitional cell carcinoma of the bladder.

Occupational exposure to which of the following is a recognised risk factor for bladder cancer?

(Please select 1 option)

<input type="radio"/>	Aflatoxin
<input type="radio"/>	Aniline dye
<input type="radio"/>	Beryllium
<input type="radio"/>	Mercury
<input type="radio"/>	<i>Strongyloides stercoralis</i>

<input type="radio"/>	Aflatoxin	
<input type="radio"/>	Aniline dye	This is the correct answer
<input type="radio"/>	Beryllium	
<input type="radio"/>	Mercury	
<input checked="" type="radio"/>	<i>Strongyloides stercoralis</i>	Incorrect answer selected

Key Learning Points

Oncology

- Risk factors for bladder cancer include exposure to aniline dyes in the printing and textile industry.

Explanation

Risk factors for bladder cancer include:

- Smoking
- Exposure to aniline dyes in the printing and textile industry
- Rubber manufacture
- Cyclophosphamide
- Schistosomiasis - a risk factor for squamous cell carcinoma of the bladder, rather than transitional cell carcinoma, which is the most common histology for bladder carcinoma

By what mechanism do the platinum based chemotherapies cause DNA damage and cell death?

(Please select 1 option)

<input type="radio"/>	Alkylating agent
<input type="radio"/>	Antimetabolite
<input type="radio"/>	DNA cross linkage
<input type="radio"/>	Inhibition of topoisomerase
<input type="radio"/>	Unknown

(Please select 1 option)

<input type="radio"/>	Alkylating agent
<input type="radio"/>	Antimetabolite
<input type="radio"/>	DNA cross linkage This is the correct answer
<input type="radio"/>	Inhibition of topoisomerase
<input checked="" type="radio"/>	Unknown Incorrect answer selected

Key Learning Points

Oncology

- Platinum based chemotherapies cause cell death by DNA cross linkage.

Explanation

Cisplatin cross-links DNA in several different ways, interfering with cell division by mitosis.

The damaged DNA elicits DNA repair mechanisms, which in turn activate apoptosis when repair proves impossible.

Examples of platinum based chemotherapies are cisplatin, carboplatin and oxaliplatin.

Dr. Assem

You are taking ward referrals on behalf of the renal team and are asked to see a 24-year-old woman who has been undergoing chemotherapy for acute myeloid leukaemia.

Unfortunately over the past 24 hours her condition has deteriorated and she is now oliguric; this is associated with a rise in her creatinine to 420 $\mu\text{mol/l}$ (79-118).

Which of the following treatments would have been most effective in preventing this episode?

(Please select 1 option)

<input type="radio"/>	Colchicine
<input type="radio"/>	IV normal saline
<input type="radio"/>	Naproxen
<input type="radio"/>	Prednisolone
<input type="radio"/>	Rasburicase

<input type="radio"/>	Colchicine
<input type="radio"/>	IV normal saline
<input type="radio"/>	Naproxen
<input type="radio"/>	Prednisolone
<input checked="" type="radio"/>	Rasburicase Correct

Key Learning Points

Oncology

- Whilst ensuring adequate hydration and alkalinisation of urine is of value, rasburicase, (recombinant urate oxidase) is effective when used both pre and post the onset of chemotherapy in reducing urate accumulation.

Explanation

Tumour lysis syndrome is recognised after the onset of chemotherapy in patients with acute leukaemia.

Whilst ensuring adequate hydration and alkalinisation of urine is of value, rasburicase, (recombinant urate oxidase) is effective when used both pre and post the onset of chemotherapy in reducing urate accumulation.

The commonest reported side effect of rasburicase therapy is fever associated with administration and rasburicase overdose may lead to accumulation of hydrogen peroxide.

Other options for the management of tumour lysis syndrome include

- Prophylactic allopurinol
- Acetazolamide to drive urine alkalinisation.

A man presents with generalised fatigue and weakness. A diagnosis of Eaton-Lambert syndrome is made.

An antibody to what cellular component is found in this condition?

(Please select 1 option)

<input type="radio"/>	Anticholinesterase
<input type="radio"/>	Mitochondria
<input type="radio"/>	Potassium channels
<input type="radio"/>	Sodium channels
<input type="radio"/>	Voltage gated calcium channels

<input type="radio"/>	Anticholinesterase
<input type="radio"/>	Mitochondria
<input type="radio"/>	Potassium channels
<input type="radio"/>	Sodium channels
<input checked="" type="radio"/>	Voltage gated calcium channels Correct

Key Learning Points

Oncology

- Eaton-Lambert syndrome is associated with the presence of antibodies against the voltage dependent calcium channels and is a paraneoplastic phenomenon associated with bronchial carcinoma.

Explanation

The EL syndrome is rare and unlike myasthenia gravis which affects mostly women primarily affects men over the age of 40 and is usually associated with an underlying bronchial neoplasm.

Strength usually is reduced in proximal muscles of the legs and arms producing a waddling gait and difficulty elevating the arms.

The disorder is associated with the presence of antibodies against the voltage dependent calcium channels.

A 76-year-old woman has had Paget's disease of bone for at least 15 years. She develops a destructive mass in the bony pelvis and a diagnosis of primary tumour is considered.

What is the most likely primary tumour?

(Please select 1 option)

<input type="radio"/>	Chondrosarcoma
<input type="radio"/>	Exostosis
<input type="radio"/>	Multiple myeloma
<input type="radio"/>	Osteoma
<input type="radio"/>	Osteosarcoma

<input type="radio"/>	Chondrosarcoma
<input type="radio"/>	Exostosis
<input type="radio"/>	Multiple myeloma
<input type="radio"/>	Osteoma
<input checked="" type="radio"/>	Osteosarcoma Correct

Key Learning Points

Oncology

- Osteogenic sarcoma complicates 5% of cases of Paget's disease.

Explanation

Paget's disease of bone usually occurs in later life.

In Paget's disease the continual repair process of bone is disturbed and ends at the stage of vascular osteoid bone. Bones are very weak.

Osteogenic sarcoma complicates 5% of cases.

Which tumour marker is most commonly raised in ovarian cancers?

(Please select 1 option)

<input type="radio"/>	AFP
<input type="radio"/>	Beta-HCG
<input type="radio"/>	CA125
<input type="radio"/>	CA19-9
<input type="radio"/>	CEA

<input type="radio"/>	AFP	
<input type="radio"/>	Beta-HCG	
<input type="radio"/>	CA125	This is the correct answer
<input type="radio"/>	CA19-9	
<input checked="" type="radio"/>	CEA	Incorrect answer selected

Key Learning Points

Oncology

- CA125 is most commonly used to monitor ovarian cancer.

Explanation

- CEA is used to monitor colorectal and breast carcinoma
- CA19-9 is used primarily to monitor pancreatic carcinoma response
- Beta-HCG and AFP are used to monitor testicular carcinoma, and are also raised in germ cell tumours of the ovary
- AFP by itself is useful in monitoring liver carcinoma

CA125 is most commonly used to monitor epithelial ovarian carcinoma but can also be raised in endometrial, lung, breast and gastrointestinal carcinoma.

A 25-year-old man is diagnosed with a testicular seminoma and treated with BEP chemotherapy.

His staging CT scan reveals para-aortic lymphadenopathy and he is referred from the multi-disciplinary meeting for external beam radiotherapy.

He is admitted after his third fraction of radiotherapy with severe community acquired pneumonia and admitted to a lead-lined side-room on an oncology ward.

Unfortunately he deteriorates and you are fast-bleeped to attend as he is peri-arrest due to impending respiratory failure.

What radiation precautions should you take before entering the room?

(Please select 1 option)

<input type="radio"/>	Lab to be informed that bloods are taken from a patient receiving external beam radiotherapy
<input type="radio"/>	Do not enter the room unless the patient arrests
<input type="radio"/>	None
<input type="radio"/>	Pregnant women not to enter the room
<input type="radio"/>	Wear a lead-lined apron and disposable gloves

Please select 1 option

<input type="radio"/>	Lab to be informed that bloods are taken from a patient receiving external beam radiotherapy
<input type="radio"/>	Do not enter the room unless the patient arrests
<input type="radio"/>	None This is the correct answer
<input checked="" type="radio"/>	Pregnant women not to enter the room Incorrect answer selected
<input type="radio"/>	Wear a lead-lined apron and disposable gloves

Key Learning Points

Oncology

- Patients who receive external beam radiotherapy alone are not radioactive, but those who have brachytherapy or are treated with unsealed sources (such as radioactive iodine for thyroid conditions) may be.

Explanation

Much confusion surrounds the use of radiotherapy, especially how patients are cared for on the ward.

It is critical to distinguish between whether the patient has had external beam radiotherapy, brachytherapy or use of an unsealed source.

External beam radiotherapy or use of targeted intraoperative radiotherapy does not render the patient radioactive.

Use of brachytherapy methods usually involves insertion of radioactive seeds or beads which may require some radiation protection precautions. The exact precautions to be taken depend on the site, and the source used. If you are dealing with these patients you should ensure you are clear on the local radiation protection guidelines.

Use of an unsealed source, for example radio-iodine treatment of [thyroid cancer](#) or hyperthyroidism, has substantial need for precautions and patients need to be isolated in a lead-lined side room, often for several days.

In this case the patient is not radioactive and needs emergency care immediately. It is likely he is in a lead-lined side room as this is the only room available on the ward and he should be treated no differently to any other patient. No precautions need to be taken with his blood.

A 55-year-old man presents with ataxia and bilateral gynaecomastia.

Which of the following is the most likely diagnosis?

(Please select 1 option)

- | | |
|-----------------------|--|
| <input type="radio"/> | Bronchial carcinoma |
| <input type="radio"/> | Hypereosinophilic syndrome |
| <input type="radio"/> | Klinefelter's syndrome |
| <input type="radio"/> | Long term treatment with cyclophosphamide for granulomatosis with polyangiitis |
| <input type="radio"/> | Long term treatment with oral steroids for chronic asthma |

- | | | |
|----------------------------------|--|----------------------------|
| <input type="radio"/> | Bronchial carcinoma | This is the correct answer |
| <input type="radio"/> | Hypereosinophilic syndrome | |
| <input type="radio"/> | Klinefelter's syndrome | |
| <input type="radio"/> | Long term treatment with cyclophosphamide for granulomatosis with polyangiitis | |
| <input checked="" type="radio"/> | Long term treatment with oral steroids for chronic asthma | Incorrect answer selected |

Key Learning Points

Oncology, Respiratory Medicine

- Non small cell lung cancer can give rise to gynaecomastia, which may be painful and associated with testicular atrophy

Explanation

Klinefelter's and lung cancer are causes of gynaecomastia but the combination of ataxia and gynaecomastia makes it far more likely to be lung cancer.

Gynaecomastia is a non-metastatic paraneoplastic syndrome usually due to non-small cell lung cancer.

It can be painful and may be associated with testicular atrophy.

Ataxia can occur as a result of a paraneoplastic cerebellar degeneration associated with the malignancy.

A 60-year-old woman presents with a gradual onset of lumbar spine pain over the past two weeks associated with a gradual deterioration in her mobility. She has a past history of metastatic breast cancer to her bones currently controlled on anastrozole.

An emergency MRI reveals widespread metastatic deposits in her spine with encroachment at L2 causing a moderate degree of spinal cord compression.

What is the best course of action?

(Please select 1 option)

<input type="radio"/>	Emergency chemotherapy
<input type="radio"/>	Emergency radiotherapy
<input type="radio"/>	Emergency surgical decompression
<input type="radio"/>	Emergency surgical decompression and chemotherapy
<input type="radio"/>	Emergency surgical decompression and radiotherapy

<input type="radio"/>	Emergency chemotherapy	
<input type="radio"/>	Emergency radiotherapy	
<input type="radio"/>	Emergency surgical decompression	
<input checked="" type="radio"/>	Emergency surgical decompression and chemotherapy	Incorrect answer selected
<input type="radio"/>	Emergency surgical decompression and radiotherapy	This is the correct answer

Key Learning Points

Oncology

- This patient has malignant spinal cord compression. She needs surgical decompression and radiotherapy.

Explanation

Spinal cord compression is a devastating complication of metastatic disease which needs to be treated promptly.

The patient needs to be nursed flat in bed with neutral spine alignment and given high dose steroids until the MRI result is known. This should be continued until approximately 5-7 days after treatment is completed. The dose can be increased if there is worsening neurology.

Definitive treatment of MSCC is either surgery or radiotherapy. At present, relatively few patients with MSCC in the UK receive surgery. However, research evidence suggests that early surgery may be more effective than radiotherapy at maintaining mobility in a selected subset of patients. All decisions regarding the appropriate combination of treatment should be made by spinal surgeons and oncologists involved in the care of the patient. Definitive treatment should be initiated before further neurological deterioration, ideally within 24 hours.

When deciding definitive treatment the preference of the patient, neurological function, functional status, general health, likelihood of complications and prognosis should be taken into account. Age alone does not prohibit surgical management.

NICE guidelines state that radiotherapy should be offered to patients with spinal metastases which are causing spinal pain. It is not indicated with the intention of preventing spinal cord compression in asymptomatic patients.

Surgery should be considered urgently for patients with spinal metastases and evidence of structural spinal failure. The aim is achievement of spinal cord decompression and durable spinal column stability. Surgery is not curative, and therefore radiotherapy is typically given for local control of the tumour to prevent local recurrence.

In general, chemotherapy has no role in the treatment of spinal cord compression.

A 30-year-old woman has a right mastectomy and sentinel lymph node biopsy for a carcinoma diagnosed by fine needle aspiration cytology.

The histological pattern is that of a poorly differentiated carcinoma that is negative for oestrogen and progesterone receptors, as well as for HER-2. One of the sentinel lymph nodes demonstrates a metastasis.

Her 32-year-old sister is found to have a similar lesion.

Which of the following statements regarding risk factors for this lesion is the most appropriate?

(Please select 1 option)

- | | |
|-----------------------|--|
| <input type="radio"/> | A history of late menarche is likely to be present in females in this family |
| <input type="radio"/> | Fibrocystic changes were present for many years |
| <input type="radio"/> | She had a history of exposure to hydrocarbon compounds |
| <input type="radio"/> | She has a positive antinuclear antibody test |
| <input type="radio"/> | These findings suggest a BRCA-1 mutation |

- | | |
|----------------------------------|--|
| <input type="radio"/> | A history of late menarche is likely to be present in females in this family |
| <input type="radio"/> | Fibrocystic changes were present for many years |
| <input type="radio"/> | She had a history of exposure to hydrocarbon compounds |
| <input type="radio"/> | She has a positive antinuclear antibody test |
| <input checked="" type="radio"/> | These findings suggest a BRCA-1 mutation Correct |

Key Learning Points

Oncology

- A pattern of early breast cancers in a family may indicate a genetic cause such as the BRCA-1 mutation

Explanation

A small number of breast cancers are the result of an inherited BRCA-1 mutation (or BRCA-2) but the family history of breast cancer at a young age makes this more likely.

Early menarche and late menopause and nulliparity are risks for breast cancer.

Autoimmune diseases do not appreciably increase the risk for breast cancer.

A 73-year-old man with extensive bony metastases from carcinoma of the prostate is brought to the Emergency department by his family.

They are concerned as his pain has worsened over the past few days, but increasing his morphine has only resulted in worsening drowsiness and confusion which has impacted his quality of life significantly. Currently he is managed with maximal paracetamol and 120 mg of MST BD. His past medical history includes HTN and chronic kidney disease which has been stable for years.

Investigations show:

Haemoglobin	141 g/L	(135-177)
White cell count	$7.2 \times 10^9/L$	(4-11)
Platelets	$193 \times 10^9/L$	(150-400)
Sodium	140 mmol/L	(135-146)
Potassium	4.3 mmol/L	(3.5-5)
Creatinine	132 $\mu\text{mol/L}$	(79-118)

Which of the following is the most appropriate way to manage his pain relief?

(Please select 1 option)

<input type="radio"/>	Change him to a three day fentanyl patch
<input type="radio"/>	Reduce his MST to 80 mg BD
<input type="radio"/>	Reduce his MST to 100 mg BD and add naproxen
<input type="radio"/>	Start a subcutaneous morphine syringe driver
<input type="radio"/>	Stop his MST and titrate oramorph to his pain

(Please select 1 option)

<input type="radio"/>	Change him to a three day fentanyl patch	
<input type="radio"/>	Reduce his MST to 80 mg BD	
<input type="radio"/>	Reduce his MST to 100 mg BD and add naproxen	This is the correct answer
<input type="radio"/>	Start a subcutaneous morphine syringe driver	
<input checked="" type="radio"/>	Stop his MST and titrate oramorph to his pain	Incorrect answer selected

Key Learning Points

Oncology

- The key to management of bony metastases is a multimodal approach to managing pain, which involves opiates, paracetamol and an appropriate non-steroidal anti-inflammatory agent.

Explanation

The key to management of bony metastases is a multimodal approach to managing pain, which involves opiates, paracetamol and an appropriate non-steroidal anti-inflammatory agent. This patient is on both morphine (MST - a slow release preparation of morphine sulphate) and paracetamol.

In this case he is too drowsy because of his morphine, but it is not appropriate to stop it and titrate oramorph when he complains of pain. It is much more appropriate to engineer a small dose reduction and add naproxen. Whilst his creatinine is abnormal, this may improve if you are able to improve his drowsiness so that he can eat and drink. You would want to monitor it closely and make sure his renal function wasn't deteriorating with the addition of NSAIDs. It is not directly contraindicated but monitoring should take place.

We are given no indication that he is unable to eat and drink, so a subcutaneous morphine syringe driver is not required at this stage.

A 35-year-old woman develops an erythematous rash over her left nipple after breast feeding her child.

It is not painful but has not resolved with multiple courses of antibiotics. She has noted some recent nipple inversion.

What is the best investigation?

(Please select 1 option)

- | | |
|-----------------------|------------------------------|
| <input type="radio"/> | CT chest, abdomen and pelvis |
| <input type="radio"/> | Mammogram |
| <input type="radio"/> | MRI of breast |
| <input type="radio"/> | Skin biopsy |
| <input type="radio"/> | Ultrasound of breast |

Please select 1 option

<input type="radio"/>	CT chest, abdomen and pelvis
<input type="radio"/>	Mammogram
<input type="radio"/>	MRI of breast
<input type="radio"/>	Skin biopsy This is the correct answer
<input checked="" type="radio"/>	Ultrasound of breast Incorrect answer selected

Key Learning Points

Oncology

- This patient likely has Paget's disease of the breast; a skin biopsy will confirm this.

Explanation

This is Paget's disease of the breast. It presents insidiously and is similar in appearance to eczema; as such it often goes undiagnosed for several months.

Most cases are associated with invasive breast cancer, or ductal carcinoma in situ. Malignant cells infiltrate into the epidermis via the mammary duct epithelium, leading to thickening of the affected skin.

Skin biopsy with immunohistochemistry is the first line investigation. Investigations should also be done for underlying malignancy - biopsy if a lump is palpable, imaging if no lump is palpable.

Management is usually surgical with post-operative radiotherapy being offered to young patients with a high chance of recurrence.

A 23-year-old man with a teratoma of the testis attended for review following chemotherapy.

Which one of the following serum tumour markers is of most value in monitoring the clinical progression of his disease?

(Please select 1 option)

<input type="radio"/>	Alpha-fetoprotein
<input type="radio"/>	Carbohydrate antigen CA 15-3
<input type="radio"/>	Carbohydrate antigen CA 19-9
<input type="radio"/>	Carbohydrate antigen CA 125
<input type="radio"/>	Carcinoembryonic antigen

<input type="radio"/>	Alpha-fetoprotein	This is the correct answer
<input type="radio"/>	Carbohydrate antigen CA 15-3	
<input type="radio"/>	Carbohydrate antigen CA 19-9	
<input type="radio"/>	Carbohydrate antigen CA 125	
<input checked="" type="radio"/>	Carcinoembryonic antigen	Incorrect answer selected

Key Learning Points

Oncology

- AFP levels are part of post resection testicular teratoma surveillance.

Explanation

Alpha-fetoprotein (AFP), beta-hCG and PLAP (placental like isoenzyme of alkaline phosphatase) are the major tumour markers in use for the monitoring of testicular teratoma.

CA 125 is a tumour marker used for ovarian tumours.

CA 15-3 is a tumour marker for breast carcinoma, and CA 19-9 is used in pancreatic tumours.

Carcinoembryonic antigen (CEA) is a marker for colonic tumours.

Which of the following regarding salivary gland pleomorphic adenomas is correct?

(Please select 1 option)

- | | |
|-----------------------|---|
| <input type="radio"/> | Are more common in males than in females |
| <input type="radio"/> | Are more common in the sub-mandibular than the parotid gland |
| <input type="radio"/> | In the parotid gland most commonly arise medial to the facial nerve |
| <input type="radio"/> | They are the most common salivary gland tumour |
| <input type="radio"/> | Typically enhance following intravenous contrast injection in CT |

Dr. Assen

<input type="radio"/>	Are more common in males than in females	
<input type="radio"/>	Are more common in the sub-mandibular than the parotid gland	
<input type="radio"/>	In the parotid gland most commonly arise medial to the facial nerve	
<input type="radio"/>	They are the most common salivary gland tumour	This is the correct answer
<input checked="" type="radio"/>	Typically enhance following intravenous contrast injection in CT	Incorrect answer selected

Key Learning Points

Oncology, Radiology

- Salivary gland pleomorphic adenomas are the most common salivary gland tumour and are benign.

Explanation

They are the most common salivary gland tumour representing 70% to 80% of all benign salivary gland tumours.

They occur most often in women over 40.

Eighty four per cent occur in the parotid gland.

Ninety per cent of parotid gland pleomorphic adenomas arise lateral to the facial nerve.

Usually they do not enhance.

A 70-year-old woman with known metastatic breast cancer to her lungs and bones presents with a symptomatic pleural effusion whilst taking anastrozole.

Subsequent drainage of this effusion reveals it to be malignant in nature.

The breast MDT suggests switching her endocrine agent to exemestane.

What is the mechanism of action of exemestane?

(Please select 1 option)

☐ Competitive oestrogen receptor antagonist

☐ Non-steroidal aromatase inhibitor

☐ Pure oestrogen receptor antagonist

☐ Steroidal aromatase inhibitor

☐ Synthetic progesterone derivative

<input type="radio"/>	Competitive oestrogen receptor antagonist
<input type="radio"/>	Non-steroidal aromatase inhibitor
<input type="radio"/>	Pure oestrogen receptor antagonist
<input checked="" type="radio"/>	Steroidal aromatase inhibitor Correct
<input type="radio"/>	Synthetic progesterone derivative

Key Learning Points

Oncology

- Exemestane is an oral steroidal aromatase inhibitor used in second line treatment of metastatic breast cancer.

Explanation

Exemestane is an oral steroidal aromatase inhibitor used in second line treatment of metastatic breast cancer.

Anastrozole and letrozole are non-steroidal aromatase inhibitors.

Tamoxifen is a competitive oestrogen receptor antagonist with partial oestrogen agonist actions on bone.

Fulvestrant is a pure oestrogen receptor antagonist given via the subcutaneous route.

Megace is a synthetic progesterone derivative with anti-tumour properties.

A 40-year-old woman presents to her GP with a left sided breast lump.

On examination it measures approximately 25 mm and has associated skin tethering. Examination of her axilla reveals a 20 mm mobile lymph node, examination is otherwise unremarkable.

What is the best sequence of investigation of this lump?

(Please select 1 option)

- | | |
|-----------------------|---|
| <input type="radio"/> | CT breast, mammography, ultrasound guided fine needle aspiration |
| <input type="radio"/> | Physical examination, breast MRI, CT chest abdomen and pelvis |
| <input type="radio"/> | Physical examination, mammography, breast MRI |
| <input type="radio"/> | Physical examination, mammography, CT guided fine needle aspiration |
| <input type="radio"/> | Physical examination, mammography, ultrasound guided fine needle aspiration |

<input type="radio"/>	CT breast, mammography, ultrasound guided fine needle aspiration	
<input type="radio"/>	Physical examination, breast MRI, CT chest abdomen and pelvis	
<input type="radio"/>	Physical examination, mammography, breast MRI	
<input type="radio"/>	Physical examination, mammography, CT guided fine needle aspiration	
<input checked="" type="radio"/>	Physical examination, mammography, ultrasound guided fine needle aspiration	Correct

Key Learning Points

Oncology

- This patient likely has an underlying breast cancer which needs triple assessment with physical examination, mammography and ultrasound guided fine needle aspiration.

Explanation

The triple assessment of a breast lump is essential to diagnose a breast lump accurately. It involves physical examination, mammography and then ultrasound guided FNA.

A marker may be inserted at this time if the lump is difficult to palpate to aid the surgeons at the time of excision.

Breast MRI is used for patients with invasive breast cancer in the following circumstances:

- if there is a discrepancy regarding the extent of disease from clinical examination, mammography and ultrasound assessment for planning treatment
- if breast density precludes accurate mammographic assessment
- to assess tumour size if breast conserving surgery is being considered for invasive lobular cancer

Staging CT is not used routinely in primary breast cancer, only if there is suspicion of metastatic spread.

Reference:

A 75-year-old man with squamous cell carcinoma of the lung is thought to have resectable disease.

Which of the following would be a contraindication to surgery?

(Please select 1 option)

- | | |
|-----------------------|---|
| <input type="radio"/> | Clubbing |
| <input type="radio"/> | Forced expiratory volume (FEV) ₁ of 0.75 L |
| <input type="radio"/> | His age of 75 years |
| <input type="radio"/> | Pleural effusion |
| <input type="radio"/> | Syndrome of Inappropriate ADH |

- ☐ Clubbing
- ☒ Forced expiratory volume (FEV1) of 0.75 L This is the correct answer
- ☐ His age of 75 years
- ☐ Pleural effusion
- ☒ Syndrome of inappropriate ADH Incorrect answer selected

Key Learning Points

Oncology: Respiratory Medicine

- A post-bronchodilator FEV1 of >1.5 litres is needed for a lobectomy, >2 litres for a pneumonectomy

Explanation

Assessing fitness for surgery in cases of lung carcinoma can be difficult, and requires consideration of a number of factors.

Lung function needs to be assessed prior to referral to the thoracic surgical team. A post-bronchodilator FEV1 of >1.5 litres is sufficient if a lobectomy is all that is required. If the tumour necessitates a pneumonectomy, the post-bronchodilator FEV should be more than 2 litres.

Below these values, further investigation in the form of estimation of transfer factor, oxygen saturations at rest and quantitative isotope perfusion should be undertaken. These values can be used to calculate estimated postoperative FEV1 and postoperative transfer factor.

Patients with an estimated postoperative FEV1 less than 40% predicted, transfer factor more than 40% predicted and oxygen saturations of more than 90% on air are considered to be average risk. Those with an FEV1 and transfer factor of less than 40% are thought to be high risk. All other combinations are indications for exercise testing (shuttle walk tests or formal cardiopulmonary exercise tests).

High-risk patients identified by this step-wise testing should be discussed at a formal multidisciplinary meeting, and should be considered for more limited resection or non-surgical management.

Perioperative morbidity increases with advancing age, and more elderly patients typically require more intensive perioperative support. However, surgery for clinically stage I and II disease can be as effective in patients over the age of 70 and should be considered regardless of age. Age over 80 alone is not a contraindication to lobectomy or wedge resection for stage I disease, but may be a contraindication to pneumonectomy and each case should be assessed individually.

Cardiovascular fitness should be assessed with a preoperative ECG. Those with an audible murmur should have an echocardiogram. A recent MI (within 6 months) is an indication for cardiology opinion prior to surgery.

All patients with a history of previous stroke, transient ischaemic attacks, or carotid bruits should be assessed with carotid Doppler studies. Those with significant stenosis should be assessed by a vascular surgeon or stroke physician.

Patients presenting with preoperative weight loss of more than 10% and/or performance status of WHO 2 or worse should have their BMI and albumin measured, and metastatic disease carefully excluded.

Patients who are anatomically suited to resection but have more than one adverse medical factor should have their management discussed formally at a multidisciplinary meeting.

In addition to the above patient factors, there are characteristics of the tumour which will help determine operability. All patients being considered for surgery should have a plain chest radiograph and CT scan of the thorax, liver and adrenal glands. Confirmatory percutaneous biopsy in patients presenting with peripheral lesions is not mandatory, particularly if the lesion was not present on previous chest radiographs. Patients with mediastinal nodes greater than 1cm in diameter on CT should undergo biopsy.

Patients with stage I (cT1N0 and cT2N0) and stage II (cT1N1, cT2N1 and cT3N0) tumours should be considered operable. Patients with stage IIIA (cT3N1 and cT1-3N2) tumours have a low chance of being cured by surgery alone, but it can be used in the context of a trial in combination with adjuvant chemotherapy. Stage IIIB and IV tumours should generally be considered inoperable.

Whilst most pleural effusions associated with lung carcinoma are due to the tumour (and results in classification as a T4 tumour), in some patients cytological examination of the fluid is negative. If this is confirmed on more than one occasion, and clinical judgement dictates that the effusion is not related to the tumour, the effusion should be excluded as a staging element. This may mean they are suitable for surgery, and therefore it is not the correct answer here.

Paraneoplastic conditions, such as clubbing and syndrome of inappropriate ADH (SIADH) are not linked to the stage of disease and are therefore not automatic contraindications to surgery.

Which one of the following statements is true of B cell CLL?

(Please select 1 option)

<input type="radio"/>	Autoimmune thrombocytopenia is uncommon
<input type="radio"/>	Diffuse infiltration of bone marrow indicates good prognosis
<input type="radio"/>	Late transformation to ALL occurs in the majority of patients
<input type="radio"/>	Reduced immunoglobulins are a risk of recurrent viral infections
<input type="radio"/>	Stage A disease should be treated with chemotherapy

☐ Autoimmune thrombocytopenia is uncommon **This is the correct answer**

☐ Diffuse infiltration of bone marrow indicates good prognosis

☐ Late transformation to ALL occurs in the majority of patients

☒ Reduced immunoglobulins are a risk of recurrent viral infections **Incorrect answer selected**

☐ Stage A disease should be treated with chemotherapy

Key Learning Points

Oncology

- Autoimmune thrombocytopaenia is uncommon in CLL.

Explanation

Immune thrombocytopenia occurs in only 2% of cases.

Hypogammaglobulinaemia predisposes to encapsulated bacteria, for example, pneumococcus/ *H. influenzae* causes death in 30% cases.

There are two transformations in chronic lymphocytic leukaemia (CLL):

- CLL/PL (10%)
- Richter's syndrome (5% = high grade non-Hodgkin's lymphoma).

Treatment only for Stage B, C and A with clear evidence of progression.

In an asymptomatic woman, which of the following conveys the greatest risk of developing breast cancer?

(Please select 1 option)

<input type="radio"/>	Early menarche
<input type="radio"/>	Late menopause
<input type="radio"/>	Oral contraceptive use
<input type="radio"/>	Previous fibroadenoma excised aged 25
<input type="radio"/>	Two first degree relatives with breast cancer

Dr. Assem

<input type="radio"/>	Early menarche
<input type="radio"/>	Late menopause
<input type="radio"/>	Oral contraceptive use
<input type="radio"/>	Previous fibroadenoma excised aged 25
<input checked="" type="radio"/>	Two first degree relatives with breast cancer Correct

Key Learning Points

Oncology

- A strong family history is a feature in 20-25% of all breast cancer patients.

Explanation

Early menarche and late menopause both confer an additional risk of developing breast cancer thought to be due to increased hormone exposure throughout life.

Oral contraceptive use is also associated with a slight increase in risk of developing breast and also endometrial cancer.

A previous fibroadenoma does not increase the patient's risk at all.

Which of the following antiemetics is most useful following treatment with a platinum based chemotherapy?

(Please select 1 option)

<input type="radio"/>	Cyclizine
<input type="radio"/>	Dexamethasone
<input type="radio"/>	Metoclopramide
<input type="radio"/>	Ondansetron
<input type="radio"/>	Prochlorperazine

<input type="radio"/>	Cyclizine	
<input type="radio"/>	Dexamethasone	
<input type="radio"/>	Metoclopramide	
<input type="radio"/>	Ondansetron	This is the correct answer
<input checked="" type="radio"/>	Prochlorperazine	Incorrect answer selected

Key Learning Points

Oncology

- Ondansetron is the best antiemetic in this list for chemotherapy-induced nausea and vomiting.

Explanation

Post-chemotherapy nausea and vomiting are very important side effects to try and control because of the significant morbidity associated.

Not all chemotherapeutic agents are equally emetogenic; the platinum based chemotherapies are most likely to cause sickness while the antimetabolites such as 5-FU are usually well tolerated.

Treatment with a 5-HT₃ antagonist is particularly useful in platinum based chemotherapy where it also avoids the dystonic side effects noted with metoclopramide use.

A 39-year-old male is receiving cisplatin based chemotherapy as therapy for lymphoma.

Which of the following is a typical side effect of cisplatin?

(Please select 1 option)

<input type="radio"/>	Cerebellar ataxia
<input type="radio"/>	Haemorrhagic cystitis
<input type="radio"/>	Optic neuritis
<input type="radio"/>	Ototoxicity
<input type="radio"/>	Rhabdomyolysis

Please select 1 option/

<input type="radio"/>	Cerebellar ataxia
<input type="radio"/>	Haemorrhagic cystitis
<input type="radio"/>	Optic neuritis
<input checked="" type="radio"/>	Ototoxicity This is the correct answer
<input type="radio"/>	Rhabdomyolysis Incorrect answer selected

Key Learning Points

Oncology, Pharmacology

- Typical side effects of cisplatin include marrow toxicity, ototoxicity and peripheral neuropathy

Explanation

Typical side effects of cisplatin include:

- Marrow toxicity
- Ototoxicity
- Peripheral neuropathy
- Nephrotoxicity
- Alopecia, and
- Changes in taste.

Although optic neuritis is described it is not a typical side effect.

A 62-year-old male undergoes surgery for caecal carcinoma.

Which of the following tumour markers is most appropriate for the continued surveillance of this patient?

(Please select 1 option)

<input type="radio"/>	AFP
<input type="radio"/>	CA 19-9
<input type="radio"/>	CA 27-29
<input type="radio"/>	CA 125
<input type="radio"/>	CEA

<input type="radio"/>	AFP
<input type="radio"/>	CA 19-9
<input type="radio"/>	CA 27-29
<input type="radio"/>	CA 125
<input checked="" type="radio"/>	CEA Correct

Key Learning Points

Oncology

- CEA is the most appropriate tumour marker for colonic cancer

Explanation

CEA is the most appropriate tumour marker for the monitoring of potential recurrence of colonic cancer.

CEA is also elevated in breast, melanoma and pancreatic malignancy to name but a few.

The value of CA 19-9 is higher concentrations often reflect more advanced pancreatic cancer.

A 68-year-old man presents with a one month history of dyspnoea and a 3 kg weight loss.

On examination there were signs of a large left pleural effusion, confirmed on chest x ray.

Pleural fluid analysis revealed:

Protein	38 g/L
Cytology	a few lymphocytes and red blood cells

Which one of the following investigations should be considered next?

(Please select 1 option)

- ☐ Bronchoscopy
- ☐ CT scan of thorax
- ☐ Repeat pleural aspiration with biopsy
- ☐ Thoracoscopic pleural biopsy
- ☐ Tuberculin test

<input type="radio"/>	Bronchoscopy
<input type="radio"/>	CT scan of thorax This is the correct answer
<input type="radio"/>	Repeat pleural aspiration with biopsy
<input type="radio"/>	Thoracoscopic pleural biopsy
<input checked="" type="radio"/>	Tuberculin test Incorrect answer selected

Key Learning Points

Oncology, Respiratory Medicine

- A contrast CT thorax can help differentiate between benign and malignant disease and also guide further investigations if an exudate effusion is suspected.

Explanation

The aspiration results here suggest this effusion is an exudate, which would fit with it being unilateral. The next most important step would be a contrast CT thorax which can help differentiate between benign and malignant disease and also guide further investigations.

Video-assisted thoracoscopic surgery (VATS) can:

- Ensure adequate pleural biopsies are obtained
- Drain pleural fluid, and
- Allow pleurodesis to prevent recurrence.

It should be considered after other non-invasive tests have proven negative. Usually the surgeons can do bronchoscopy at the same time under general anaesthetic.

Percutaneous pleural biopsies do not produce good samples and are less often done.

Which of the following concerning diamorphine elixir for the relief of pain in terminal patients is correct?

(Please select 1 option)

<input type="radio"/>	Analgesia is enhanced if cocaine is added
<input type="radio"/>	Constipation is a characteristic sequel to treatment
<input type="radio"/>	Dependence occurs rapidly
<input type="radio"/>	Initial sedation typically continues whilst the drug is administered
<input type="radio"/>	The same amount of pain relief is produced as when the same dose is given via intramuscular injection

(Please select 1 option)

<input type="radio"/>	Analgesia is enhanced if cocaine is added	
<input type="radio"/>	Constipation is a characteristic sequel to treatment	This is the correct answer
<input type="radio"/>	Dependence occurs rapidly	
<input type="radio"/>	Initial sedation typically continues whilst the drug is administered	
<input checked="" type="radio"/>	The same amount of pain relief is produced as when the same dose is given via intramuscular injection	Incorrect answer selected

Key Learning Points

Oncology, Palliative Care, Therapeutics

- Constipation is a commonly known side effect of opiate medications.

Explanation

Sedation occurring in the first few days typically wears off, leaving the patient alert.

Hallucinations also tend to occur.

An aperient should always be added to the treatment regime.

Addiction is not a problem.

An intramuscular injection is three times more effective than the same oral dose.

(Cornwall Trainers)

Dr Assem

A 70-year-old male presents with haemoptysis.

Bronchoscopy reveals a tumour in the proximal right main bronchus.

Which of the following is a contraindication to radical radiotherapy?

(Please select 1 option)

<input type="radio"/>	Adenocarcinoma
<input type="radio"/>	FEV1 of 25% predicted
<input type="radio"/>	Involvement of the pulmonary artery
<input type="radio"/>	Ischaemic heart disease
<input type="radio"/>	Superior vena caval obstruction

<input type="radio"/>	Adenocarcinoma
<input type="radio"/>	FEV1 of 25% predicted This is the correct answer
<input type="radio"/>	Involvement of the pulmonary artery
<input checked="" type="radio"/>	Ischaemic heart disease Incorrect answer selected
<input type="radio"/>	Superior vena caval obstruction

Key Learning Points

Oncology, Radiology, Respiratory Medicine

- Patients with potentially operable tumours who are either too unfit for surgery, or who refuse surgery may be suitable for radical radiotherapy.

Explanation

Patients with potentially operable tumours who are either too unfit for surgery, or who refuse surgery may be suitable for radical radiotherapy; that is, radiotherapy with intention to cure using doses of at least 60 Gy.

Using continuous hyperfractionated accelerated radiotherapy (CHART) can improve two year survival significantly from 20% to 29% compared with conventional radiotherapy¹.

Contraindications are tumours larger than 4 cm and poor pulmonary function (generally taken as FEV1 less than 50% predicted).

A 53-year-old woman is admitted with nausea and vomiting. She has inoperable cancer with pain due to posterior abdominal wall infiltration. This has been controlled well with Kapake (codeine 30 mg and paracetamol 500 mg), two tablets four times per day.

Which is the best option for controlling her pain?

(Please select 1 option)

<input type="radio"/>	Fentanyl skin patch
<input type="radio"/>	Intramuscular pethidine
<input type="radio"/>	Morphine four hourly orally and as needed intramuscularly
<input type="radio"/>	Rectal non-steroidal anti-inflammatory drug
<input type="radio"/>	Subcutaneous diamorphine by continuous infusion

(Please select 1 option)

<input type="radio"/>	Fentanyl skin patch
<input type="radio"/>	Intramuscular pethidine
<input type="radio"/>	Morphine four hourly orally and as needed intramuscularly
<input type="radio"/>	Rectal non-steroidal anti-inflammatory drug
<input checked="" type="radio"/>	Subcutaneous diamorphine by continuous infusion Correct

Key Learning Points

Oncology, Palliative Care

- Continuously infused opiates are the most effective and controllable parenteral analgesia in palliative situations.

Explanation

This patient has inoperable carcinoma and already needs opiate analgesia orally; as she is vomiting she will need parenteral analgesia.

The most effective way of achieving this, and being able effectively to titrate the dose to achieve adequate analgesia, is subcutaneous diamorphine by continuous infusion.

Fentanyl patches are difficult to titrate because they are used for 72 hours. You usually therefore only use them once a patient has a stable opiate usage.

Intramuscular pethidine has a delayed onset and its effect is prolonged, which again is not ideal when you do not know what the patient's opiate requirements are.

Oral morphine is unlikely to be tolerated whilst she is vomiting.

Non-steroidals are unlikely to be sufficient in this case.

Mutation in codon 12 of the Ras oncogene often results in which of the following?

(Please select 1 option)

<input type="radio"/>	Decreased GTP binding
<input type="radio"/>	Decreased GTP hydrolysis
<input type="radio"/>	Increased GTP binding
<input type="radio"/>	Increased GTP hydrolysis
<input type="radio"/>	Increased interaction with SOS

<input type="radio"/>	Decreased GTP binding	
<input type="radio"/>	Decreased GTP hydrolysis	This is the correct answer
<input type="radio"/>	Increased GTP binding	
<input type="radio"/>	Increased GTP hydrolysis	
<input checked="" type="radio"/>	Increased interaction with SOS	Incorrect answer selected

Key Learning Points

Oncology

- Decreased GTPase activity results in a constitutively active Ras.

Explanation

The Ras family of oncogenes are important intracellular signalling proteins which transmit signals from receptor tyrosine kinase proteins in the cell membrane down to the nucleus.

Ras is controlled by the activity of a GTPase binding site; when guanosine triphosphate (GTP) is bound Ras is active and it slowly hydrolyses the GTP to guanosine diphosphate (GDP) resulting in an inactive state.

Mutations in codon 12 result in decreased GTPase activity and a Ras protein which is 'always on' resulting in increased proliferation of the cell.

Which one of the following is a common feature in the presentation of myeloma?

(Please select 1 option)

<input type="radio"/>	Hypercalcaemia
<input type="radio"/>	Hyperglycaemia
<input type="radio"/>	Hypocalcaemia
<input type="radio"/>	Hyponatraemia
<input type="radio"/>	Polycythaemia

(Please select 1 option)

<input type="radio"/>	Hypercalcaemia	This is the correct answer
<input type="radio"/>	Hyperglycaemia	
<input type="radio"/>	Hypocalcaemia	
<input type="radio"/>	Hyponatraemia	
<input checked="" type="radio"/>	Polycythaemia	Incorrect answer selected

Key Learning Points

Oncology

- Hypercalcaemia - nausea, fatigue, confusion, polyuria and constipation are all presenting clinical features of multiple myeloma

Explanation

The following are presenting clinical features of multiple myeloma:

- Older adults - median age 60 years; male more than female
- Anaemia
- Bone pain - most common in the back or ribs; may present as a pathologic fracture following minimal trauma, especially of the femoral neck
- Infection - commonly with encapsulated organisms such as *Streptococcus pneumoniae*, *Haemophilus influenzae*; due to suppression of antibody production and neutropenia
- Hypercalcaemia - nausea, fatigue, confusion, polyuria, constipation
- Weight loss is common
- Hyperviscosity.

The hypercalcaemia is caused by osteoclast activating factors.