Subacute thyroiditis (also known as De Quervain's thyroiditis) is thought to occur following viral infection and typically presents with hyperthyroidism.

**Features**
- hyperthyroidism
- painful goitre
- raised ESR
- globally reduced uptake on iodine-131 scan

**Management**
- usually self-limiting - most patients do not require treatment
- thyroid pain may respond to aspirin or other NSAIDs
- in more severe cases steroids are used, particularly if hypothyroidism develops

### Q-26

A 34-year-old woman presents with palpitations and feeling hot all the time. On examination she has a non-tender goitre. Bloods show the following:

<table>
<thead>
<tr>
<th></th>
<th>TSH</th>
<th>Free T4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;0.05 mU/l</td>
<td>22 pmol/l</td>
</tr>
</tbody>
</table>

**ANSWER:**
Graves' disease

**EXPLANATION:**
Graves’ disease is a much more likely diagnosis than subacute (De Quervain's) thyroiditis which is associated with a tender goitre and raised ESR.

**EXPLANATION Q-24 THROUGH 26:**

**THYROID FUNCTION TESTS**
The interpretation of thyroid function tests is usually straightforward:

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>TSH</th>
<th>Free T4</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thyrotoxicosis (e.g. Graves' disease)</td>
<td>Low</td>
<td>High</td>
<td>In T3 thyrotoxicosis the free T4 will be normal</td>
</tr>
<tr>
<td>Primary hypothyroidism (primary atrophic hypothyroidism)</td>
<td>High</td>
<td>Low</td>
<td>Replacement steroid therapy is required prior to thyroxine</td>
</tr>
<tr>
<td>Secondary hypothyroidism</td>
<td>Low</td>
<td>Low</td>
<td>Common in hospital inpatients T3 is particularly low in these patients</td>
</tr>
<tr>
<td>Sick euthyroid syndrome*</td>
<td>Low**</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Subclinical hypothyroidism</td>
<td>High</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Poor compliance with thyroxine</td>
<td>High</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Steroid therapy</td>
<td>Low</td>
<td>Normal</td>
<td></td>
</tr>
</tbody>
</table>

*Sulfonylureas should be avoided in breast feeding and pregnancy

**Q-27**
Which one of the following unwanted effects is most likely to occur in patients taking gliclazide?

A. Peripheral neuropathy  
B. Cholestasis  
C. Photosensitivity  
D. Syndrome of inappropriate ADH secretion  
E. Weight gain

**ANSWER:**
Weight gain

**EXPLANATION:**
All of the above side-effects may be seen in patients taking sulfonylureas but weight gain is the most common.

**SULFONYLUREAS**
Sulfonylureas are oral hypoglycaemic drugs used in the management of type 2 diabetes mellitus. They work by increasing pancreatic insulin secretion and hence are only effective if functional B-cells are present. On a molecular level they bind to an ATP-dependent K+(KATP) channel on the cell membrane of pancreatic beta cells.

**Common adverse effects**
- hypoglycaemic episodes (more common with long acting preparations such as chloropropamide)
- weight gain

**Rarer adverse effects**
- syndrome of inappropriate ADH secretion
- bone marrow suppression
- liver damage (cholestatic)
- peripheral neuropathy

Sulfonylureas should be avoided in breast feeding and pregnancy

Q-28
The International Diabetes Federation produced a consensus set of diagnostic criteria in 2005, which are now widely in use. These require the presence of central obesity (defined as waist circumference > 94cm for Europid men and > 80cm for Europid women, with ethnicity specific values for other groups) plus any two of the following four factors:

- raised triglycerides level: > 1.7 mmol/L, or specific treatment for this lipid abnormality
- reduced HDL cholesterol: < 1.03 mmol/L in males and < 1.29 mmol/L in females, or specific treatment for this lipid abnormality
- raised blood pressure: > 130/85 mm Hg, or active treatment of hypertension
- raised fasting plasma glucose > 5.6 mmol/L, or previously diagnosed type 2 diabetes

In 1999 the World Health Organization produced diagnostic criteria which required the presence of diabetes mellitus, impaired glucose tolerance, impaired fasting glucose or insulin resistance, AND two of the following:

- blood pressure: > 140/90 mmHg
- dyslipidaemia: triglycerides: > 1.695 mmol/L and/or high-density lipoprotein cholesterol (HDL-C) < 0.9 mmol/L (male), < 1.0 mmol/L (female)
- central obesity: waist:hip ratio > 0.90 (male), > 0.85 (female), and/or body mass index > 30 kg/m2
- microalbuminuria: urinary albumin excretion ratio > 20 mg/min or albumin:creatinine ratio > 30 mg/g

Other associated features include:

- raised uric acid levels
- non-alcoholic fatty liver disease
- polycystic ovarian syndrome

Q-36
A 62-year-old man is reviewed in diabetes clinic. His glycaemic control is poor despite weight loss, adherence to a diabetic diet and his current diabetes medications. He has no other past medical history of note. Which one of the following medications would increase insulin sensitivity?

A. Repaglinide  
B. Tolbutamide  
C. Pioglitazone  
D. Acarbose  
E. Gliclazide

**ANSWER:** Pioglitazone

**EXPLANATION:**
Please see Q-18 for Thiazolidinediones

---

A 67-year-old woman presents with lethargy, depression and constipation. A set of screening blood tests reveals the following:

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>3.05 mmol/l</td>
</tr>
<tr>
<td>Albumin</td>
<td>41 g/l</td>
</tr>
</tbody>
</table>

What is the single most useful test for determining the cause of her hypercalcaemia?

A. ESR  
B. Phosphate  
C. Vitamin D level  
D. Parathyroid hormone  
E. ACE level

**ANSWER:** Parathyroid hormone

**EXPLANATION:**
Parathyroid hormone levels are useful as malignancy and primary hyperparathyroidism are the two most common causes of hypercalcaemia. A parathyroid hormone that is normal or raised suggests primary hyperparathyroidism.

Please see Q-22 for hypercalcaemia: causes

---

A 56-year-old lady with a BMI of 26 is reviewed in the diabetic clinic due to poor glycaemic control. She is currently being treated with gliclazide 160mg bd. Her latest bloods show:

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na⁺</td>
<td>139 mmol/l</td>
</tr>
</tbody>
</table>
| K⁺        | 4.1 mmol/l  
| Urea      | 8.4 mmol/l  
| Creatinine | 180 µmol/l |
| ALT       | 25 iu/l  
| yGT       | 33 iu/l  
| HbA1c     | 9.4% |

Which one of the following medications should be added next?

A. Guar gum  
B. Pioglitazone  
C. Metformin  
D. Acarbose  
E. Repaglinide

**ANSWER:** Pioglitazone

**EXPLANATION:**
Please see Q-38 for hypercalcaemia: causes
Given that she is overweight metformin would be a natural choice to add. The creatinine however is elevated so pioglitazone is the next best option. NICE recommend that the metformin dose should be reviewed if the creatinine is > 130 µmol/l (or eGFR < 45 ml/min) and stopped if the creatinine is > 150 µmol/l (or eGFR < 30 ml/min)

One possible drawback of using pioglitazone is that it may lead to weight gain, especially given her BMI is already 26.

Please see Q-18 for Thiazolidinediones

Q-39
A 19-year-old female arrives at your clinic with flu-like symptoms, she has recently been diagnosed with type 1 diabetes and has come for advice regarding her diabetes management whilst she is ill. Which of the following options is one of the 'sick-day rules' insulin-dependent diabetics should adhere to during illness?

A. Reduce insulin doses
B. Frequently monitor their blood glucose as the normally would
C. Substitute all main meals with sugar-containing foods
D. Aim to drink at least 3L of fluid
E. Check urinary ketones at the start of illness

ANSWER:
Aim to drink at least 3L of fluid

EXPLANATION:
Option 4 is the correct answer. Insulin-dependent patients should be encouraged to drink at least 3L of fluid over 24 hours. Patients should continue their normal insulin regimen but check their blood glucose more regularly, therefore options 1 and 2 are wrong. Main meals should not be substituted for sugary foods, if a patient is struggling to eat then they may take sugary drinks. Ketones should also be measured, but more frequently than what is being proposed in option 5, for example, every 3-4 hours or even more frequently depending on the readings.

NICE Clinical Knowledge Summaries - Diabetes Type 1
https://cks.nice.org.uk/diabetes-type-1#!scenarioclarification:2

'Candidates gave generally good responses to questions concerning management of type 2 diabetes. However, type 1 diabetes caused difficulty and candidates are reminded in particular to review the management of type 1 diabetes during intercurrent illness, and sick day rules.'

DIABETES MELLITUS: SICK DAY RULES
The following are key messages that should be given to all patients with diabetes if they become unwell:

• Increase frequency of blood glucose monitoring to four hourly or more frequently
• Encourage fluid intake aiming for at least 3 litres in 24hrs
• If unable to take struggling to eat may need sugary drinks to maintain carbohydrate intake
• It is useful to educate patients so that they have a box of 'sick day supplies' that they can access if they become unwell
• Access to a mobile phone has been shown to reduce progression of ketosis to diabetic ketoacidosis

If a patient is taking oral hypoglycaemic medication, they should be advised to continue taking their medication even if they are not eating much. Remember that the stress response to illness increases cortisol levels pushing blood sugars high even without much oral intake. The possible exception is with metformin, which should be stopped if a patient is becoming dehydrated because of the potential impact upon renal function.

If a patient is on insulin, they must not stop it due to the risk of diabetic ketoacidosis. They should continue their normal insulin regime but ensure that they are checking their blood sugars frequently. Patients should be able to check their ketone levels and if these are raised and blood sugars are also raised they may need to give corrective doses of insulin. The corrective dose to be given varies by patient, but a rule of thumb would be one day’s insulin dose divided by 6 (maximum 15 units). NHS Scotland have produced a useful 'fast start-up' patients to follow:

Possible indications that a patient might require admission to hospital would include:
• Suspicion of underlying illness requiring hospital treatment eg myocardial infarction
• Inability to keep fluids down - admit if persisting more than a few hours
• Persistent diarrhoea
• Significant ketosis in an insulin dependent diabetic despite additional insulin
• Blood glucose persistently >20mmol/l despite additional insulin
• Patient unable to manage adjustments to usual diabetes management
• Lack of support at home e.g. a patient who lives alone and is at risk of becoming unconscious

Q-40
A diabetic man is diagnosed as having painful diabetic neuropathy in his feet. He has no other medical history of note. What is the most suitable first-line treatment to relieve his pain?

A. Duloxetine
B. Sodium valproate
C. Carbamazepine
D. Referral to pain management clinic
E. Tramadol

ANSWER: Duloxetine
In a patient with suspected Addison's disease the definite investigation is a ACTH stimulation test (short Synacthen test). Plasma cortisol is measured before and 30 minutes after giving Synacthen 250ug IM. Adrenal autoantibodies such as anti-21-hydroxylase may also be demonstrated.

If a ACTH stimulation test is not readily available (e.g. in primary care) then sending a 9 am serum cortisol can be useful:
- > 500 nmol/l makes Addison’s very unlikely
- < 100 nmol/l is definitely abnormal
- 100-500 nmol/l should prompt a ACTH stimulation test to be performed

Associated electrolyte abnormalities are seen in around one-third of undiagnosed patients:
- hyperkalaemia
- hyponatraemia
- hypoglycaemia
- metabolic acidosis

Q-48 THROUGH 50
Theme: Diabetes mellitus: diagnosis

A. Normal
B. Diabetes mellitus
C. Impaired fasting glucose
D. Samples mixed up
E. Impaired glucose tolerance
F. Suggests diabetes mellitus but further testing needed
G. Impaired fasting glucose and impaired glucose tolerance

Please select the diagnosis for each of the following scenarios:

Q-48
After fasting overnight a patient's urine sample shows glucose ++, no ketones

ANSWER: A 62-year-old woman presents with polyuria and lethargy. Her HbA1c is 50 mmol/mol (6.7%)

Q-49
A patient who presents with polydipsia has a non-fasting glucose sample taken which is reported as 11.4 mmol/l

ANSWER: Diabetes mellitus

Q-50
A 62-year-old woman presents with polyuria and lethargy. Her HbA1c is 50 mmol/mol (6.7%)

ANSWER: Diabetes mellitus

EXPLANATION:
In 2011 WHO released supplementary guidance on the use of HbA1c on the diagnosis of diabetes. A HbA1c of greater than or equal to 48 mmol/mol (6.5%) is diagnostic of diabetes mellitus in a symptomatic patient.

EXPLANATION Q-48 THROUGH 50:
Please see Q-5 for Diabetes mellitus: management of type 2

Q-51
A 24-year-old man is prescribed an extended course of oral prednisolone following a flare of ulcerative colitis. Which one of the following side-effects is most associated with prolonged corticosteroid use?

A. Insomnia
B. Thrombocytopaenia
C. Hypotension
D. Bronchospasm
E. Hyperkalaemia

ANSWER: Insomnia

EXPLANATION:
Psychiatric problems are common with longer term steroid use.

CORTICOSTEROIDS
Corticosteroids are amongst the most commonly prescribed therapies in clinical practice. They are used both systematically (oral or intravenous) or locally (skin creams, inhalers, eye drops, intra-articular). They augment and in some cases replace the natural glucocorticoid and mineralocorticoid activity of endogenous steroids.

The relative glucocorticoid and mineralocorticoid activity of commonly used steroids is shown below:

<table>
<thead>
<tr>
<th>Minimal glucocorticoid activity, very high mineralocorticoid activity,</th>
<th>Glucocorticoid activity, high mineralocorticoid activity,</th>
<th>Predominant glucocorticoid activity, low mineralocorticoid activity</th>
<th>Very high glucocorticoid activity, minimal mineralocorticoid activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fludrocortisone</td>
<td>Hydrocortisone</td>
<td>Prednisolone</td>
<td>Dexamethasone</td>
</tr>
<tr>
<td>Betamethasone</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Side-effects
The side-effects of corticosteroids are numerous and represent the single greatest limitation on their usage. Side-effects are more common with systemic and prolonged therapy.

Glucocorticoid side-effects
- endocrine: impaired glucose regulation, increased appetite/weight gain, hirsutism, hyperlipidaemia
- Cushing’s syndrome: moon face, buffalo hump, striae
• musculoskeletal: osteoporosis, proximal myopathy, avascular necrosis of the femoral head
• immunosuppression: increased susceptibility to severe infection, reactivation of tuberculosis
• psychiatric: insomnia, mania, depression, psychosis
• gastrointestinal: peptic ulceration, acute pancreatitis
• ophthalmic: glaucoma, cataracts
• suppression of growth in children
• intracranial hypertension

Mineralocorticoid side-effects
• fluid retention
• hypertension

Selected points on the use of corticosteroids:
• patients on long-term steroids should have their doses doubled during intercurrent illness
• the BNF suggests gradual withdrawal of systemic corticosteroids if patients have: received more than 40mg prednisolone daily for more than one week, received more than 3 weeks treatment or recently received repeated courses

Q-52
A 62-year-old gentleman with a background of myocardial infarction, congestive heart failure and chronic obstructive pulmonary disease attends for a diabetes review. He has recently been diagnosed with type 2 diabetes mellitus and despite a trial of lifestyle modifications his HbA1c is 56 mmol/mol. His GP decides to commence drug treatment. Which of the following drugs would be contraindicated for this patient?

A. Metformin
B. Sitagliptin
C. Pioglitazone
D. Insulin
E. Gliclizide

ANSWER: Pioglitazone

EXPLANATION: Pioglitazone can cause fluid retention and is therefore contraindicated in patients with heart failure.

Please see Q-5 for Diabetes mellitus: management of type 2 diabetes. Which one of the following is most suggestive of MODY?

A. Ketosis during periods of hyperglycaemia
B. Family history of early onset diabetes mellitus
C. A history of polycystic ovarian syndrome
D. Lack of response to sulphonylureas
E. A history of autoimmune disease

ANSWER: Family history of early onset diabetes mellitus

EXPLANATION: MODY is inherited in an autosomal dominant fashion so a family history is often present

MODY
Maturity-onset diabetes of the young (MODY) is characterised by the development of type 2 diabetes mellitus in patients < 25 years old. It is typically inherited as an autosomal dominant condition. Over six different genetic mutations have so far been identified as leading to MODY.

It is thought that around 1-2% of patients with diabetes mellitus have MODY, and around 90% are misclassified as having either type 1 or type 2 diabetes mellitus.

MODY 1
• 60% of cases
• due to a defect in the HNF-1 alpha gene

MODY 2
• 20% of cases
• due to a defect in the glucokinase gene

Features of MODY
• typically develops in patients < 25 years
• a family history of early onset diabetes is often present
• ketosis is not a feature at presentation
• patients with the most common form are very sensitive to sulphonylureas, insulin is not usually necessary

Q-54
A 54-year-old woman presents systemically unwell. She has recently started carbimazole for hyperthyroidism. What is the most important blood test to perform?

A. Liver function tests
B. Full blood count
C. Prothrombin time
D. Urea and electrolytes
E. Cortisol

ANSWER: Full blood count
A. No set criteria holistic clinical decision
B. 2%
C. 5%
D. 10%
E. 15%

**ANSWER:** 5%

**EXPLANATION:**
The AKT summary report for the October 2014 exam sitting noted that there seemed to be lack of knowledge around current guidance on the management of obesity. Please see the link below for the full NICE guidance on obesity, updated in 2014.

The patient should be reviewed three months after commencing orlistat, and it is generally only continued if the weight loss is 5% of total weight or more. The new guidelines make an exception in type 2 diabetes, where a lower target could be discussed with the patient.

It should be noted orlistat is also available for patients to purchase over-the-counter.

*Please see Q-21 for Obesity: Therapeutic Options*

---

**Q-80**

A 52-year-old woman with suspected diabetes mellitus has an oral glucose tolerance test, following the standard WHO protocol. The following results are obtained:

<table>
<thead>
<tr>
<th>Time (hours)</th>
<th>Blood glucose (mmol/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>5.9</td>
</tr>
<tr>
<td>2</td>
<td>8.4</td>
</tr>
</tbody>
</table>

How should these results be interpreted?

A. Impaired fasting glucose and impaired glucose tolerance
B. Normal
C. Diabetes mellitus
D. Impaired glucose tolerance
E. Impaired fasting glucose

**ANSWER:** Impaired glucose tolerance

**EXPLANATION:**

---

**Q-82**

A 54-year-old man with type 2 diabetes mellitus is reviewed in clinic. He is currently taking pioglitazone, metformin, aspirin and simvastatin. Which one of the following problems is most likely to be caused by pioglitazone?

A. Photosensitivity
B. Thrombocytopenia
C. Myalgia
D. Peripheral oedema
E. Hyponatraemia

**ANSWER:** Peripheral oedema

**EXPLANATION:**

---

**Q-83**

A 40-year-old woman is diagnosed as having Addison’s disease. What combination of medications is she most likely to be prescribed?

A. Prednisolone + fludrocortisone
B. Hydrocortisone + fludrocortisone
C. Hydrocortisone + dehydroepiandrosterone (DHEA)
D. Prednisolone + spironolactone
E. Hydrocortisone + oestrogen/progesterone

ANSWER: Hydrocortisone + fludrocortisone

EXPLANATION: Addison's disease management - hydrocortisone + fludrocortisone

Please see Q-43 for Addison's Disease: Management

Q-84
A 60-year-old man who has type 1 diabetes mellitus complains of reduced hypoglycaemic awareness. This has been a problem since he was discharged from hospital a few weeks ago. During his admission a number of new medications were started. Which one of the following is most likely to be responsible?

A. Clopidogrel
B. Bendroflumethiazide
C. Atenolol
D. Simvastatin
E. Isosorbide mononitrate

ANSWER: Atenolol

EXPLANATION: Please see Q-53 for Insulin Therapy: Side Effects

Q-85
A 44-year-old woman presents to her GP as she is feeling 'hot all the time' and is consequently worried she is going through an early menopause. Her husband has also noticed a 'fullness' of her neck which has become apparent over the past few weeks. On examination her pulse is 90/minute and she has a small, non-tender goitre. Blood tests are arranged:

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSH</td>
<td>&lt; 0.05 mu/l</td>
</tr>
<tr>
<td>Free T4</td>
<td>24 pmol/l</td>
</tr>
<tr>
<td>Anti-thyroid peroxidase antibodies</td>
<td>102 IU/mL (&lt; 35 IU/mL)</td>
</tr>
<tr>
<td>ESR</td>
<td>23 mm/hr</td>
</tr>
</tbody>
</table>

What is the most likely diagnosis?

A. Hashimoto's thyroiditis
B. Toxic multinodular goitre
C. Thyroid cancer
D. De Quervain's thyroiditis
E. Graves' disease

ANSWER: Primary hyperparathyroidism

EXPLANATION: The most likely diagnosis here is primary hyperparathyroidism caused by parathyroid adenoma or hyperplasia. The classical biochemical findings are a high serum calcium and low phosphate. The parathyroid hormone level is either high or inappropriately normal.

Secondary hyperparathyroidism is caused by chronic hypocalcaemia (e.g. chronic kidney disease). Serum calcium is low or normal which parathyroid normal levels are high. Tertiary hyperparathyroidism develops from secondary hyperparathyroidism and results in autonomous parathyroid...
A. Every 6 - 8 weeks  
B. Every 3 - 6 months  
C. Every 7 - 9 months  
D. Every 12 months  
E. Every 18 months

In type 1 diabetes, the HbA1c should be measured every 3-6 months  

**ANSWER:** Every 3 - 6 months  

**EXPLANATION:**  
Please see Q-17 for Diabetes Mellitus: Management of Type 1

**Q-94**  
You receive a phonecall from a 27-year-old insulin dependent diabetic. They have started vomiting this morning and would like some advice. Which of the following options would be most appropriate to tell them?

A. Avoid sugary drinks that could push blood sugar up  
B. Continue normal insulin even if not eating and may need to increase dose  
C. Stop insulin if not eating due to risk of hypoglycaemia  
D. Reduce dose of insulin by half if not eating  
E. Double dose of insulin to prevent diabetic ketoacidosis  

**ANSWER:** Continue normal insulin even if not eating and may need to increase dose  

**EXPLANATION:**  
It is important to be aware of the advice given to diabetics if they become unwell, as this is a common scenario that GPs may face. Feedback in from AKT January 2016 specifically mentions that 'candidates struggled with common problems concerning insulin administration and dosages'.

The AKT January 2016 feedback report stated:  

We often note difficulties with questions concerning management of diabetes. In AKT 26, candidates struggled with common problems concerning insulin administration and dosages, and advice to patients about managing regimens such as basal-bolus. Even if this work is often handled by nurses on a day-to-day basis, GPs should be familiar with the management of common long-term conditions such as diabetes, to be able to give safe advice.

Please see Q-39 for Diabetes Mellitus: Sick Day Rules

---

A 43-year-old man presents to surgery with lethargy. Examination is unremarkable apart from a blood pressure of 192/112 mmHg. Routine blood tests reveal:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na⁺</td>
<td>146 mmol/l</td>
</tr>
<tr>
<td>K⁺</td>
<td>2.4 mmol/l</td>
</tr>
<tr>
<td>Bicarbonate</td>
<td>34 mmol/l</td>
</tr>
<tr>
<td>Urea</td>
<td>5.3 mmol/l</td>
</tr>
<tr>
<td>Creatinine</td>
<td>75 µmol/l</td>
</tr>
</tbody>
</table>

What is the most likely diagnosis?

A. Phaeochromocytoma  
B. Renal artery stenosis  
C. Diabetes mellitus  
D. Bartter's syndrome  
E. Primary hyperaldosteronism  

**ANSWER:** Primary hyperaldosteronism  

**EXPLANATION:**  
Hypokalaemia associated with hypertension points towards a diagnosis of primary hyperaldosteronism. Bartter's syndrome is associated with normotension.

**PRIMARY HYPERALDOSTERONISM**  
Primary hyperaldosteronism was previously thought to be most commonly caused by an adrenal adenoma, termed Conn’s syndrome. However, recent studies have shown that bilateral idiopathic adrenal hyperplasia is the cause in up to 70% of cases. Differentiating between the two is important as this determines treatment. Adrenal carcinoma is an extremely rare cause of primary hyperaldosteronism.

Features
- hypertension
- hypokalaemia (e.g. muscle weakness)
- alkalosis

Investigations
- high serum aldosterone
- low serum renin
- high-resolution CT abdomen
- adrenal vein sampling

Management
- adrenal adenoma: surgery
- bilateral adrenocortical hyperplasia: aldosterone antagonist e.g. spironolactone
Q-124
A 15 year old boy presents with his mother as she is concerned he has not started puberty. He has a lack of secondary sexual development, altered smell and reduced testicular size. You suspect Kallman syndrome. Which of the following hormone profiles with regard to FSH (follicle-stimulating hormone), LH (luteinizing hormone) and testosterone would fit this diagnosis?

A. Raised LH, FSH and testosterone
B. Raised LH and reduced FSH and testosterone
C. Reduced testosterone, reduced FSH and reduced LH
D. Raised FSH and LH and reduced testosterone
E. Raised FSH and reduced LH and testosterone

**ANSWER:**
Reduced testosterone, reduced FSH and reduced LH

**EXPLANATION:**
Kallman syndrome is a rare genetic condition associated with deficient GnRH (gonadotrophin deficient releasing hormone) and anosmia (or severe hyposmia).

This leads to a state of hypogonadotrophic hypogonadism. Within the hormone profile this is characterised by a low testosterone, low FSH and low LH.

This is in contrast to Kleinfelter Syndrome a chromosomal abnormality leading to an extra x-chromosome 47XXY. This condition causes a hypogonadotropic hypogonadism (raised FSH and LH and reduced testosterone).

Please see Q-60 for Kallman’s Syndrome

Q-125
A patient is diagnosed with type 2 diabetes mellitus and started on metformin monotherapy. Following NICE guidelines, what target should be set for the HbA1c?

A. Agree target with patient but generally aim for 58 mmol/mol
B. Agree target with patient but generally aim for 42 mmol/mol
C. As low as possible
D. Agree target with patient but generally aim for 48 mmol/mol
E. 54 mmol/mol

**ANSWER:**
Agree target with patient but generally aim for 48 mmol/mol

**EXPLANATION:**
As this patient is on metformin monotherapy the target should be 48 mmol/mol (6.5%). If he was on dual therapy a target of 53 mmol/mol (7.0%) would be recommend by NICE. Please see Q-5 for Diabetes mellitus: management of type 2

Q-126
A 27-year-old patient makes an appointment with her GP as she wishes to commence the combined oral contraceptive pill. Which medication on her repeat prescription might represent a contraindication to commencing this method of contraception, due to potential interactions?

A. Levothyroxine
B. Paroxetine
C. Seretide
D. Orlistat
E. Mefenamic acid

**ANSWER:**
Orlistat

**EXPLANATION:**
The AKT summary report for the October 2014 exam sitting noted that candidates had trouble with questions regarding the management of obesity. Please see the link below for the full NICE guidance on obesity, published in 2014.

Orlistat is a gastrointestinal lipase inhibitor which is used to treat obesity it reduces the absorption of fat from the gut. This commonly causes loose stool/diarrhoea unless a low-fat diet is strictly adhered to. Therefore, it is important to consider whether orlistat is suitable when the patient takes critical medications such as antiepileptics and the contraceptive pill, where increased transit time through the gut via orlistat could reduce their efficacy. If the patient in the question above wishes to remain on orlistat, an alternative method of contraception may be more reliable.

Please see Q-21 for Obesity: Therapeutic Options

Q-127
A 51-year-old woman who is known to have poorly controlled type 1 diabetes mellitus is reviewed. Her main presenting complaint is bloating and vomiting after eating. She also notes that her blood glucose readings have become more erratic recently. Which one of the following medications is most likely to be beneficial?

A. Helicobacter pylori eradication therapy
B. Lansoprazole
C. Amitriptyline
D. Metoclopramide
E. Cyclizine

**ANSWER:**
Metoclopramide

**EXPLANATION:**
As this patient is on metformin monotherapy the target should be 48 mmol/mol (6.5%). If he was on dual therapy a target of 53 mmol/mol (7.0%) would be recommend by NICE. Please see Q-5 for Diabetes mellitus: management of type 2
The laboratory ring through a sodium result of 118 mmol/L from a routine annual blood test. The patient is an 80 year old lady recently started on sertraline for low mood. She also takes amlodipine for hypertension. You ring her and she says she feels well in herself. The appropriate next step is?

Withhold drugs that cause hyponatraemia and recheck serum sodium in 2 weeks
7%
Arrange emergency admission
59%
Withhold drugs that cause hyponatraemia and recheck serum sodium in 48 hours
16%
Arrange a home visit to assess
11%
Arrange a review appointment the next day
7%

**ANSWER:**

**EXPLANATION:**
A sodium result of 118 mmol/L falls into the category of severe hyponatraemia (less than 125 mmol/L). Emergency admission is indicated because hyponatraemia is potentially life threatening, particularly when it is severe and/or of acute onset (over a period of less than 48 hours). It is due to swelling of brain cells when water moves from the extracellular to the intracellular compartment because of differences in osmolality between brain and plasma. Cerebral oedema and raised intracranial pressure can lead to seizures, coma or cardio-respiratory arrest.

Hyponatraemia can be classified by biochemical severity and rate of onset:
- **Biochemical severity**
  - mild hyponatraemia = serum sodium 130-135 mmol/L
  - moderate hyponatraemia = serum sodium 125-129 mmol/L
  - severe hyponatraemia = serum sodium less than 125 mmol/L
- **Rate of onset**
  - acute = hyponatraemia duration for less than 48 hours
  - chronic = hyponatraemia duration for 48 hours or more.

**HYPONATRAEMIA: CORRECTION**

Central pontine myelinolysis
- demyelination syndrome caused by rapid correction of chronic hyponatraemia
- may lead to quadriplegiasis and bulbar palsy
- diagnosis: MRI brain

For each one of the following scenarios select the vitamin which may cause these features if deficient:

Wernicke-Korsakoff syndrome
- Answer: Thiamine

Neural tube defects
- Answer: Folic acid

Haemorrhagic disease of the newborn
- Answer: Vitamin K

Fred is a 55-year-old man who has been diagnosed with lung cancer. He is currently on chemotherapy. He presents to you with a 2-week history of constipation and nausea. He has been finding it difficult to cope and becoming tearful and depressed. He has also noticed that his arms and legs have been increasingly aching. You arrange for a routine set of bloods:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb</td>
<td>109 g/l</td>
</tr>
<tr>
<td>Platelets</td>
<td>336 * 10^9/l</td>
</tr>
<tr>
<td>WBC</td>
<td>3.4 * 10^9/l</td>
</tr>
<tr>
<td>Na⁺</td>
<td>136 mmol/l</td>
</tr>
<tr>
<td>K⁺</td>
<td>4.8 mmol/l</td>
</tr>
<tr>
<td>Urea</td>
<td>6.3 mmol/l</td>
</tr>
<tr>
<td>Creatinine</td>
<td>80 µmol/l</td>
</tr>
</tbody>
</table>
Corrected Ca$^{2+}$: 3.2 mmol/l
Albumin: 30 g/l
ALP: 99 u/l
Phosphate: 1.06 mmol/l

What would be the most appropriate management?

A. Advise to avoid calcium rich foods and increase fluid intake & repeat bloods in 1 week
B. Prescribe analgesia as per WHO ladder
C. Prescribe SSRI
D. Prescribe oral bisphosphonate and advice to increase fluid intake & repeat bloods in 1 week
E. Admit immediately

ANSWER: Admit immediately

EXPLANATION: Fred is developing symptomatic metastatic hypercalcaemia.

The NICE Clinical Knowledge Summaries (CKS) state that if a patient has symptomatic hypercalcaemia or moderate to severe hypercalcaemia (adjusted serum calcium concentration greater than 3.0 mmol/L) then the patient should be admitted immediately for intravenous fluids and bisphosphonate therapy.

Remember the clinical symptoms of hypercalcaemia can be very non-specific. The following list is provided in the NICE CKS:

Skeletal
- Bone pain.
- Fractures associated with underlying bone disorders (fragility fractures in hyperparathyroidism or pathological fractures in malignancy).

Neuromuscular and neuropsychiatric
- Drowsiness, delirium, coma.
- Fatigue, muscle weakness.
- Impaired concentration and memory.
- Depression.
- Neurological signs (for example upper motor neurone deficits and ataxia).

Gastrointestinal
- Nausea, vomiting, anorexia, weight loss.
- Constipation, abdominal pain.
- Peptic ulcer, pancreatitis (both rare).

Renal
- Renal colic due to renal stones.
- Polyuria, polydipsia, and dehydration (due to nephrogenic diabetes insipidus).
- Renal impairment (due to nephrocalcinosis).

Cardiovascular
- Hypertension.
- Shortened QT interval on electrocardiogram (ECG).
- Cardiac arrhythmias (rare).

Other
- Itching, keratitis, conjunctivitis, and corneal calcification

Please see Q-163 for Hypercalcaemia: Management

Q-186
You get phoned about a patient's potassium result:

K+ 6.3 mmol/l

Which one of the following would not explain this result?

A. Delay in transport to the laboratory
B. Losartan therapy
C. Addison’s disease
D. Acute renal failure
E. Conn’s syndrome

ANSWER: Conn’s syndrome

EXPLANATION: Conn’s Syndrome is associated with hypokalaemia.

Please see Q-158 for Hyperkalaemia

Q-187
A 43-year-old man requests a 'medical' as he is concerned about his risk of heart disease. His father died at the age of 45-years following a myocardial infarction. His lipid profile is as follows:

<table>
<thead>
<tr>
<th>HDL</th>
<th>LDL</th>
<th>Triglycerides</th>
<th>Total cholesterol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4 mmol/l</td>
<td>5.7 mmol/l</td>
<td>2.3 mmol/l</td>
<td>8.2 mmol/l</td>
</tr>
</tbody>
</table>

Clinical examination reveals tendon xanthomata around his ankles. What is the most likely diagnosis?

A. Mixed hyperlipidaemia
B. Nephrotic syndrome
C. Alcohol excess
D. Non-familial hypercholesterolaemia
E. Familial hypercholesterolaemia

ANSWER: Familial hypercholesterolaemia
Hypokalaemia with hypertension

- Cushing's syndrome
- Conn's syndrome (primary hyperaldosteronism)
- Liddle's syndrome
- 11-beta hydroxylase deficiency*

Carbenoxolone, an anti-ulcer drug, and liquorice excess can potentially cause hypokalaemia associated with hypertension.

Hypokalaemia without hypertension

- diuretics
- GI loss (e.g. Diarrhoea, vomiting)
- renal tubular acidosis (type 1 and 2**)
- Bartter's syndrome
- Gitelman syndrome

*21-hydroxylase deficiency, which accounts for 90% of congenital adrenal hyperplasia cases, is not associated with hypertension

**type 4 renal tubular acidosis is associated with hyperkalaemia

Q-199

A 54-year-old female with rheumatoid arthritis is noted to have proteinuria on annual review. Which one of the following drugs is most associated with the development of proteinuria?

A. Ciclosporin
B. Gold
C. Methotrexate
D. Infliximab
E. Sulfasalazine

ANSWER: Gold

EXPLANATION:

NEPHROTIC SYNDROME: CAUSES

Primary glomerulonephritis accounts for around 80% of cases

- minimal change glomerulonephritis (causes 80% in children, 30% in adults)
- membranous glomerulonephritis
- focal segmental glomerulosclerosis
- membranoproliferative glomerulonephritis

Systemic disease (about 20%)

- diabetes mellitus
- systemic lupus erythematosus
- amyloidosis

Drugs

- gold (sodium aurothiogalactate), penicillamine

CHRONIC KIDNEY DISEASE: HYPERTENSION

The majority of patients with chronic kidney disease (CKD) will require more than two drugs to treat hypertension. ACE inhibitors are first line and are particularly helpful in proteinuric renal disease (e.g. diabetic nephropathy). As these drugs tend to reduce filtration pressure a small fall in...
Renal function was similar to 3 months ago. What is the most appropriate action?

No change to his medication
Switch bendroflumethiazide to furosemide
Add a beta-blocker
Add spironolactone
Stop ramipril

**ANSWER:**
Switch bendroflumethiazide to furosemide

**EXPLANATION:**
As the eGFR is 29 ml/min switching bendroflumethiazide to furosemide would be the next step in controlling his blood pressure. Please see the guidelines in the external links section.

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Q-215
A patient with chronic kidney disease stage 4 is started on lisinopril. Bloods are checked two weeks later. There have been no other changes to his medication and on examination the patient is volume replete. According to NICE, up to what increase in creatinine is acceptable following the introduction of an ACE inhibitor?

A. No increase
B. 5%
C. 10%
D. 15%
E. 30%

**ANSWER:**
30%

**EXPLANATION:**
Please see Q-200 for Chronic Kidney Disease: Hypertension

Q-216
A 62-year-old man attends your clinic. He has a history of hypertension and atrial fibrillation for which he is anticoagulated with warfarin. A urine dipstick taken 8 weeks ago during a routine hypertension clinic appointment showed blood + with no protein or leucocytes. This result has been repeated on two further occasions. What is the most appropriate action?

A. Take no further action
B. Send a 24-hour urine sample for protein estimation
C. Refer to nephrology
D. Refer to urology
E. Confirm with urine microscopy

**ANSWER:**
Refer to urology

**EXPLANATION:**
The incidence of non-visible haematuria is similar in patients taking warfarin to the general population therefore these patients should be investigated as normal. Most haematuria protocols suggest sending younger patients (e.g. < 40 years) to nephrology initially.

Please see Q-202 THROUGH 204 for Haematuria

Q-218
A 43-year-old man has a work-up for hypertension. He has found to have blood + on a urine dipstick of a freshly voided sample. Which one of the following may account for this finding?

A. Smoking
B. Exercise
C. Obesity
D. Eating red meat the previous day
E. Use of ramipril

**ANSWER:**
Exercise

**EXPLANATION:**
Calcium channel blockers are also sometimes used to aid the spontaneous passage of the stone.

Please see Q-201 for Renal Stones: Management