

REPORT OF GENERAL FELLOWSHIP EXAMINATION APRIL/MAY 2001

This report is prepared to provide candidates, their tutors and their Supervisors of Training with information about the way in which the Examiners assessed the performance of candidates in the Examination. Answers provided are not model answers but guides to what was expected. Candidates should discuss the report with their tutors so that they may prepare appropriately for future examinations.

Sixteen candidates presented for the examination and ten passed.

ORAL SECTIONS

Cross Table Vivas

This section was generally handled very well. Fourteen candidates passed.

There were six tables. The topics covered included:

- Resuscitation of a young fit male with multiple injuries following a motor vehicle crash. A closed head injury, pulmonary contusion and pelvic fractures necessitated specific management.
- Respiratory management of a young pregnant woman with respiratory failure due to pneumonia.
- Initial assessment and treatment of an 8 month old baby with meningitis.
- Recognition and management of a 35 year old woman with thyroid storm following removal of a gangrenous appendix.
- Organisation over the telephone of the transport to a cardiac centre of a man with a suspected Type A aortic dissection. This included assessment and eventual definitive treatment.
- Management of a young man with overwhelming post-splenectomy sepsis syndrome.

OSCE

Eleven candidates passed this Section.

There were ten stations, which included:

1. Chest X-rays

- NG tube in LLL bronchus associated a pulmonary infiltrate
- Cardiogenic pulmonary oedema and IABP
- LUL collapse
- Old surgical management of TB
- Barotrauma

2. *ECGs*

- Acute myocardial infarction
- Broad complex irregular tachycardia (300) - ? WPW
- Diffuse T wave inversion in a hypertensive unconscious female - ? SAH
- Inferior ischaemia with runs of VT

3. *Biochem profiles*

- GIT haemorrhage
- Rhabdomyolysis
- Mannitol induced hypernatraemia
- Pyroglutamic acidosis (see CCM 2000; 28:1803-7)

4. *Equipment*

- Griggs forceps
- Antibiotic impregnated CVC
- Codman ICP monitor
- Pulmonary artery catheter
- High flow haemodialysis catheter

5. *ICU Case*

- The ABG, ECG, CXR, haemodynamic profile and IABP tracing of a patient with cardiogenic shock.

6. *Paediatrics*

- CXR of bronchiolitis in a 2mth old
- RFT in an asthmatic
- ECG with prolonged QT syndrome
- Jackson Rees modification of the Ayres T piece

7. *ABG*

- Chronic respiratory acidosis with metabolic compensation
- Severe metabolic alkalosis with respiratory compensation
- Salbutamol induced lactic acidosis
- Respiratory acidosis in a pregnant woman after a chest injury

8. *X-rays*

- Supine pneumothorax
- Ruptured diaphragm
- Air in the heart
- Mitral stenosis

9. *Communication*

- Candidates were asked to provide a mid-term In-training Assessment to a junior ICU registrar (actor) in her first year of training. The registrar had previously received good term reports as a junior doctor but colleagues recently find her unreliable, difficult to work with and not seeking appropriate assistance.
- Candidates were expected to develop rapport with the registrar and conduct an interview along the lines of:
 - Introduction, setting the scene, explaining the aims of the interview
 - Information gathering, exploring her circumstances and feelings about the term
 - Information imparting, explaining the staff concerns and getting her response to them
 - Setting a plan for remedial action
 - Organising follow-up review before completing the ITA.

10. Procedure

- Failed intubation drill
- Candidates were called to assist a junior registrar in the reintubation of patient with a head and face injury who was known to be a very difficult intubation even before he developed swelling. He has self-extubated and the registrar can't intubate and is having problems ventilating.

CLINICAL SECTION

Hot Cases

Candidates encountered a variety of ICU patients and were asked to explore specific problems or do a routine morning assessment, including:

- Patient with IABP post CAG for morning round review and plan for the day or for assessment of the cardiovascular system
- Patient after neck stabbing for assessment of complications (eg brachial plexus, cord, sympathetic chain, major vascular injury)
- General assessment of a woman following surgery for multitrauma
- Patient with fractured pelvis developing oliguria
- Patient following CAGs with weaning failure due to pulmonary oedema
- Patient following CAGs with Parkinson's Disease

Candidates are encouraged to behave as they would in their own units. Although not dwelling too long on the equipment around the bed, it would be important to know the PAOP and CI in a cardiac patient and gather as much information as possible to understand the patient's condition.

Cold Cases

There were numerous diverse patients. The patients were presented as problem cases and assessment of a system or area of the body was requested. Examples of typical patients were:

- Scleroderma patient with pulmonary fibrosis
- Patient with syringomyelia and quadriplegia
- Jaundiced patient with primary biliary cirrhosis
- A patient with aortic sclerosis and mitral regurgitation
- Patient with alcoholic cirrhosis
- Patient with COPD

SHORT ANSWER QUESTIONS

1. *A patient presents with a red swollen leg and systemic signs of sepsis. You suspect necrotising fasciitis. How will you confirm the diagnosis and what are the priorities of management?*

This question was generally well covered but candidates often failed to consider history and examination as part of the diagnostic process. Necrotising fasciitis is an uncommon soft tissue infection, which is characterised by widespread fascial necrosis with relative sparing of skin and underlying muscle. It may be caused by a single virulent bacterium usually from skin or mixture of bacteria usually enteric.

The question was in two parts:

- (a) Confirm the diagnosis. Suspicion will be raised by history, examination and confirmed by investigations and surgical exploration. There may be a history of inciting event such as animal or insect bite, penetrating trauma, abdominal surgery, appendicitis, perineal surgery or trauma.

Early examination reveals an erythematous, tender, swollen area accompanied by local pain and fever. The skin becomes smooth, shiny and tensely swollen. In a few days the skin darkens to a patchy, dusky blue as blisters and bullae develop. Frank gangrene may then develop.

Investigations reveal non-specific leukocytosis and positive blood cultures. X-ray may reveal subcutaneous air but early surgical exploration will confirm the diagnosis in the absence of resistance of normally adherent fascia to blunt dissection. There is a watery, thin (sometimes foul-smelling) pus in the subcutaneous space.

Other adjuncts include CT, MRI and full thickness biopsy. CT may show the subcutaneous air but MRI shows the extent of the fascial necrosis and guides limits of debridement. Biopsy helps differentiate fasciitis from cellulitis which is usually medically treated.

- (b) Management priorities are :
- confirmation of diagnosis (history, examination, investigations)
 - resuscitation (fluid, inotropes)
 - early and definitive surgery (the most important intervention)
 - antibiotics to cover gram positive, gram negative and anaerobic organisms before definitive cultures are available (eg ampicillin/gentamicin/metronidazole or clindamycin/gentamicin if penicillin allergic)
 - hyperbaric oxygen as an adjunct
2. *A patient with Guillain-Barré Syndrome is quadriparetic and ventilated via a tracheostomy. She wishes to eat. How does a tracheostomy interfere with swallowing? How will you assess her ability to swallow safely?*

This is not an uncommon question in long-stay ICU patients. Is eating possible?

The two parts to be covered are:

- (a) How does a tracheostomy interfere with swallowing?

Normal swallowing requires timing and coordination of many muscles and several cranial nerves, which are under voluntary and involuntary nervous control. The phases are; (1) oral preparatory –mastication and creation of a bolus, (2) oral transit –delivering the bolus to the back of the tongue, soft palate is elevated to allow passage, (3) pharyngeal – is most complex with pharyngeal constriction to create a dynamic pressure gradient, breath-holding, elevation of arytenoids, cord adduction and epiglottic inversion, (4) oesophageal stage –with coordinated contraction and relaxation of oesophageal sphincters and peristaltic waves carrying the bolus.

A list of therefore could have included: Placement of a tracheostomy -

- impedes laryngeal elevation
- impairs hypopharyngeal and laryngeal sensation by desensitisation
- leads to disuse atrophy of laryngeal and pharyngeal muscles
- impairs glottic reflex closure
- reduces subglottic pressure

- (b) How will you assess her ability to swallow safely?

A tracheostomy cuff does not guarantee prevention of aspiration.

Assessment is best achieved by:

- assessment of (1) general condition and (2) specific ability to handle a test swallow.

A breathless and weak patient, who is unwell with sepsis etc., is unable to coordinate swallowing.

- motor movements of the lips face tongue jaw and palate are evaluated for strength, symmetry, speed, accuracy and range of motion for specific nerve deficits. Elevation of the larynx with attempted swallowing should be observed. Strength of cough and timing and fullness of laryngeal excursion give clues to general laryngeal protection.

-test of swallowing and airway protection: this is commonly performed with blue dye mixed with a variety of food consistencies. A bolus of thick liquid is more easily maintained in a bolus and more safely swallowed. After swallowing the tracheostomy is suctioned at intervals to detect leak of dye into the airway. Unfortunately, false negative tests are common (confirmed by video fluoroscopic imaging) so vigilance should be maintained even if the test is passed.

3. *You are the team leader on the Cardiac Arrest team. What are your roles and what are the priorities of cardiac arrest management which you must help implement?*

a) The roles of the team leader include:

- 1) Ensure that the priorities of management are carried out effectively and efficiently. Coordinate defibrillation, intubation cannulation and drug administration
- 2) Help establish a diagnosis by ECG and physical examination and by obtaining all available history from hospital notes and bystanders.
- 3) Check resuscitation status (?DNR) and prognosis
- 4) Order investigations
- 5) Reassess response to treatment
- 6) Communicate with admitting consultant
- 7) Ensure family is notified
- 8) Organise post resuscitation care

b) Priorities of cardiac arrest management may be best listed by drawing a sensible algorithm (preferably AHA 2000 Or ILCOR 1999). The list should include

- immediate basic life support
- rapid rhythm diagnosis
- defibrillation for VF, intubation/adrenaline for asystole or PEA
- continued drug and defibrillation management
- effective post –resuscitation care

4. *List the pharmacodynamic properties of:*

- *aprotinin*
- *DDAVP*
- *tranexemic acid*

when used to reduce the bleeding associated with cardiac surgery.

See Lancet 4th Dec 1999; vol 354 and J Cardiothoracic and Vasc Anesth 1999;4:6-11

The pharmacodynamic properties of:

a) Aprotinin are:

- non specific serine protease inhibitor
- inhibitor of trypsin, plasmin, kalikrein, contact phase of coagulation
- this inhibits fibrinolysis, coagulation and inflammation
- when given before bypass it may prevent clotting activation, factor consumption and platelet dysfunction leading to reduced blood loss re-operation rate, transfusion
- adverse effects include fever, anaphylaxis on repeat exposure

b) DDAVP are: a vasopressin analogue that induces release of the contents of endothelial cell-associated Weibral-Palade bodies, including von Willebrand factor. In doses used in cardiothoracic surgery (0.3ug/kg) it potentiates primary haemostasis and may lead to water retention and vasoconstriction. It has been shown to have a small effect on transfusion rate but an associated two fold increase in perioperative myocardial infarction

c) Tranexemic acid are: a lysine analogue which is a potent, specific inhibitor of fibrinolysis. It has been shown to decrease transfusion rate, reoperation rate but not outcome after cardiothoracic surgery. Adverse effects reported include: myopathy, hypotension and intravascular thrombosis.

5. *A patient is admitted to ICU because of severe symptomatic hypercalcaemia. List the manifestations and common causes. It is found to be due to metastatic carcinoma of the breast. How should the hypercalcaemia be treated?*

(see J Am Soc Nephrol 2001; 12: S3-9)

(a) Manifestations include

- kidney: polyuria, polydipsia, muscle weakness, oliguria, renal failure
- GIT : anorexia, nausea, vomiting, constipation
- CNS : weakness, lethargy and depression
- CVS : hypertension, shortened QT
- Musculoskeletal: bone pain

Common causes:

- hyperparathyroidism (primary, secondary, tertiary)
- neoplasia (humeral)
- immobilisation
- sarcoidosis
- Vit D intoxication
- recovery stage of pancreatitis or rhabdomyolysis.

(b) Treatment, if due to metastatic carcinoma of breast:

- rehydration with saline
- frusemide if fluid overloaded
- aggressive diuresis has a limited potential to remove calcium and may lead to renal dysfunction if inappropriate negative fluid balances ensues.
- Bisphosphonates are first line therapy in malignancy. They prevent osteolysis
- Calcitonin may be adjuvant
- Haemodialysis may be necessary if acute oliguric renal failure occurs.

6. *List the changes to the foetal circulation at birth. What may interfere with this adaption to the external environment?*

At birth closure of the umbilical vessels increases systemic vascular resistance and lung expansion leads to a dramatic fall in pulmonary vascular resistance. Pulmonary blood flow increases, leading to a rise in left atrial pressure and functional closure of the foramen ovale. The ductus arteriosus constricts under the effects of elevated oxygen pressures and local prostaglandins.

Persistent foetal pattern circulation is essentially due to persistent hypoxia and elevated PVR, which may be due to:

- 1) low lung volume (hyaline membrane disease, perinatal asphyxia)
- 2) pulmonary hypoplasia (eg diaphragmatic hernia)
- 3) meconium aspiration
- 4) chronic placental insufficiency
- 5) perinatal hypoxia
- 6) sepsis (group B strep)
- 7) hyperviscosity syndrome

7. *What are the important elements of a Medical Emergency Team (MET) program? How may a MET improve in-hospital morbidity and mortality?*

A discussion or debate about the role of MET was not sought. It required a simple statement about theoretical structure and advantage.

- (a) The important elements of the MET team include:
- call criteria for alerting the team to a sick patient
 - education of ward staff to recognise deteriorating patient condition
 - effective training and composition of MET team with diagnostic and procedural skills
 - review of calls, aggregation of data and follow-up
- (b) How may this improve in-hospital morbidity and mortality: early signs of deteriorating function leading to cardiac arrest and death have been identified. Early intervention will prevent irreversible organ damage. In most studies 50-60% of patients were admitted to hospital with a respiratory illness. Early intervention in a deteriorating patient will prevent an hypoxic/hypercarbic arrest.

Education and increased awareness of all staff of the signs and symptoms of critical illness leads to improved management of these patients.

8. *Describe the pathophysiology of the Obstructive Sleep Apnoea Syndrome. What are the potential long-term complications of this syndrome?*

- (a) Patency of the oropharyngeal airway is due to activity of paired sets of upper airway muscles. The presence of respiratory activity in the muscles of the soft palate, pharyngeal walls and tongue prevents otherwise floppy strictures from being sucked into the airway. Obstruction during sleep may be due to a combination of factors:
- 1) reduced airways size -enlarged tonsils/adenoids, macroglossia myxoedema, acromegaly, malignancy. A large percentage of OSA patients have a structurally small airway.
 - 2) neuromuscular tone- reduced tone occurs in REM sleep, particularly in postural muscles of the pharynx, palate etc.
 - 3) neuromuscular coordination – the normal coordination of increased upper airway tone with inspiration is lost.
- (b) Potential long-term complications include:
- Cardiac- hypertension, nocturnal angina/arrhythmias
 - Pulmonary- respiratory failure, cor pulmonale
 - Neurological- headache, somnolence, dementia
 - Psychiatric – depression, personality changes
 - Other - impotence, polycythaemia, glaucoma

9. *How may a history of severe rheumatoid arthritis influence the intensive care management of a 55 year-old woman with faecal peritonitis?*

Rheumatoid arthritis is associated with a myriad of effects and complications.

An ICU relevant list may include:

- a) manifestations of the disease itself and its complications:
 - bone and joint destruction (atlantoaxial subluxation)
 - vasculitis (renal impairment)
 - pulmonary fibrosis
 - neutropenia, anaemia, thrombocytopenia (eg Felty's Syndrome)
- b) related to treatment
 - Steroids- immunosuppression, skin changes, diabetes
 - Methotrexate- immunosuppression, skin changes, diabetes
 - NSAIDS- prone to renal failure, peptic ulcer disease etc
 - Gold penicillamine

From this it can be seen that the ways that RA influences ICU management may be manifold. The candidate was expected to briefly explain the consequences of these factors in the management of faecal peritonitis.

10. *A 180cm, 200kg man presents to ICU following emergency cholecystectomy. How does his obesity affect his physiology and how may it influence his ICU management?*

a) Obesity affects the physiology of several systems:

Cardiovascular- there is increased left and right ventricular stroke work with a tendency to left ventricular hypertrophy.

Hypertension is significantly correlated with obesity

Respiratory- total respiratory compliance is reduced by decreased chest wall compliance with fat accumulation subcutaneously and intraabdominally. There is a reduction in FRC caused by reduced ERC. If FRC is less than closing capacity, hypoxia may ensue.

b) Obesity influences his ICU management via:

- 1) interference with normal physiology (as above)
- 2) coexisting medical problems (hypertension, ischaemic heart disease, diabetes, sleep apnoea, pulmonary hypertension)
- 3) technical difficulties with
 - intravenous access
 - intubation
 - monitoring devices (eg NIBP cuffs)
 - bed size (nerve compression)
- 4) difficulty mobilising
 - DVT
 - Pressure areas

11. *Following off-bypass coronary artery bypass grafting a patient returns to the ICU. Soon after arrival he becomes bradycardic and profoundly hypotensive, unresponsive to a fluid challenge. What may cause this and what is the most appropriate course of action?*

Potential causes of this scenario include:

- pericardial tamponade
- graft occlusion by clot/spasm/kinking/stitch
- complete heart block
- non-specific events: eg disconnection leading to severe hypoxia/bradycardia and myocardial ischaemia, pulmonary embolus

The most appropriate course of action is:

- bag the patient with 100%
- administer immediately available inotrope (aramine or adrenaline)
- commence ECM if pulseless
- obtain and use chest opening pack
- internal cardiac massage
- if the problem is not immediately amenable to therapy eg relief of tamponade, organise cardiopulmonary bypass to rest the heart and allow exploration of the grafts.

12. *Critically evaluate the use of mobile chest X-rays in ICU including indications, method, precautions and information obtained.*

Mobile chest X-rays are essential diagnostic tools in ICU but are subject to overuse and misinterpretation.

Indications include: any ventilated patient with sudden respiratory or cardiovascular deterioration, after intubation, after insertion of NG tube, daily in critically ill ventilated patients and after insertion of CVC or ICC etc

The method: if possible the CXR should be erect with a consistent distance and energy used. Full inspiration should be held during exposure.

Precautions include: avoid in pregnant patients, cover genitalia in young patients particularly if long stay expected. Stay > 3 metres away from X-ray beam.

The useful information includes: position of lines etc., heart, mediastinal, soft tissue, bone and lung pathology (collapse, consolidation, effusion, oedema), trends in fluid status etc

13. *The nurse notes a marked difference between blood pressure recorded via an arterial line in one arm and non-invasive pressure recorded from the other arm. What may be causing this difference? Which reading will you use to guide management?*

The difference in pressures may be caused by:

- (a) error in intra arterial measurement due to
 - zero error (poor calibration, drift, wrong height)
 - poor system (long tubing, soft wall, narrow bore)
 - local arterial stenosis, spasm, hypothermia, intense vasoconstriction, subclavian stenosis etc
- (b) error in NIBP measurement
 - wrong size cuff
 - irregular pulse, AF (consecutive pulses required)
 - subclavian stenosis
- (c) lack of correlation because measures are from different sites and use different principles.

The candidate might have explained the oscillometric and invasive pressure recording principles to elucidate the problem.

The choice of reading for clinical use depends on the above factors. Mean arterial pressure from the arterial line in the absence of hypothermia, subclavian stenosis etc may be the most reliable. If there is doubt about this reading then a more proximal recording (eg femoral catheter or long brachial catheter or implantable transducer) may be necessary. In a vasculopathy it would seem wise to trust the higher pressure.

14. *What are the determinants of central venous pressure? How may its measurement guide patient management?*

Central venous pressure (CVP) is dependent on intravascular fluid volume, right ventricular function, pulmonary vascular resistance, venous capacitance, intrathoracic pressure, ventricular compliance and *viz a tergo* (arterial pressure).

Measurement of CVP is used as an indirect guide of right ventricular filling but any absolute measure has a complex relationship with right ventricular preload. If other conditions are constant, trends in CVP may reflect vascular compliance and changes in volume status.

Absolute measures along with pulmonary wedge pressure may help in the diagnosis of:

- right ventricular infarction
- pulmonary embolus
- ARDS severity
- Cor pulmonale
- tamponade

CVP waveforms may indicate nodal rhythm, tricuspid incompetence etc

15. *What is the significance of persistent hiccoughs in a ventilated ICU patient and how will you manage them?*

Hiccoughs may be due to

- Irritation of diaphragm (subphrenic abscess, cholecystitis, pneumonia, pericarditis)
- Irritation of stomach wall (distension, ulcer, ileus)
- Phrenic nerve stimulation /irritation (neoplasm, goitre)
- Brainstem lesion (neoplasm, ischaemia, surgery)
- Metabolic (uraemia)

Management is often unsatisfactory:

- diagnosis and treatment of underlying cause (NG tube, drain subphrenic)
- many medications have been used, indicative of their poor efficacy (eg chlorpromazine, metaclopramide, haloperidol, phenytoin, carbamazepine)
- physical stimulation of posterior pharynx by NG tube may interrupt the reflex arc

In the event of persistent, fatiguing hiccoughs phrenic nerve block has been tried.

LONG ANSWER QUESTIONS

QUESTION 1

A 72 year old woman (55kg), Mrs X, with a history of severe emphysema and chronic bronchitis is intubated in the Emergency Department (ED) because of drowsiness associated with hypercarbia after her initial arterial blood gas analysis revealed:

pH 7.219 PCO₂ 98mmHg PO₂ 48mmHg HCO₃ 39mmol/l lactate 2.5 mmol/l

You are called to the ED to assess and admit this woman to ICU.

(a) Outline your initial management including ventilator settings.

This elderly lady with severe chronic lung disease is admitted with acute on chronic hypercarbia and drowsiness. She is intubated.

a) Initial management should involve:

- continued resuscitation (check position of ETT, establish ventilation to rest the respiratory muscles, assess and restore the circulation with fluid bolus/inotrope etc)
- mode of ventilation should be appropriate for her strength of respiration and in the first instance may involve sedation and either SIMV, CMV or PSV. The principle will be to allow a long expiratory time with TV 6-8mls/kg, rate 8-10 and PEEP no greater than the measured auto-PEEP. Auto-PEEP greater than 5 or incomplete expiration should be treated with slower rate and increased bronchodilator.
- diagnosis of precipitating event (acute bronchitis, pneumonia, sputum retention, CCF, pneumothorax, asthma, sedation, B-blocker, aspiration, hypokalaemia), chronic status, other comorbidities. This requires talking to family, GP and specialist, examining from head to toe and getting a chest X-ray
- complete medical history, allergies, medications etc
- establishment of monitoring
- contact with family/friends to gather information and establish lines of communication
- continued support and treatment overnight with ventilation, bronchodilators, antibiotics (eg erythromycin, cefotaxime), steroids as indicated.

The history from her daughter reveals that Mrs X lives independently but is limited by severe breathlessness with exercise. (b) Does this change your management?

NO. The degree of incapacity is not inconsistent with the presentation and does not indicate a particularly good or poor prognosis. The management at this stage is intensive while resting the patient for 24hrs, treating the precipitant and awaiting an opportunity to start weaning.

(c) *What are the effects of her lung disease on her respiratory physiology and how will this effect your management?*

Although usually coexistent these problems (emphysema/chronic bronchitis) have theoretically different effects. Chronic bronchitis leads to increased airway resistance from mucosal oedema, secretions, bronchospasm, loss of elastic tissue supporting small airways leading to dynamic airway compression. Emphysema leads to loss of alveolar spaces and capillary bed. The end result is airflow limitation, prolonged expiration, hyperinflation (reducing diaphragm efficiency and increasing work of breathing), pulmonary hypertension, V/Q mismatch and tendency to degrees of hypoxia and hypercarbia. Chronic hypercarbia may lead to reliance on hypoxic drive and chronic hypoxia to cor pulmonale and polycythaemia. Skeletal muscle dysfunction may be prominent due to malnutrition, steroids, electrolyte abnormalities and reduced muscle blood flow.

These effect management by necessitating avoidance of gas trapping during ventilation (long exp time, bronchodilators etc), ensuring enteral nutrition and sputum clearance with physiotherapy, aiming to maintain the patient's usual PCO₂ and PO₂ with a normal pH.

At one week she remains ventilator dependent.

(d) *What may interfere with her weaning and what may be done to facilitate weaning?*

A list may be best here:

- breathing system; demand valve resistance, humidifier, turbulence
- ETT; too small
- Airway; untreated asthma, secretions
- Lung interstitium; oedema, collapse, infection
- Musculoskeletal; weakness, hyperinflation, kyphoscoliosis
- Cardiovascular; low cardiac output state, ischaemia
- CNS drive; dugs, stroke,

The aim is to minimise the external work of breathing against inefficient ventilators and tubing, consider a tracheostomy which allows staged separation from the ventilator and improve all aspects of the patients general condition including nutrition, K/PO₄/Mg, lung function and cardiovascular status.

After 3 weeks of difficult management Mrs X is discharged to the ward.

(e) *What are the principles of managing her should she deteriorate and require readmission to ICU?*

After 3 weeks in ICU this 72 year old lady with severe CAL is entitled to the opportunity of a frank discussion about advance care planning. The aim of this question was to explore discharge planning to prepare Mrs X and family for eventualities. Much will depend on what has been learnt about her disease and whether the admission was the result of inexorable deterioration of her lung disease or precipitated by a reversible event. A group conference should be organised before discharge.

The general plan being:

- prepare for the discussion by providing a suitable environment, gaining the medical facts, getting a medical consensus on a contingency plan
- establish what the family and patient know
- determine how much information they want. How open and frank a discussion.
- explain the medical information and a proposed medical plan
- assess the response of the patient/family and respond to their emotion, questions and disagreements
- establish general, accepted goals for long term care
- finalise a plan

Details will include Mrs X's desire for intubation if necessary in the future, the use of non-invasive ventilation etc

That night she develops sputum retention and becomes drowsy. Her daughter demands ICU admission (f) What will you do?

The response will depend on the results of the conference, and the plan reached. If her daughter demands ICU admission for Mrs X it is best to

- assess the medical appropriateness of admission at this time
- assess alternative or more appropriate avenues of management
- discuss with admitting consultant to agree on a plan
- communicate with Mrs X's daughter and arrive at a mutually agreeable plan bearing in mind that the stated wishes of Mrs X are paramount

A review of events of the day should be undertaken to ascertain if there is a cause for this deterioration eg sedation, narcotic administration, sepsis, pneumothorax.

If readmission appears to be appropriate then there is no problem.

If it is not, because of terminal irreversible condition or it is against the clear wishes of Mrs X, the feelings and motivation of the daughter will need to be addressed and answered.

QUESTION 2

You have taken over the directorship of a district hospital ICU. Part of your mandate is to establish a Quality Assurance program. (a) How will you achieve this?

When moving into a new role it may take time to assess the individual needs of the unit and staff. Changes will need to be introduced sequentially and with the cooperation of the staff. Quality assurance projects will need to be learning experiences and productive rather than punitive.

The candidate was expected to discuss the elements of an organised program and what he/she would do including:

- ICU Morbidity and Mortality data collection and review
- Incident Monitoring data collection and review
- Hospital Outcome data collection and review
- Staff working hours, retention, continuing education
- Occupational safety record
- Appointment of a Quality Assurance Coordinator

(b) What is the relevance of Evidence Based Medicine to your patients and how will you apply this?

Evidence Based Medicine has been defined as the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. It is not new let alone revolutionary. Its relevance to the candidate's practice is its ability to add to clinical experience, basic science and physiological principle.

Unfortunately an individual would be unable to review and critically assess all the literature available in all languages. Practitioners are dependent on reviews, meta-analyses and expert opinions. Many questions have yet to be answered effectively or in many cases are yet to be addressed at all. Other questions are beyond scientific assessment eg the use of no antibiotic in pneumonia. A complete appreciation of EBM requires review of the literature, audit of local practice ie techniques/management in one's own ICU, implementation of EBM based practice and follow-up audit of results. Although not itself assessed by trials, EBM, by scientific appraisal and review, formalises an aspect of quality improvement which should be relevant to ICU practice.

An article appears reporting the positive effects of a new agent in a trial of 50 patients with septic shock.

(c) What criteria will you use to assess the validity of this article to your ICU?

The criteria for assessment of such an article include:

- Is the trials design valid and powered to achieve a result? It seems doubtful in this case but a large effect in a specific group may be detected.
- Was the hypothesis based on valid evidence?
- Were all the entered patients accounted for?
- Were the groups equivalent after randomisation?
- Was there proper blinding of study personnel?
- Apart from the experimental intervention were the groups treated equivalently?
- Was the statistical analysis appropriate?
- How large was the treatment affect?
- Can the results be applied to my patients?

After a year you become aware of a very high mortality in the post-operative patients of one of the surgeons. (d) How will you approach this problem?

This is a topical and difficult problem. It is best approached by assessing the surgeon's results in the light of available benchmarks. It is possible that there is a high referral rate of high-risk patients. Before precipitating alarm it would be best to start by gathering information from all available sources and then confiding in trusted colleagues for advice and personal experiences. Referral to the medical defence group would provide expert legal and medical advice. If there is concrete evidence of negligent, incompetent or poor practice it should be presented to hospital division and administration and the surgeon involved. Further avenues may then be regional medical board.

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