

Chapter 1

Pre-operative investigations

1. Pre-admission clinic

What is the purpose of the pre-admission clinic (PAC)?

- ◆ To assess the patient's medical condition and optimise it pre-operatively if necessary.
- ◆ To check that the planned procedure is still appropriate and to continue the process of informed consent.
- ◆ To make arrangement for any special procedures or facilities which might be required, such as frozen section histopathology specimens or a booked ITU bed.
- ◆ To identify any appropriate investigations and ensure that any reports available have been seen and checked by the senior person responsible.

Who should be present at the PAC?

The PAC should be anaesthetic-led and provided by specialist nurses and person(s) from the admitting surgical team. Access to senior surgical advice should also be available for complex cases and those with

significant comorbid conditions. Patients identified as high risk should be seen by the consultant anaesthetist.

Briefly outline the process of 'clerking a patient'

Clerking a surgical patient is an essential process of formally admitting the patient under a consultant's care. Patients can be 'pre-clerked' in the PAC, or clerked on admission.

Clerking a patient requires taking a full history, including details of the presenting symptoms, past medical history, family and social history, and drug and allergy history. The history should be completed by a full systematic enquiry of other relevant medical symptoms. The patient is then examined, with particular attention paid to the signs of the presenting condition and other systems that may affect the peri-operative management, e.g. cardiorespiratory system in patients undergoing general anaesthetic.

After formal clerking, appropriate investigations are arranged, the consent is checked, the drug chart is completed and any other arrangements, such as antibiotic prophylaxis, 'marking the patient', shaving or bowel preparation, are arranged.

2. Pre-operative haematology

What information does a pre-operative full blood count (FBC) provide?

A full blood count provides haemoglobin concentration, white cell count and platelet count. Haemoglobin concentration (12-16g/dl in male, 11-14g/dl in female), is a measure of the oxygen-carrying capacity of the blood. White cell count ($5-10 \times 10^9/l$) is raised in the presence of infection. Platelet count ($150-450 \times 10^9/l$) is one measure of blood clotting. A FBC may also provide details of red cell morphology (e.g. microcytosis in iron deficiency, macrocytosis in folate deficiency) and white cell differential (e.g. neutrophilia, leucopenia).

Which patients require a pre-operative FBC?

- ◆ All elective pre-operative patients over 60 years old, adult females or patients with a suspicion of anaemia, blood loss, haematological disease, cardiorespiratory conditions, sepsis or coagulation problems.
- ◆ All emergency pre-operative patients, especially those with abdominal conditions, malignancy, trauma and sepsis.
- ◆ All patients for surgery that could incur significant blood loss.

When should we ask for clotting studies?

Any patients on anticoagulants, with liver disease, or with a known clotting disorder should have pre-operative clotting studies. Clotting studies are important for patients having epidural anaesthesia (see section 2.6.1), as abnormal clotting can lead to spinal haematoma.

The prothrombin time (11-13 secs) measures the clotting factors of the extrinsic pathway. It is prolonged in patients on warfarin, and those with liver disease or disseminated intravascular coagulation (DIC).

The activated partial thromboplastin time (APTT) (<35 secs) measures the clotting factors of the intrinsic pathway. It is prolonged in heparin therapy, haemophilia and DIC. It used to be called the kaolin-cephalin clotting time (KCCT).

Why do some patients need a sickle test?

Patients of Afro-Caribbean origin may carry the gene for abnormal haemoglobin causing sickle cell disease. This may not be clinically obvious and can manifest itself at times of physical stress such as that caused by surgery. All patients of Afro-Caribbean origin should be pre-operatively tested.

3. Pre-operative biochemistry

When should the surgical team consider pre-operative urea and electrolyte (U & E) estimation?

Standard U & E estimation provides plasma concentrations of:

- ◆ Sodium (133-144mmol/l).
- ◆ Potassium (3.3-4.8mmol/l).
- ◆ Urea (2.5-6.5mmol/l).
- ◆ Creatinine (55-125µmol/l).

Pre-operative U & Es should be performed in all patients undergoing major surgery, and in all patients over 65 years.

Patients with concomitant cardiopulmonary disease, hepatic or renal disease, or metabolic or endocrine disorders may have deranged U & Es. In addition, pre-operative U & Es should be checked in all patients with a history of diarrhoea or vomiting, or with malnutrition, or those who are taking medications which might affect U & E concentrations, e.g. diuretics, steroids, cardiovascular medications, or who are on an intravenous infusion.

Which patients require pre-operative urinalysis?

Urinalysis testing provides evidence of the following substances in the urine: protein, blood, glucose, bilirubin, urobilinogen, ketones, nitrites, leucocytes, and urine pH and specific gravity. It does not provide exact urine concentrations, but does provide some quantitative information (negative, +, ++, +++, etc.).

Routine pre-operative urinalysis should be performed on all emergency cases with abdominal or pelvic pain, in patients with abdominal or pelvic trauma and in diabetics.

A urine pregnancy test is performed in women of childbearing age with abdominal symptoms, or who require X-rays.

When is blood-glucose testing required pre-operatively?

The normal range for random blood glucose is 3-7mmol/l. It should be performed in all pre-operative patients with diabetes mellitus, malnutrition or obesity; patients presenting with abscesses, cellulitis or unusual infections; all patients over 60 years; and when glycosuria or ketonuria is present on urinalysis.

What information is provided by liver function tests (LFTs)?

All pre-operative patients with upper abdominal pain, jaundice, malnutrition, known hepatic dysfunction, a history of alcohol abuse, or who are taking hepatically-metabolised medication should have pre-operative LFTs.

LFTs provide plasma concentrations of:

- ◆ Bilirubin (3-25µmol/l).
- ◆ Alkaline phosphatase (30-120iU/l).
- ◆ Alanine transaminase (ALT)/aspartate transaminase (AST) (10-60iU/l).
- ◆ Albumin (39-50g/l).
- ◆ Gamma-GT (10-80iU/l).

In addition, emergency pre-operative patients with abdominal pain should have amylase estimation.

4. Principles of pre-operative radiology

What information is required for referral for a radiology investigation?

Requesting an imaging investigation should be considered the same as a referral for any other specialist medical opinion. The best chance of getting the most from any investigation is to ensure the person doing the investigation is as fully informed as possible. Reasons for the request must be clear and a full medical and surgical history should be given. In complex cases, it is often best to go and talk to the radiologist.