

Pre-operative preparation & Post - operative care

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2 Guidelines on Pre-operative preparation and immediate post-operative care

2.1 Introduction

Preoperative preparation of patients undergoing elective and emergency surgical or diagnostic procedures is an important part of peri-operative care. The anaesthetist is responsible for optimal preoperative preparation of the patient in order to minimise anaesthetic-related complications. Preoperative management of patients on various medications needs additional knowledge and expertise. As it is impossible to provide the junior anaesthetists with information regarding all possible medications, the guidelines provide recommendations only on some important drugs. The anaesthetist is expected to see the patient both pre and postoperatively. Safe return of the patient to the ward after recovering from effects of anaesthesia and surgery should be supervised by the anaesthetist.

3 Preoperative Assessment

3.1 Introduction

The main goal of preoperative assessment is to improve the outcome of surgery and anaesthesia. Consultation by an anaesthetist is essential for the medical assessment of a patient prior to anaesthesia for surgery or any other procedure to ensure that the patient is in optimal condition for the procedure. Clinical history & examination based assessment has to be carried out initially followed by the appropriate investigations where indicated. These guidelines are intended to guide the non-specialist anaesthetists, house officers and medical officers who assess patients for surgery or any other procedure which requires an anaesthetic. By using these guidelines the patient can be optimally investigated minimising last minute cancellation due to inadequate assessment and preparation.

These guidelines apply to the care of all patients who require anaesthesia. In unusual circumstances e.g. extreme emergencies these guidelines may need to be modified and the reasons for so doing must be documented in patients' records.

3.2 OBJECTIVES

3.2.1 Purpose of pre-operative assessment

This enables the identification of those patients who require:

- Few or no pre op investigations
- Targeted investigations
- Further assessment or referral after specific investigations.

3.2.2 Objectives of pre -operative assessment

1. Identify potential anaesthetic difficulties
2. Identify existing medical conditions
3. Improve safety by assessing and quantifying risk
4. Allowing planning of peri -operative care
5. Provide opportunity for explanation and discussion to allay fear and anxiety

3.3 The anaesthetic pre- op assessment clinic (if available in your hospital) :

- Provides the opportunity for anaesthetist to see patients with potential anaesthetic problems early.
- Should preferably involve a consultant anaesthetist/ a senior medical officer in anaesthesia.
- Should have staff and equipment, facilities for X-ray, ECG, and other pre operative testing.

Patients should ideally be seen within two weeks before admission for surgery.

3.3.1 Methods of pre-operative screening

Questionnaires –

- Filled by the patients at the surgical out patient clinic
- Filled by a nurse by interviewing patients

3.3.2 Requirements for efficient functioning of pre-op assessment clinic

- Patient's full hospital record must be available to the anaesthetist.
- Surgical house officer/medical officer should perform preliminary clerking and examination.
- Patient should have an opportunity to meet other professionals that will be involved in their care.
- Elective postoperative admission to an intensive care unit or high dependency unit can be organised during pre -operative assessment clinic visit.

3.4 Assessment

Physical examination & history complement each other and help determine the abnormalities not apparent from history alone.

3.4.1 History

- A review of patient's present and past medical and surgical history
- A review of drugs and anaesthetic related problems in the patient and in the immediate family circle

3.4.2 Physical examination

- Assessment of organ / systems & the airway
- Patients' anatomy to be specifically evaluated prior to regional anaesthesia & invasive procedures
- A review of psychological status

3.4.3

ASA (American Society of Anaesthesiologists) Grading	
ASA Grade 1	"Normal healthy patient" (without any clinically important comorbidity and without any clinically significant past/present medical history).
ASA Grade 2	"A patient with mild systemic disease that does not limit activity"
ASA Grade 3	"A patient with severe systemic illness that limits physical activity"
ASA Grade 4	" A patient with severe systemic disease that is a constant threat to life"
ASA Grade 5	" Moribund patient"

Grading of Surgery	
Grade 1 (minor)	Excision of skin lesions, Incision & drainage of skin abscesses
Grade 2 (intermediate)	Repair of inguinal hernia; stripping of varicose veins; adeno- tonsillectomy; arthroscopies
Grade 3 (major)	Thyroidectomy; Total abdominal hysterectomy; lumbar discectomy; endoscopic resection of prostate
Grade 4 (major +)	Total joint replacement; lung surgery; colonic resection; radical neck resection

Assessment should be completed by classifying the patients according to ASA physical status and grading of surgery so that high risk patients with poor reserves will require consultation with specialists to help optimize the physical status for surgery and anaesthesia.

3.4.4 Appropriate laboratory tests

Usefulness of investigations is doubtful in asymptomatic patients. Routine testing is also expensive and rarely alters the perioperative management. Therefore the laboratory tests should be ordered on the basis of findings on the clinical history, examination, the intensity of planned surgery & the results of bed side tests done on admission.

BED SIDE TESTS

Urinalysis	- All Patients
Pregnancy	- Any woman who says she may be pregnant (with consent)

HAEMATOLOGY TESTS

FBC Not necessary for minor surgery in otherwise fit patients

- Women of child-bearing age
- Men > 60 yrs
- Baseline where blood loss is likely to be significant e.g. moderate (abdominal hysterectomy, major vascular or abdominal surgery)
- Significant CVS/RS disease
- Thalassaemia/Sickle Cell/ Haematological disease, Clinical signs of anaemia
- Bowel disease (including Ulcerative Colitis/Crohn's)
- Liver/Renal Disease (including alcohol abuse)
- Rheumatoid/Connective tissue disease, Diabetes
- Known malignancy
- Long-term NSAID'S
- Short of breath on minimal exertion or orthopnoea

N.B. Repeat Hb if there is likely to have been a change significant change since last result e.g. bleeding

Clotting

- Not necessary for minor, intermediate or major surgery in otherwise fit patients
- For all patients for major + (Grade 4) surgery such as hepato-biliary and vascular surgery
- Liver disease (incl. suspected alcohol abuse) , Jaundice
- Coagulopathy known or suspected (e.g. recent blood transfusion, family history, Signs or symptoms of excessive bleeding, Anti-coagulant therapy)

Patients on anti-coagulants must have INR checked as normal before surgery.

See section on perioperative management of patients on anti-coagulants

Blood grouping and cross matching

- All operations where blood loss may be significant
- Group and save if facilities are available as this allows immediate issue of blood without cross-matching in patients with no abnormal antibodies. Discuss patients with abnormal antibodies with transfusion service.

Haemoglobin Electrophoresis

- Family History of haemoglobinopathy (Thalassaemia, sickle disease)

BIOCHEMICAL TESTS

Urea & Electrolytes, Creatinine

- Patients > 60 yrs
- Baseline for all operations likely to require large amounts of fluid/blood replacement
- Significant CVS/RS disease including hypertension
- Bowel disease, Liver/Renal Disease
- Rheumatoid/Connective tissue disease, Diabetes, malignancy
- Diuretics/ACE inhibitors/B-blockers/Digoxin/ Steroids
- All patients on iv fluids
- Clinical signs of anaemia, short of breath on minimal exertion, orthopnoea

N.B. U&E result must be recent in patients at risk of low or high K⁺ or i.v. fluids

Blood Sugar

- Not necessary for minor surgery in otherwise healthy patients
 - All patients > 40 yrs presenting for intermediate, major and major+ surgery
 - Patients with abnormal urinalysis
 - Liver and pancreatic disease (incl. suspected alcohol abuse)
 - Diabetes (immediately before surgery)
 - All vascular patients B-blockers, Steroids History of dizziness or collapse
 - Large or unusual abscesses
- HbA1C** – for major surgery, patients with poor control

Liver Function Tests & Consider Bone Profile (serum calcium, magnesium & phosphates)

- Hepato-biliary surgery, Liver disease, Jaundice
- Known or suspected excessive alcohol intake
- Known Hep B/ C
- Thyroid Surgery (baseline Ca²⁺)
- Malignancy with risk of metastases
- Malnourishment
- Renal failure
- Significant heart failure Methotrexate, Anti-fungals (i.v. only)

Thyroid Function Tests

- Thyroid surgery
- Thyroid disease – unless clinically euthyroid AND with normal TFTs within last 6 months
- Signs or symptoms of hypo- or hyperthyroidism

Fasting Lipids

- Vascular Surgery
- Signs of hyperlipidaemia in patients < 50 yrs old e.g. Xanthelasma

CARDIAC TESTS

Echo-cardiogram ALL PATIENTS WITH UNINVESTIGATED CARDIAC MURMURS

ECG

- All males > 40 yrs and All females > 50 yrs
- CVS disease
- Diabetes
- Obstructive Sleep Apnoea
- BMI > 35
- Family history of hyperlipidaemia
- Digoxin, anti-arrhythmics, diuretics, ACE inhibitors
Cardiac murmur or carotid bruit
- Recent chest pain, dizziness, palpitations, collapse

Pacemaker Check

- Patients with pacemaker should have a check no more than 6 months before surgery
- Patients with implantable defibrillator or demand pacemaker should be discussed with consultant anaesthetist

IMAGING

CXR

- Routine CXR is not indicated on any patient whatever their age.
- Patients with stable disease do **NOT** require a CXR if they have had one within the last 12 months, unless they have worsening symptoms, recent trauma or possible metastases.
- Baseline Ix for thoracotomy, patients needing ITU post-operatively (Major + surgery)
- **ALL** patients with recent history of significant trauma, Possible metastases, heavy smokers
- Kyphoscoliosis, rheumatoid Arthritis/CT disease
- Past history or risk of T.B
- Consider in CVS/RS/Renal disease (esp. Heart failure, unstable asthma/COAD) Acute respiratory symptoms, orthopnoea

Carotid Doppler

- Patients with a Carotid bruit

C-Spine X-ray

- Recent history of neck trauma
- Rheumatoid arthritis with neurological symptoms (e.g. tingling in hands),
- Consider in Ankylosing Spondylitis

OTHER TESTS

Peak Flow

- All patients with COAD/asthma (pre/post inhalers)

Spirometry

- Kyphoscoliosis
- Exercise tolerance < 100 yds

ABGs

- Dyspnoea at rest or on minimal exertion
- Saturation < 90% on room air
- Baseline in severe respiratory disease, thoracic surgery
- Severe COAD patients (may be on home oxygen or non-invasive ventilation)
- Obstructive sleep apnoea patients on CPAP

DISEASES : RELEVANT TESTS

CVS DISEASE

Minimum FBC, U&E, LFTs, ECG

Consider CXR if none within 12 months or worsening symptoms; Clotting if anti-coagulated

All patients with uninvestigated murmurs MUST have echocardiogram.

- Patients with non-optimally treated disease or unstable angina need referral to cardiologist/ physician for optimization/investigation.
- Patients with a history of ischaemic heart disease or diabetes who are unable to climb stairs must be discussed with anaesthetist.
- All patients with pacemakers need referral for a check if they have not had one within 6 month. For implantable defibrillators or demand pacemakers discuss with consultant anaesthetist.

RS DISEASE

Minimum FBC, U&E, LFTs, ECG

Consider

- CXR if none within 12 months or worsening symptoms
- Peak flow (pre/post inhalers), Spirometry if exercise tolerance < 100 yds
- ABG's if O₂ sat < 90% on air or dyspnoea on minimal exertion
- **Patients with non-optimally treated disease need referral for optimization/Investigation**

RENAL DISEASE

Minimum FBC, U&E, LFTs, Blood Sugar, ECG

Consider Clotting
CXR

Patients on dialysis need discussion with renal team and anaesthetist. They also need U&E + clotting on the morning of surgery

DIABETES

Minimum FBC, U&E, Creat, LFTs, Blood Sugar
ECG

Consider HbA1C – for major surgery, patients with poor control
CXR

Patients with poor control i.e. HbA1C > 9% need referral to physician for review

THYROID DISEASE

Minimum

FBC, blood sugar, U & E, ECG

X Ray neck- AP, lateral

If patient is clinically euthyroid, has been regularly followed up and has normal thyroid function tests within the last year, they do not need repeat thyroid functions tests.

If clinically not euthyroid, they must have repeat tests and urgent medical referral.

Consider

Patients with goiters need full assessment of airway. This may include thoracic inlet view +/- CT scan.

RHEUMATOID ARTHRITIS / CONNECTIVE TISSUE DISEASE

Minimum FBC, U&E, Creat, LFTs, Blood Sugar
ECG, HbA1C

Consider

CXR, C-Spine X-ray, Peak flow/ Spirometry if symptoms

CNS DISEASE

If the patient has had a significant head injury within the last 72 hours discuss with anaesthetist the need for CT scan.

DRUGS

Diuretics	U&E esp. K ⁺ , ECG
Antihypertensives	U&E esp. K ⁺ ECG
Digoxin	U&E esp. K ⁺ ECG
Digoxin level if ECG abnormal or symptomatic (if possible)	
Anti-arrhythmics, Aminophylline	U&E esp. K ⁺ ECG
Steroids	U&E esp. K ⁺ LFTs ,FBC
+/- clotting	
Anticoagulants	Relevant clotting screen,FBC (platelets)
Thyroid Rx	+/- LFTs ; +/- ECG
Immunosuppressants	FBC, U&E, LFTs
Major Tranquillisers	U&E (risk of hyponatraemia)

FOR ALL TESTS THE PERSON ORDERING THE TEST IS RESPONSIBLE FOR CHECKING THE RESULT AND ACTING ON IT IF ABNORMAL.

3.4.5 Special considerations in children

1. Unnecessary investigations should be avoided in otherwise healthy children who present for minor or intermediate surgery. They do not require routine haematological or biochemical investigations.
2. Routine Haemoglobin should be done in following patients before **any surgery**:
 - Children at risk of thalassaemia or sickle cell disease
 - Children who are clinically pale
 - Neonates
 - Ex-premature infants under 1 year
 - Children in whom intra-operative transfusion is necessary
 - Children with systemic disease
3. Routine biochemistry for:
 - Children with metabolic, endocrine or renal diseases
 - Children receiving intravenous fluids

4. Perioperative feeding

Implementation of fasting guidelines is necessary to prevent risk of aspiration of gastric contents and also to avoid unnecessarily prolonged fasting both pre- and postoperatively. The anaesthetist should indicate the fasting regime in the patient's notes depending on the patient's age and medical problems.

4.1. Preoperative fasting in adults

4.1.1 For healthy Adult patients undergoing elective surgery (without GI disorders) :

'The 2 and 6 rule'

- 2- Water up to two hours before induction of anaesthesia.
- Clear fluids*, including clear tea and black coffee also permitted up to 2 h before induction.
- 6- Food/milk/sweets/tea or coffee with milk can be taken 6 h (minimum) before induction.
- Chewing gum/ betel not permitted on day of surgery.
- Regular medication should be continued, unless contraindicated; premedication (benzodiazepines) acceptable; taken with up to 30 ml fluid.

**** Clear fluids – non-particulate, non-carbonated fluids those through which newsprint can be read***

4.1.2 For higher risk adult patients undergoing elective surgery:

- Includes those with obesity, diabetes and gastro-oesophageal reflux.
- Follow same fasting regime as healthy patients, unless contraindicated.
- The anaesthetic team should consider further interventions (such as acid aspiration prophylaxis), as appropriate.

4.1.3 Postoperative resumption of oral intake in healthy adults

- Patients should be encouraged to drink when ready, providing there are no contraindications

4.2 Perioperative feeding in Children (0 to 16 years)

4.2.1 Preoperative fasting in children undergoing elective surgery – ‘The 2-4-6 rule’

- ‘2’ - Intake of water and other clear fluid* up to 2 h before induction of anaesthesia
- ‘4’ - Breast milk up to 4 h before induction
- ‘6’ - Formula milk, cows’ milk or solids (Food, including sweets) up to 6 h
- The anaesthetic team should consider further interventions for children at higher risk of regurgitation and aspiration
- Regular medication should be continued, unless contraindicated; premedication (benzodiazepines) acceptable; taken with clear fluid up to 0.5 ml/kg

**** Clear fluids – non-particulate, non-carbonated fluids those through which newsprint can be read***

4.2.2 Postoperative resumption of oral intake

- Oral fluids can be *offered* to healthy children when they are fully awake following anaesthesia, providing there are no contraindications
- Consider clear fluids or breast milk first
- No requirement to drink as part of the discharge criteria
- GI tract/major abdominal surgery consult surgical team for postoperative recovery regimes

4.3 Patients undergoing emergency surgery

- Treat as though the patient has a full stomach.
- If possible, follow normal fasting guidance to allow gastric emptying.

5. Guidelines for Perioperative Steroid Replacement Therapy

5.1. Introduction

Patients on steroids presenting for surgery may have impaired stress response due to prolonged suppression of hypothalamic-pituitary-adrenal axis, irrespective of route of administration. Underlying disease process in combination with this suppression may lead to significant morbidity or mortality in the peri-operative period, especially in patients who are on high dose steroids (>10mg of prednisolone or equivalent). Therefore continuation of the same dose or additional supplementation is indicated depending on the duration of steroid therapy and degree of surgical trauma. According to recent research large doses of steroids are not necessary for replacement in most of the cases.

5.2 Replacement of steroids in the peri-operative period

5.2.1 Patients not on steroids at present

➤ **Discontinued within three months**

If steroid therapy has been discontinued within three months prior to surgery treat as if on steroids.

➤ **Discontinued more than three months ago**

No replacement necessary in the peri-operative period.

5.2.2 Patients currently on regular steroid therapy

<10mg prednisolone per day	Normal hypothalamic-pituitary axis	No additional steroid cover required
>10mg prednisolone per day	Minor surgery (i.e. herniotomy)	Routine preoperative steroid dose or hydrocortisone 25mg iv at induction
	Intermediate surgery (i.e. Abdominal hysterectomy)	Routine preoperative steroid dose plus hydrocortisone 25mg iv at induction Postoperative hydrocortisone 25 mg 6 hourly for 24 hours
	Major surgery (cardiac)	Routine preoperative steroid dose plus hydrocortisone 25mg iv at induction Postoperative hydrocortisone 25 mg 6 hourly for 48-72 hrs
High dose steroid immunosuppression	Continue usual immunosuppressive dose until able to revert to normal oral intake E.g. Prednisolone 60mg/24h=hydrocortisone240mg/24h	

Prednisolone 5 mg is equivalent to :

Hydrocortisone 20mg
Methylprednisolone 4 mg
Betamethasone 750 mcg
Dexamethasone 750 mcg
Cortisone 25 mg
Prednisone 5 mg
Triamcinolone 4 mg

6. Anticoagulants and antiplatelet drugs in the peri-operative period

6.1 Introduction

Patients who are on these drugs may have increased risk of bleeding in the peri-operative period and risk of spinal haematoma following regional anaesthesia. When stopping or adjusting the dose of these drugs always consult the cardiologist, haematologist or the physician in the local hospital. Patients presenting for routine surgery should be referred to the consultant anaesthetist in advance to plan the perioperative care.

6.2 Objective/Scope

These guidelines are intended to guide the non-specialist anaesthetist on peri-operative management of adult patients on anticoagulant agents and drugs affecting platelet activity.

6.3 Drugs Affecting The Coagulation Cascade

6.3.1 Warfarin– Inhibits the synthesis of vitamin K –dependant clotting factors {II (prothrombin), VII, IX, X} in the liver by depleting vitamin K stores.

6.3.1.1 Therapeutic use of warfarin

For therapeutic purposes INR should be maintained within a certain limit depending on the condition. The following table provides a guide on the INR that should be maintained for the following conditions.

Uses	INR
Deep vein thrombosis	2-2.5
Pulmonary embolus	2.5-3.0
Chronic atrial fibrillation	2.5-3.0
Dilated cardiomyopathy	2.5-3.0
Mural thrombus	2.5-3.0
Rheumatic mitral valve disease	2.5-3.0
Recurrent deep vein thrombosis	3.5
Pulmonary embolus	3.5
Mechanical heart valve	3.5

6.3.1.2 Perioperative management of patients on warfarin therapy

➤ **Minor surgery**

- Reduce INR to < 1.5 by reducing the dose and monitoring INR for 4 days.
- Recommence standard treatment dose on the following postoperative day.

➤ **Major surgery**

- Stop warfarin 3 days preoperatively and monitor INR in high risk patients (prosthetic valves, high risk of DVT)
- When INR becomes < 3.0 start heparin as an infusion at a rate of 1000 IU /hr and adjust to keep the APTT between 1.5-2.5.
- Stop heparin infusion 4 hours prior to surgery.
- Restart warfarin as soon as the risk of surgical haemorrhage is passed (continue low molecular weight heparin or i.v. heparin until INR is in the therapeutic range).

6.3.2. Heparin

6.3.2.1 Unfractionated heparin

– binds to antithrombin III reversibly and enhances its ability to inhibit certain proteases in the coagulation cascade (XIII, XII, XI, X, IX, plasmin and thrombin). Also binds directly to coagulation proteases and facilitate their reaction with anti thrombin III.

Uses

1. Prevention of venous thromboembolic disease
2. Priming of haemodialysis and cardiopulmonary bypass
3. Disseminated intravascular coagulation
4. Fat embolism

Minor surgery

- Stop heparin infusion 4-6 hours prior to surgery.

Major surgery

- Stop heparin infusion 4 hours prior to surgery.
- Monitor and maintain APTT at 1.5 -2.5 times control.
- In an emergency the anticoagulant effects of heparin can be reversed with protamine sulphate (1 mg i.v. neutralizes 100 IU of heparin). Restart heparin infusion 12 hours after surgery.

6.3.2.2 Low molecular weight heparin

- Inhibits factor Xa and enhances the effects of antithrombin III. It is used in DVT, PE treatment and prophylaxis, unstable angina and critical peripheral arterial sclerosis.

Minor surgery- stop 12 hour prior surgery and restart 2 hours after surgery

Major surgery- stop 12 hours prior to surgery and re start 12 hours after surgery.

6.3.3 DRUGS INHIBITING PLATELET ACTIVITY

6.3.3.1 Aspirin

– Irreversibly inhibits cyclo-oxygenase within the platelet resulting in reduced production of thromboxane A₂.

Use : Vaso-occlusive disease (IHD , strokes) – medium dose (75-325 mg per day)

Peri-operative care of patients on aspirin

- If a patient is on antiplatelet therapy routine investigations will not reveal an increased bleeding time or reduced platelet function
- In emergency cases the risk of bleeding should be anticipated and balanced against the benefits of the surgery. If significant bleeding occurs in the perioperative period, platelet transfusion may be required as first line therapy

Minor surgery

Not necessary to discontinue. For certain ophthalmological procedures discuss with the surgeon.

Major surgery

Orthopaedic surgery –discuss with the surgeon

6.3.3.2 NSAIDS

Major surgery

Stop for 3 days prior to surgery if long-acting

6.3.3.3 Dipyridamole

Potentiates effect of aspirin

6.3.3.4 Clopidogrel

Major surgery

Stop for at least 7 days before surgery

In emergencies use high dose of steroids and aprotinin to reduce the bleeding time.

6.3.3.5 Platelet glycoprotein IIb/IIIa antagonists

- irreversibly prevents ADP from binding to its receptor on the platelet surface and prevents the glycoprotein IIb/IIa receptor transforming to its active form

Monoclonal antibody to receptors (abciximab)

Major surgery

Should stop at least 7 days prior to a procedure.

6.3.3.6 Peptide inhibitors (lamifiban, eptifibatide)

Inhibits the glycoprotein IIa, IIIb receptor

Major surgery

Should stop 10 days prior to the procedure

6.4 GUIDELINES FOR CENTRAL NEURAXIAL BLOCKS FOR PATIENTS ON ANTICOAGULANTS AND ANTIPLATELET DRUGS

6.4.1 Introduction

Bleeding and compression neuropraxia is a potential complication of regional anaesthesia shown to have an increased incidence in patients who are anticoagulated or on antiplatelet drugs combined with anticoagulants.

The increased use of thromboprophylaxis with anticoagulants has caused concerns over higher risk of vertebral canal haematoma which is a catastrophic complication. It is more often associated with epidural catheter use than with any other central nerve block technique. Other risk factors include coagulation or bleeding disorders, technically difficult punctures sometimes due to anatomical abnormalities of the spinal cord and multiple or bloody punctures.

As pharmacological thromboprophylaxis is becoming common practice in Sri Lanka and also the number of patients receiving anti-platelet drugs is increasing, it is imperative to compile with the following recommendations to avoid disasters associated with spinal haematoma.

- **Recommendations for central neuraxial blockade (spinal or epidural block) in patients on Anticoagulants**

6.4.1 Therapeutic doses of anticoagulants

- Full oral anticoagulation with warfarin or standard heparin is an absolute contra-indication to central neuraxial blockade and a relative contra-indication to peripheral nerve blockade. The INR should be 1.5 or lower for institution of a block or removal of a catheter.
- Spinal or epidural anaesthesia should be performed 60 minutes before intraoperative systemic heparinization. The catheter should be removed only after the complete disappearance of remaining heparin effect.

6.4.2.2 Prophylactic doses of anticoagulants

- The use of anticoagulants increases the risk of a spinal haematoma and it is the sole anaesthetist's responsibility, depending on his own skills, to determine a favourable benefit/risk ratio. Discuss with the consultant anaesthetist.

A) Low dose unfractionated heparin (5,000 IU 8-12 hourly or 7,500 IU 12-hourly)

A.1 Subcutaneous heparin

- Monitor platelet count (should be $>100 \times 10^9$ for epidurals; $>50 \times 10^9$ for subarachnoid block), platelet quality (thromboelastography if available) in patients on long-term heparin to exclude heparin-associated thrombocytopenia)
- Stop heparin 4-6 hours before procedure
- Re start 2 hours after the procedure
- Remove epidural catheter 4-6 hours after the last dose of heparin

A.2 Intravenous infusion of heparin

- Stop infusion 4 hours before block
- Restart infusion 12 hours after the block
- Restart 24 hours after if there was a bloody tap
- Remove epidural catheter 4 hours after the stopping the infusion

B) Low-molecular Weight Heparin (LMWH)

- Use the smallest effective dose of LMWH for thromboprophylaxis. Eg: enoxaparin 20 - 40mg once daily
- Give the first dose of LMWH 12 hours before surgery
- Perform the block 12 hours after the first dose of LMWH
- Re start LMWH 4 hours after the block
- Remove epidural catheter 12 hours after giving LMWH or 24 hours in case of a bloody tap
- The next dose can be given immediately after block administration or catheter removal
- Do not combine with antiplatelet or oral anticoagulants as it increases the risk of haematoma

6.4.3 Emergency surgery:

- Follow the above recommendations if the patient presents for emergency surgery
- Avoid regional techniques if safe time intervals cannot be achieved

6.4.4 Recommendations for central neuraxial blockade (spinal or epidural block) in patients on anti-platelet drugs

- In general, patients treated with one platelet aggregation-inhibiting drug (aspirin) are no longer seen as problematic in central nervous blockade. However when combined with a form of heparin therapy central nervous blockade should not be performed.
- Clopidogrel should be discontinued 7 days before any central neuraxial block or peripheral block due to the risk of haematoma formation.

6.4.5 Recommendations for early detection of a spinal haematoma in high risk patients

Careful neurological surveillance is essential to prevent a catastrophic event. Decompression of the spinal cord carried out within less than 12 hours following the onset of the first clinical signs only allows for neurological recovery in fifty percent of patients.

- Record any difficulty or bleeding during the block procedure and ensure greater vigilance during the postoperative period. Omit or delay the next dose of thromboprophylactic agent
- Instruct the ward staff to closely monitor for neurological deficit:

- ❖ Severe radicular pain is not the initial complaint of a patient with a spinal haematoma

- ❖ Weakness outlasting the anticipated duration of the motor blockade or a new onset of lower limb weakness or numbness is commoner
- ❖ Vesicular dysfunction
- ❖ Back pain

Drug	Block	Removal of epidural catheter
Warfarin	Only if INR < 1.5 If INR >1.5 delay surgery or consider alternative anaesthetic or anaesthetic technique if surgery is urgent.	Only if INR < 1.5
Heparin – full anticoagulation	Contra-indicated	Contra-indicated
Unfractionated Heparin-thromboprophylaxis	Subcutaneous: Stop heparin 4-6 hours before procedure Re start 2 hours after the procedure Intravenous: Stop infusion 4 hours before block Restart infusion 12 hours after the block Restart 24 hours after if there was a bloody tap	Remove 4-6 hours after the last dose of heparin Remove 4 hours after stopping the infusion
LMWH	Give first dose 12 hours before surgery Perform the block 12 hours after the first dose Re start 4 hours after the block	Remove epidural catheter 12 hours after giving LMWH or 24 hours in case of a bloody tap next dose can be given immediately after block administration or catheter removal
Aspirin	Proceed if only on aspirin Avoid if combined with anticoagulants or other antiplatelet drugs as well	
Clopidogrel	Discontinue 7 days before surgery / block	

7. Guidelines For Immediate Post– Anaesthesia Care (Recovery)

7.1 INTRODUCTION

Discharge of patients from the recovery room is the responsibility of the anaesthetist, but adoption of strict discharge criteria allows this to be delegated to recovery nursing staff. The anaesthetist must provide practical guidance to all staff responsible for the care of patients in the immediate postoperative period. No patient should leave the recovery without seen by the anaesthetist and being approved as suitable for discharge to the ward. The anaesthetist should record his / her name and sign the checklist approving this. The time of transfer to recovery and time of discharge should be clearly documented with other relevant information.

The criteria for discharge must be met for each individual patient before they can return to the wards. The premature discharge of a patient to the ward could be detrimental to their health and could lead to severe postoperative complications and ultimately death.

7.2 OBJECTIVES

- To ensure the safe return of patients to the ward following surgery and /or anaesthesia.
- To minimize the risk of postoperative complications.
- This guideline is intended for use in patients who have undergone general, regional and local anaesthetics.
- This guideline is not intended for use in the discharge of patients from critical care or high dependency areas.

7.3 BASIC REQUIREMENTS IN THE RECOVERY AREA

7.3.1 Location

- Should be near the theatre suite. There could be one recovery for the whole theatre complex or common recovery areas for adjacent theaters. There should be a separate exit to discharge patients to wards.
- Should be air-conditioned.

7.3.2 Bed spaces

- Recovery bed should be tiltable and have side bars and brakes.
- The ratio of bed spaces to number of operating rooms should not be less than two.
- There should be adequate space in between beds for monitors, other essential equipment and for the movement of the staff.
- The facility should be open plan allowing each recovery area to be observed but with the provision of screens between patients.
- Each bed space should have pipe line or cylinder O₂ with humidifier/ flow meter, suction with a range of suction catheters and adequate number of electrical supply.

7.3.3 Other facilities

- Storage area
- Dirty utility room
- Secure supply of drugs
- Sink
- Area for clerical activities
- Local lighting to assist examination
- Communication facilities with an emergency call system
- Display of protocols

7.3.4 Equipment and drugs

- Minimum monitoring in relation to CVS, RS, GU and CNS: Pulse oximetry, Non invasive blood pressure/ sphygmomanometer, ECG should be continued until the patient is fit enough to be discharged from the recovery.
- Oxygen delivery systems: face masks, Mapleson C system, oxygen tubings etc.
- Stethoscope
- Temperature monitor (Infra-red ear thermometer / Digital thermometer / Mercury thermometer)
- Glucometer
- Drip stands
- External warmer/ Blankets
- Common equipment : Fully equipped resuscitation trolley with a Defibrillator with Ambu Bag(adult/ paediatric) etc.
- Sick bowls/ urinals

7.3.5 Recovery room staff-

- A qualified nurse who is competent in recovering postoperative patients. One to one nursing is recommended until patient is fit for discharge to the ward.
- The staff involved in recovering patients after any form of anaesthesia should be competent in at least basic adult and paediatric life support.

7.3.6 Handing over Patients to nursing staff

The anaesthetist should provide the following information:

- Brief summary of surgery
- Past medical illness
- Anaesthetic drugs used /pain relief/anti-emetics given and the time
- Total fluids given and the losses
- Any special requirements

7.3.7 Clinical monitoring by a trained nurse (to be recorded in the notes)

- Level of consciousness / sensory level
- Airway maintenance
- Adequacy of breathing: Respiratory Rate, depth, pattern
- Colour (pallor/ cyanosis), Saturation on oxygen and air
- Pain
- Adequacy of circulation: Pulse rate and rhythm /Blood Pressure/ urine out put
- Temperature
- Distended Bladder
- Other: central venous pressure, neurovascular observation (where applicable)

7.4 CRITERIA TO BE FULFILLED BEFORE DISCHARGE

7.4.1 Level of consciousness: Patient should be oriented in time and place to ensure patient is conscious and able to communicate (age appropriate). He should be able to move all 4 limbs on command or on stimulation if a small child.

7.4.2 Stable Vital signs: Vital signs mentioned earlier should be within normal parameters or those agreed with anaesthetist or surgeon. Age appropriate vital signs should be applied for children.

7.4.3 Good pain relief: Patient should have no pain or minimum pain level acceptable (or pain score of 0-2 as per pain protocol). Discharge of patients to ward with pain is unacceptable. Patients with pain or pain score more than 3 or above should be reviewed and seen by anaesthetist to treat pain before discharge.

7.4.4 Nausea and vomiting: Patients actively retching or vomiting should be treated with anti-emetic drugs as prescribed by the anaesthetist.

7.4.5 Blood loss: Should be within expected limits and dressing should be intact and any ooze documented. Drains should be patent to avoid internal bleeding and / or haematoma. The surgeon should be informed of any excessive bleeding and review the patient if necessary.

7.4.6 Oxygen therapy should be discontinued unless prescribed, if saturation on air is within agreed limits set by the anaesthetist. If this is not possible necessary action should be taken to identify the problem and oxygen should be prescribed by the anaesthetist.

7.4.7 Arterial line should be removed as patients with an arterial line can only be cared for in designated areas (HDU, ITU).

7.4.8 All theater documentation should be completed (operation document, drug chart to include analgesia, antiemetics, fluids). Discharge check list to be completed and signed by both anaesthetist and recovery nurse.

7.4.9 Patients should stay in the recovery at least 15 minutes after regaining consciousness and blood transfusion and 30minutes following regional block before sending to the ward.

7.4.10 Reassurance should be given and planned discharge explained to the patient.

7.4.11 The ward should be informed of impending return of the patient together with relevant information including oxygen therapy, fluids, blood and any other immediate special instruction.

7.4.12 Patient should be ideally escorted to ward by a qualified nurse to deal with any emergency situation which may occur on the transfer. This should be organised where adequate staff is available.

7.4.13 Medical and surgical notes should be returned to the ward with the patient so that the ward staff is able to continue post-operative instructions.

8. Discharge Criteria for Day Cases

Day surgery is a continually evolving specialty, and would be useful economically for Sri Lanka as long as quality and safety for the patient could be provided. The patients can be discharged from hospital on the same day if they fulfill the following criteria.

Surgical Factors :

- No Bleeding from the site of surgery

Anaesthetic Factors :

- No residual anaesthetic effect
- Well awake
- Able to walk to toilet without support/ under supervision (Age appropriate)
- No nausea / vomiting
- Able to pass urine
- Cardiovascular/ respiratory parameters stable.

Patient Factors :

- Should have a responsible adult to look after
- Should be pain free/tolerable/pain responding to Paracetamol , Diclofenac sodium
- Should have a mode of communication: access to a telephone / mobile phone.
- Should be able to reach the nearest GP/ Hospital within one hour
- Should have access to a reliable transport (public transport is unacceptable)

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