

## General and specific Perioperative Care of the Surgical Patient

**5. Diabetes mellitus.** Diabetic patients are at increased risk of morbidity and mortality. Vascular disease is common in diabetics, and MI, often with an atypical presentation, is the leading cause of perioperative death among diabetic patients.

**a. Preoperative evaluation.** All diabetic patients should have their blood glucose measured in pre-op holding and intraoperatively to prevent unrecognized hyperglycemia or hypoglycemia.

(1) Patients with **diet-controlled diabetes mellitus** can be maintained safely without food or glucose infusion before surgery.

(2) **Oral hypoglycemic agents** should be discontinued the evening before scheduled surgery. Long-acting agents such as chlorpropamide or glyburide should be discontinued 2 to 3 days prior.

(3) **Insulin-dependent diabetics** require insulin and glucose preoperatively to prevent ketosis and catabolism. Patients undergoing major surgery should receive one-half of their morning insulin dose and 5% dextrose intravenously. Subsequent insulin administration by either subcutaneous (SC) sliding-scale or insulin infusion is guided by frequent blood glucose determinations. SC insulin pumps should be inactivated the morning of surgery.

**6. Anticoagulation.** The most common indications for warfarin therapy are atrial fibrillation, venous thromboembolism (VTE), and mechanical heart valves. Warfarin's anticoagulant effect endures for several days following cessation of the drug. Recommendations for the management of anticoagulation in the perioperative period require weighing the risks of thromboembolic events against the risk of perioperative bleeding.

**a. Preoperative anticoagulation.** Surgery is generally safe when the international normalized ratio (INR) value is below 1.5. Patients whose INRs are maintained between 2.0 and 3.0 normally require withholding of the medication for 5 days preoperatively.

**b. Patients with high risk of thrombotic complications** should be managed with **bridging anticoagulation**. This can consist of transitioning as an outpatient with low-molecular-weight heparin (LMWH, stopped 24 hours prior to surgery) or as an inpatient with an unfractionated heparin (UFH, stopped 4 to 6 hours prior to surgery) infusion when Coumadin is stopped.

**c. Postoperative anticoagulation.** Coumadin requires several days to reach therapeutic levels, so therapy can be resumed on postoperative days 1 or 2. High-risk patients should be bridged with therapeutically dosed SC LMWH or IV UFH until their INR is therapeutic;

moderate-risk patients can be bridged with therapeutically dosed SC LMWH, therapeutically dosed IV UFH, or prophylactically dosed SC LMWH. Low-risk patients do not need to be bridged.

**d. Emergent procedures.** In urgent or emergent situations in which there is no time to reverse anticoagulation before surgery, plasma products, such as fresh frozen plasma (FFP), must be administered. Vitamin K can be administered, but its effects will not be seen for 8 hours if given orally and it will continue to counteract Coumadin given postoperatively.

## II. INTRAOPERATIVE MONITORING OF THE PATIENT

What parameters must be monitored in all anaesthetized patients?

- Respiratory: inspired O<sub>2</sub> (Fi O<sub>2</sub>), pulse oximetry, end-tidal CO<sub>2</sub>.
- Cardiovascular: heart rate, blood pressure, ECG, invasive blood pressure monitoring (usually only in major surgery) and central venous pressure (usually only in major surgery).
- Temperature.

## III. POSTOPERATIVE CARE OF THE PATIENT

**1. Intravenous fluids.** The intravascular volume of surgical patients is depleted by both insensible fluid losses and redistribution into the third space. As a general rule, patients should be maintained on IV fluids until they are tolerating oral intake. Extensive open abdominal procedures are associated with a loss of 500 to 1,000 mL/hour and require aggressive resuscitation.

**2. Deep venous thrombosis prophylaxis.** It is important to provide prophylactic therapy to nonambulatory patients to reduce the risk of deep venous thrombosis (DVT) and pulmonary embolism (PE). Risk of DVT development depends on both patient and procedure risk factors. Surgery for major trauma, hip or leg fractures, spinal cord injury, intra-abdominal cancer, joint replacement, and bariatric surgery are particularly of high risk. The most significant patient risk factor is a prior history of DVT. Other patient risk factors include malignancy, thrombophilias, oral contraceptive therapy, obesity, immobility, and indwelling central venous lines. Prophylaxis should be started preoperatively in patients undergoing major procedures because of venous stasis and relative hypercoagulability occur during the operation.

**3. Pulmonary toilet.** Pain and immobilization in the postoperative patient decrease the clearance of pulmonary secretions and the recruitment of alveoli. Patients with inadequate pulmonary toilet can develop fevers, hypoxemia, and pneumonia. Early mobilization, incentive spirometry, and cough and deep breathing exercises are indispensable to avoid these complications.

#### 4. Pain management:

**Pain;** An unpleasant sensory and/or emotional experience associated with actual or potential tissue damage.

#### What are the principles of post-operative pain management?

- Pre-operative:

\_ pre-emptive analgesia, e.g. NSAIDs or nerve blocks, patient education.

- Intra-operative:

\_ use of opioid analgesics, regional nerve blocks, wound infiltration with local anaesthetics.

- Post-operative:

\_ pharmacological therapy, regional anaesthetic blocks, **alternative methods**.

#### What are the alternative methods of pain relief?

Good patient education, Relaxation techniques, Acupuncture, Trans-cutaneous electrical nerve stimulation (TENS)

#### What are the systemic effects of post-operative pain?

- Cardiovascular: enhanced myocardial O<sub>2</sub> demand, myocardial ischaemia, increased sympathetic stimulation⇒increased cardiac output⇒reduced renal and splanchnic perfusion.
- Respiratory: decrease cough⇒sputum retention⇒chest infection, hypoxia.
- Gastrointestinal: reduced G.I. motility⇒constipation, ileus.
- Genitourinary: urinary retention.
- Metabolic: hyperglycaemia, hypernatraemia.
- Psychological: stress, depression.
- General: increase hospital in-stay.

some commonly used analgesics in the post-operative period:

Drug	Mode of action	Route	Adverse effects
Paracetamol	Modulates PGE <sub>2</sub> in the central nervous system	po, pr, iv	Rare: unless in overdose causes liver failure
NSAIDs (e.g. ibuprofen, diclofenac)	inhibits cyclo-oxygenase	po, pr, iv, im	gastritis, peptic ulceration, renal failure,

Weak opiates (e.g. codeine phosphate)	Act on Mu 1 receptors in the central nervous system	po, sc, iv, im, pca	bronchospasm in asthmatics, bleeding Sedation, CNS depression, respiratory depression, nausea, vomiting, itching, constipation
Strong opiates (e.g. pethidine, morphine, fentanyl)	Inhibit ascending pain pathway	Epidural, spinal po, sc, iv, im	Respiratory depression, addiction Constipation, withdrawal syndrome.

### 5. Stratification and management of postoperative pyrexia:

They can be summarised according to the post-operative time period in which they occur.

Post-operative period	Cause of pyrexia
0–24 h	systemic response to surgical trauma
24–72 h	atelectasis, pneumonia
3–7 days	pneumonia, wound infection, urinary tract infection, abdominal collection, anastomotic leak
7–10 days	DVT, PE, late wound infection

What is the management of the patient with post-operative pyrexia?

- ✓ **Obtain detailed history:** cough, sputum, dysuria, calf pain, abdominal pain,
- ✓ **Thorough clinical examination:**
  - cardiovascular: heart rate, blood pressure.
  - Respiratory: elevated respiratory rate, breathlessness, crepitations.
  - Abdominal: distension, signs of ileus.
  - wound: erythema, swelling, warmth, tenderness, discharge, dehiscence.
  - calves: swelling, erythema, warmth, tenderness.
- ✓ **Check vital signs:**
  - Temperature (check trend, e.g. persistently elevated, spikes).
  - cardiovascular: heart rate, blood pressure, urine output.
  - respiratory: respiratory rate, oxygen saturation.
  - central nervous system: GCS.

✓ **Investigations:**

- ECG.
- bloods: WCC, U and Es, CRP, ESR, blood cultures.
- mid stream urine: dipstick (should also be sent for microscopy and culture).
- chest X-ray.
- arterial blood gases: metabolic acidosis, hypoxemia.
- doppler scan if DVT suspected.
- abdominal ultrasound or CT if abdominal collection suspected.
- spiral CT or ventilation–perfusion scan if PE suspected.

- ✓ **Treatment:** All patients should receive adequate oxygenation and fluid resuscitation. Specific treatment is outlined below.

Condition	Treatment
<b>Response to trauma</b>	analgesics including paracetamol
<b>Atelectasis</b>	intensive chest physiotherapy, nebulised bronchodilators, antibiotics should only be given for associated infections
<b>Pneumonia</b>	chest physiotherapy, antibiotics as per hospital protocol
<b>Wound infection</b>	antibiotics only once wound swab taken
<b>Urinary tract infection</b>	antibiotics only once MSU sample taken
<b>Abdominal collection</b>	broad spectrum antibiotics including anaerobic cover; collections should be drained
<b>Anastomotic leak</b>	radiologically or surgically; anastomotic leaks may require further surgery
<b>DVT/PE</b>	anticoagulants should be commenced as soon as possible and must not be delayed until appropriate investigations are performed