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Common Postoperative Complications

Postoperative complications may either be general or specific to the type of surgery undertaken and should be managed with the patient's history in mind. Common general postoperative complications include postoperative fever, atelectasis, wound infection, embolism and [deep vein thrombosis \(DVT\)](#).

The highest incidence of postoperative complications is between one and three days after the operation. However, specific complications occur in the following distinct temporal patterns: early postoperative, several days after the operation, throughout the postoperative period and in the late postoperative period^[1].

General postoperative complications

Immediate

- Primary haemorrhage (starting during surgery) or reactionary haemorrhage (following postoperative increase in blood pressure) - replace blood loss and may require return to theatre to re-explore the wound.
- Basal atelectasis: minor lung collapse.
- Shock^[2]: blood loss, acute myocardial infarction, pulmonary embolism or septicaemia.
- Low urine output: inadequate fluid replacement intra-operatively and postoperatively.

Early

- Pain.
- Acute confusion: exclude dehydration and sepsis. May also be due to other various causes, including pain, sleep disturbance, medication or metabolic disturbances.
- Nausea and vomiting: analgesia or anaesthetic-related; paralytic ileus.
- Fever (see 'Postoperative fever', below).
- Secondary haemorrhage: often as a result of infection.
- [Pneumonia](#).
- Wound or anastomosis dehiscence.
- [DVT](#).
- Acute urinary retention.
- [Urinary tract infection \(UTI\)](#).
- Postoperative wound infection.
- [Pressure sores](#).
- Bowel obstruction due to fibrinous adhesions.
- Paralytic ileus.

Late

- Bowel obstruction due to fibrous adhesions.
- Incisional hernia.
- Persistent sinus.
- Recurrence of reason for surgery - eg, malignancy.
- [Keloid formation](#).
- Cosmetic appearance - depends on many factors (best discussed with surgeon).

Postoperative fever^[3]

0-24 hours

- Tissue damage and necrosis at the operation site.
- Haematoma.
- Pre-existing infection.

24-72 hours

- Pulmonary atelectasis.
- Chest infection.
- Specific infections related to the surgery - eg, biliary infection following biliary surgery, UTI following urological surgery.
- [Blood transfusion](#) or drug reaction.

Days 3-7

- Bronchopneumonia.
- Sepsis.
- Wound infection.
- Drip site infection or phlebitis.
- Abscess formation - eg, subphrenic or pelvic, depending on the surgery involved.
- Anastomosis leak.

After 7 days

- DVT.
- Pulmonary embolus.

Haemorrhage

- If large volumes of blood have been transfused then haemorrhage may be exacerbated by consumption coagulopathy. It may also be due to pre-operative anticoagulants or unrecognised bleeding diathesis.
- Perform clotting screen and platelet count; ensure good intravenous (IV) access. If there is very significant bleeding and it is safe to do so, consider inserting a central venous pressure (CVP) catheter. Give protamine if heparin has been used. Order cross-matched blood. If the clotting screen is abnormal, give fresh frozen plasma (FFP) or platelet concentrates. Consider surgical re-exploration at all times.
- Late postoperative haemorrhage occurs several days after surgery and is usually due to infection damaging vessels at the operation site. Treat the infection and consider exploratory surgery.

Infection^[4]

- Infectious complications are the main causes of postoperative morbidity in abdominal surgery. Postoperative incidence has lessened with the advent of prophylactic antibiotics but multi-resistant organisms present an increasing challenge.
- Wound infection: the most common form is superficial wound infection occurring within the first week, presenting as localised pain, redness and slight discharge usually caused by skin staphylococci.
- Cellulitis and abscesses:
 - Usually occur after bowel-related surgery.
 - Most present within the first week but can be seen as late as the third postoperative week, even after leaving hospital.
 - Present with pyrexia and spreading cellulitis or abscess.
 - Cellulitis is treated with antibiotics.
 - Abscess requires suture removal and probing of the wound but deeper abscess may require surgical re-exploration. The wound is left open in both cases to heal by secondary intention.
- Gas gangrene is uncommon and life-threatening.
- Wound sinus is a late infectious complication from a deep chronic abscess that can occur after apparently normal healing. It usually needs re-exploration to remove non-absorbable suture or mesh, which is often the underlying cause.

Disordered wound healing

Most wounds heal without complications and healing is not impaired in the elderly unless there are specific adverse factors or complications. Factors which may affect healing rate are^[5]:

- Poor blood supply.
- Excess suture tension.
- Long-term steroids.
- Immunosuppressive therapy.
- Radiotherapy.
- Severe rheumatoid disease.
- Malnutrition and vitamin deficiency.

Wound dehiscence

- This affects about 1% of midline laparotomy wounds.
- It is a serious complication with a mortality of up to 30%.
- It is due to failure of wound closure technique.
- It usually occurs between 7 and 10 days postoperatively.
- Often, it is heralded by serosanguinous discharge from the wound.
- It should be assumed that the defect involves the whole of the wound.
- Initial management includes opiate analgesia, sterile dressing to the wound, fluid resuscitation and early return to theatre for re-suture under general anaesthesia.

Incisional hernia^[6]

- This occurs in 5-20% of laparotomies, usually appearing within the first year but can be delayed by up to 15 years after surgery.
- Risk factors include obesity, distension and poor muscle tone, wound infection and multiple use of the same incision site.
- It presents as a bulge in the abdominal wall close to a previous wound. It is usually asymptomatic but there may be pain, especially if strangulation occurs. It tends to enlarge over time and become a nuisance.
- The current literature suggests:
 - Using a transverse incision if possible.
 - A suture technique with small bites.
 - A wound: suture length ratio of 1:4.
 - Recent studies have shown, that the use of prophylactic mesh in an onlay position could have a significant effect on decreasing the rate of incisional hernia^[7].

Surgical injury

- Unavoidable tissue damage to nerves may occur during many types of surgery - eg, facial nerve damage during total parotidectomy, impotence following prostate surgery or recurrent laryngeal nerve damage during thyroidectomy.
- There is also a risk of injury whilst under general anaesthetic and being transported and handled in the theatre. These include injuries due to falls from the trolley, damage to diseased bones and joints during positioning, nerve palsies and diathermy burns.

Respiratory complications

Respiratory complications occur after major surgery, particularly after general anaesthesia and can include :

- Atelectasis (alveolar collapse):
 - This is caused when airways become obstructed, usually by bronchial secretions. Most cases are mild and may go unnoticed.
 - Symptoms are slow recovery from operations, poor colour, mild tachypnoea and tachycardia. A presumed association between atelectasis and early postoperative fever has not been supported by recent studies.
 - Prevention is by pre-operative and postoperative physiotherapy.
 - In severe cases, positive pressure ventilation may be required.
- **Pneumonia**: requires antibiotics, and physiotherapy.
- Aspiration **pneumonitis**^[8]:
 - May occur in up to 1 in every 2-3,000 operations requiring anesthesia, and almost half of all patients who aspirate during surgery develop a related lung injury, such as pneumonitis or aspiration pneumonia.
 - Sterile inflammation of the lungs from inhaling gastric contents.
 - Presents with a history of vomiting or regurgitation with rapid onset of breathlessness and wheezing. A non-starved patient undergoing emergency surgery is particularly at risk.
 - It may be of help to avoid this by crash induction technique and use of oral antacids or metoclopramide.
 - Mortality is nearly 50% and requires urgent treatment with bronchial suction, positive pressure ventilation, prophylactic antibiotics and IV steroids.
- **Acute respiratory distress syndrome**^[9]:
 - Rapid, shallow breathing, severe hypoxaemia with scattered crepitations but no cough, chest pains or haemoptysis, appearing 24-48 hours after surgery.
 - it occurs in many conditions where there is direct or systemic insult to the lung - eg, multiple trauma with shock.
 - The complication is rare and various methods have been described to predict high-risk patients.
 - It requires intensive care with mechanical ventilation with positive end pressure.

See the separate [Important Complications of Anaesthesia](#) article for further details.

Thromboembolism^[10]

DVT and pulmonary embolism are major causes of complications and death after surgery.

- Many cases are silent but present as swelling of the leg, tenderness of the calf muscle and increased warmth with calf pain on passive dorsiflexion of the foot.
- Diagnosis is by venography or Doppler ultrasound.

Pulmonary embolism:

- Classically presents with sudden dyspnoea and cardiovascular collapse with pleuritic chest pain, pleural rub and haemoptysis. However, smaller pulmonary emboli are more common and present with confusion, breathlessness and chest pain.
- Diagnosis is by ventilation/perfusion scanning and/or pulmonary angiography or dynamic CT.

See the separate [Deep Vein Thrombosis](#) and [Pulmonary Embolism](#) articles.

Common urinary problems

- [Urinary retention](#)^[11]: this is a common immediate postoperative complication that can often be dealt with conservatively with adequate analgesia. If this fails, catheterisation may be needed, depending on surgical factors, type of anaesthesia, comorbidities and local policies.
- [UTI](#): this is very common, especially in women, and may not present with typical symptoms. Treat with antibiotics and adequate fluid intake.
- [Acute kidney injury](#):
 - This may be caused by antibiotics, obstructive jaundice and surgery to the aorta.
 - It is often due to an episode of severe or prolonged hypotension.
 - It presents as low urine output with adequate hydration.
 - Mild cases may be treated with fluid restriction until tubular function recovers. However, it is essential to differentiate it from pre-renal acute kidney injury due to hypovolaemia which requires rehydration.
 - In severe cases haemofiltration or dialysis may be needed while function gradually recovers over weeks or months.
 - Factors predictive of acute kidney injury included advanced age, liver disease, high-risk surgery and peripheral arterial disease^[12].

Complications of bowel surgery

- Delayed return of function^[13]:
 - Temporary disruption of peristalsis: the patient may complain of nausea, anorexia and vomiting and it usually appears with the re-introduction of fluids. It is often described as ileus.
 - The more prolonged extensive form with vomiting and intolerance to oral intake is called adynamic obstruction and needs to be distinguished from mechanical obstruction. It involves the large bowel and is usually described as pseudo-obstruction. It is diagnosed by instant barium enema.
- Early mechanical obstruction: this may be caused by a twisted or trapped loop of bowel or adhesions occurring approximately one week after surgery. It may settle with nasogastric aspiration plus IV fluids or progress and require surgery.
- Late mechanical obstruction: adhesions can organise and persist, commonly causing isolated episodes of [small bowel obstruction](#) months or years after surgery. Treat as for the early form.
- Anastomotic leakage or breakdown: small leaks are common, causing small localised abscesses with delayed recovery of bowel function. It is often diagnosed late in the postoperative period. It usually resolves with IV fluids and delayed oral intake but may need surgery^[14].
- Major breakdown causes generalised peritonitis and progressive sepsis needing surgery for peritoneal toilet and antibiotics. A local abscess can develop into a fistula.

Prevention of postoperative complications

This is an enormous subject which cannot be dealt with in any detail here. However, some basic principles are as follows:

- Colorectal surgery - evidence-based interventions associated with a reduction in complications include^[15]:
 - Weight control.
 - Optimal nutritional status.
 - Bowel preparation in selected cases (eg, temporary loop ileostomy) but not routinely.
 - Correction of [anaemia](#).
 - Correction of intra-operative blood loss.
 - Technical aspects - eg, choice of incision, technique, drainage.
 - Adequate postoperative analgesia.
 - Prophylactic use of antibiotics - the effectiveness of antibiotics in preventing surgical site infections (SSIs) is well documented, although debate continues concerning duration and choice.
 - Anastomotic leakage - there are few proven interventions. A Cochrane review found that fewer leakages occurred with stapled anastomosis than with those which were hand-sewn.
 - Ileus - shorter operative times and reduction of intra-operative blood loss are associated with a lower incidence of ileus.
- DVT and pulmonary embolus - see the separate [Prevention of Venous Thromboembolism](#) article.
- Intra-operative haemorrhage - pre-operative screening for coagulopathies is important. Various methods are available including mechanical tools, energy-based technologies and topical haemostatic agents.
- Urinary retention - interventions include use of catheterisation, optimal time of removal of catheters, type of anaesthesia and analgesia and fluid balance^[11].

Further reading & references

- [Intravenous fluid therapy in adults in hospital](#); NICE Clinical Guideline (Dec 2013, updated May 2017)
 - [Intravenous fluid therapy in children and young people in hospital](#); NICE Guideline (December 2015, last updated June 2020)
1. [Thompson JS, Baxter BT, Allison JG, et al](#); Temporal patterns of postoperative complications. Arch Surg. 2003 Jun;138(6):596-602; discussion 602-3.
 2. [Hypovolaemic shock](#); Surgical Tutor
 3. [Postoperative pyrexia](#); Surgical Tutor, a free online UK resource.
 4. [Surgical site infections: prevention and treatment](#); NICE guideline (April 2019 - last updated August 2020)
 5. [Wound infections](#); Surgical tutor, a free UK online resource.

6. Reistrup H, Zetner DB, Andresen K, et al; [Prevention of incisional hernia]. Ugeskr Laeger. 2018 Aug 20;180(34). pii: V02180094.
7. Jairam AP, Timmermans L, Eker HH, et al; Prevention of incisional hernia with prophylactic onlay and sublay mesh reinforcement versus primary suture only in midline laparotomies (PRIMA): 2-year follow-up of a multicentre, double-blind, randomised controlled trial. Lancet. 2017 Aug 5;390(10094):567-576. doi: 10.1016/S0140-6736(17)31332-6. Epub 2017 Jun 20.
8. Nason KS; Acute Intraoperative Pulmonary Aspiration. Thorac Surg Clin. 2015 Aug;25(3):301-7. doi: 10.1016/j.thorsurg.2015.04.011.
9. Griffiths MJD, McAuley DF, Perkins GD, et al; Guidelines on the management of acute respiratory distress syndrome. BMJ Open Respir Res. 2019 May 24;6(1):e000420. doi: 10.1136/bmjresp-2019-000420. eCollection 2019.
10. Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism; NICE Guideline (March 2018 - updated August 2019)
11. Jackson J, Davies P, Leggett N, et al; Systematic review of interventions for the prevention and treatment of postoperative urinary retention. BJS Open. 2018 Nov 19;3(1):11-23. doi: 10.1002/bjs5.50114. eCollection 2019 Feb.
12. Kheterpal S, Tremper KK, Englesbe MJ, et al; Predictors of postoperative acute renal failure after noncardiac surgery in patients with previously normal renal function. Anesthesiology. 2007 Dec;107(6):892-902.
13. Lubawski J, Saclarides T; Postoperative ileus: strategies for reduction. Ther Clin Risk Manag. 2008 Oct;4(5):913-7.
14. Hyman N, Manchester TL, Osler T, et al; Anastomotic leaks after intestinal anastomosis: it's later than you think. Ann Surg. 2007 Feb;245(2):254-8.
15. Kirchoff P, Clavien PA, Hahnloser D; Complications in colorectal surgery: risk factors and preventive strategies. Patient Saf Surg. 2010 Mar 25;4(1):5. doi: 10.1186/1754-9493-4-5.

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