Surgery Ward

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What are the different types of surgery?

- **Elective surgery (العمليات الباردة)**
  An elective surgery does not always mean it is optional. It simply means that the surgery can be scheduled in advance. Examples of elective surgery include removing a mole or wart, and having kidney stones removed.

- **Urgent or emergency surgery**
  This type of surgery is done because of an urgent medical condition. The condition may even be life threatening. Examples are acute appendicitis and trauma.

What Are the Different Methods of Surgery?

Open surgery: means the cutting of skin and tissues so that the surgeon has a full view of the structures or organs involved. Examples of open surgery are the removal of the organs, such as the gallbladder or kidneys.

Minimally invasive surgery: is any technique involved in surgery that does not require a large incision. Examples: Laparoscopy, Endoscopy, and Arthroscopy.

Surgical site infection

Surgical site infection is a major cause of mortality and morbidity. Development of surgical site infection is a complex, process influenced by **host**, **operative** and **microbial** factors. The microbial cause of surgical site infection varies with type of procedure but ***Staphylococcus aureus*** remains the most commonly implicated pathogen.

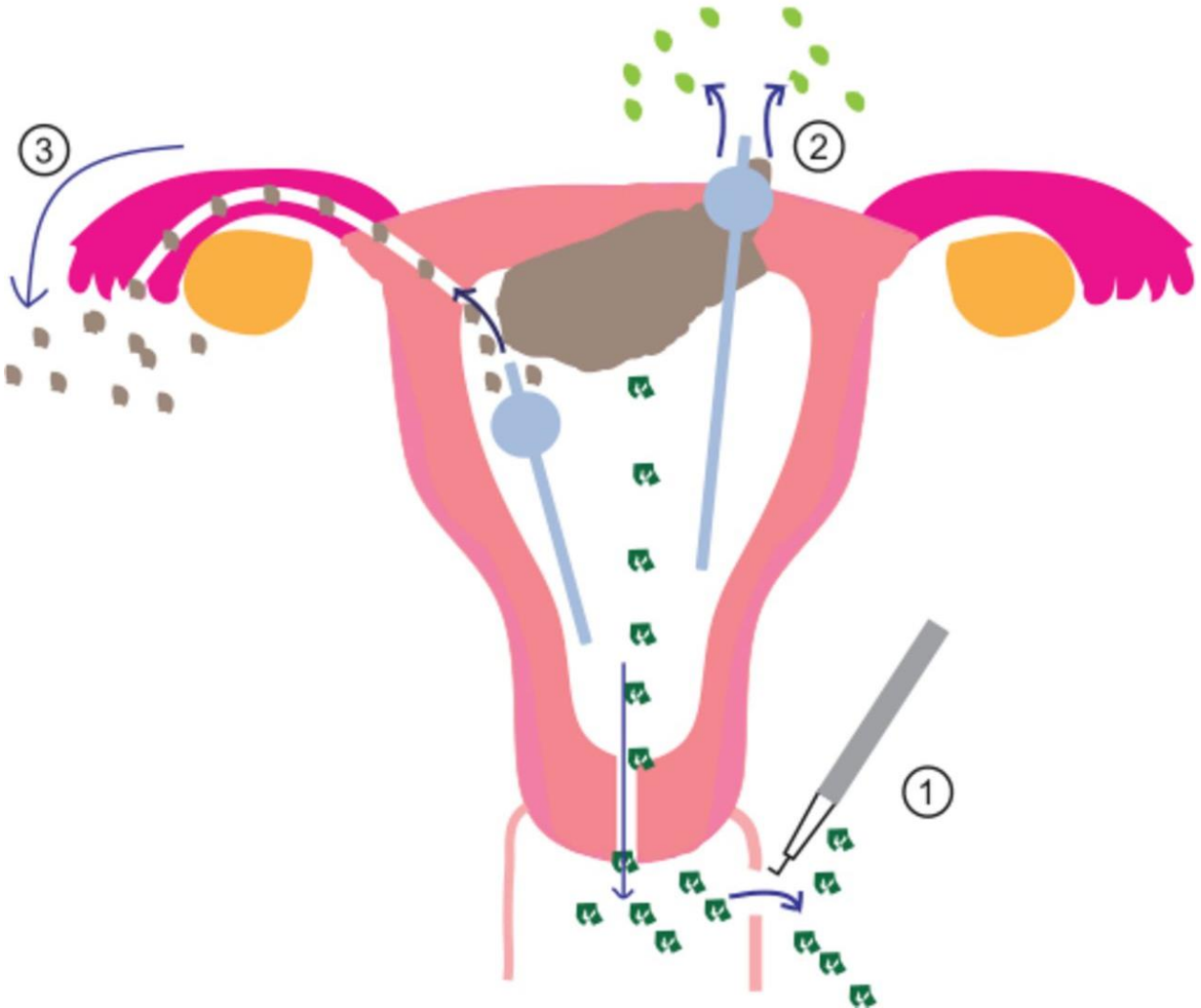
Risk factors

- Patient related factors, for example, host immunity, nutritional status and the presence or absence of advanced age, obesity, concurrent infection diabetes mellitus liver impairment, renal impairment, immune deficiency states, prolonged preoperative stay, blood transfusion, smoking
- Microbial factors (tissue adherence and invasion)
- Peri-operative antimicrobial prophylaxis.
- Duration of surgery

Classification of surgical procedures by risk of infection

Type of procedure	Definition	Wound infection rate (%)	Example	Need for prophylaxis
Clean	Atraumatic; no inflammation encountered, no break in technique; gastro-intestinal, genitourinary and respiratory tracts not entered	1.5–4.2	Inguinal hernia repair	Not usually required
Contaminated	Gastro-intestinal or respiratory tract entered but without spillage; oropharynx, appendectomy, sterile genitourinary or biliary tract entered; minor break in technique	<10	Cholecystectomy (no spillage)	Usually required
Clean-contaminated	Acute inflammation; infected bile or urine; gross spillage from gastro-intestinal tract; major lapse in technique; fresh traumatic wound (12–24 h)	10–20	Appendicectomy	Required
Dirty and infected	Established infection; transection of clean tissues to enable collection of pus; traumatic wound with retained devitalised tissue; faecal contamination; delayed treatment	20–40	Sigmoid colectomy (Hartmann's procedure) for faecal peritonitis	Treatment required (not prophylaxis)

Surgery Spillage



Complications

Surgical wound infection complications can be categorized into **local** and **systemic** ones. Local complications include delayed and non-healing of the wound, cellulitis, abscess formation, osteomyelitis as well as further wound breakdown. Systemic complications include bacteremia with the possibility of distant hematogenous spread and sepsis.

Antimicrobial prophylaxis

Antibiotics administered prior to the contamination of previously sterile tissues or fluids are considered prophylactic. The goal of prophylactic antibiotics is to prevent an infection from developing.

Not all operations require antimicrobial prophylaxis. The choice of antimicrobial prophylaxis depends on the operation, pharmacokinetics, pharmacodynamics and patient factors. **The timing** (between 60 and 30 minutes prior to incision) of antimicrobial administration is key to reducing surgical site infection.

Choice of antimicrobial: The choice of antimicrobial should take into account the following:

- Likely infecting organisms (procedure specific)
- Local susceptibility of potential pathogens to antimicrobials
- Pharmacokinetics, for example, penetration of antimicrobial
- Patient allergy to penicillin's or other antimicrobials
- Administration time (bolus better than infusion)
- Drug cost
- Carriage of resistant organisms, example, methicillin-resistant S. aureus (MRSA)
- Parenteral antibiotic administration is favored.
- First-generation cephalosporins are the preferred choice, particularly for clean surgical procedures.

Most Likely Pathogens and Specific Recommendations for Surgical Prophylaxis للاطلاع		
Type of Operation	Likely Pathogens	Recommended Regimen
Gastroduodenal	Enteric gram-negative bacilli, gram-positive cocci, oral anaerobes	Cefazolin 1 g × 1
Cholecystectomy	Enteric gram-negative bacilli, anaerobes	Cefazolin 1 g × 1
Appendectomy	Enteric gram-negative bacilli, **anaerobes**	Cefoxitin or cefotetan 1 g × 1 or cefazolin 1 g **plus** metronidazole 1 g × 1
Colorectal	Enteric gram-negative bacilli, **anaerobes**	Orally: neomycin 1g + erythromycin base 1 g at 1, 2, and 11 PM 1 day preoperatively **plus mechanical bowel preparation** IV: cefoxitin or cefotetan 1 g × 1
Prostate resection	Escherichia coli	Ciprofloxacin 500 mg orally or Trimethoprim–sulfamethoxazole 1 DS tablet

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Cesarean section	Enteric gram-negative bacilli, anaerobes, group B streptococci	Cefazolin 2 g × 1
Hysterectomy	=	=
Head and neck cancer resection	S. aureus, streptococci oral anaerobes	Clindamycin 600 mg at induction and every 8 hours × 2 more doses
Cardiac surgery	S. aureus, S. epidermidis	Cefazolin 1 g every 8 hours × 48 h
Thoracic surgery	= + enteric gram-negative bacilli	Cefuroxime 750 mg IV every 8 hours × 48 hours
Joint replacement	S. aureus, S. epidermidis	Cefazolin 1 g × 1 preoperatively, then every 8 hours
Hip fracture repair	S. aureus, S. epidermidis	Cefazolin 1 g every 8 hours × 48 h
Spinal surgery	S. aureus, S. epidermidis	Cefazolin 1 g × 1

Fluid resuscitation

- Maintenance therapy: The goal of maintenance fluid therapy is to preserve water and electrolyte balance and to provide nutrition among patients who are not able to eat or drink.
- Replacement therapy: The goal of replacement therapy is to correct existing abnormalities in volume status and/or serum electrolytes.

❖ Daily maintenance (not including pathologic ongoing loss) fluid requirements may be roughly estimated according to body weight for all age groups as follows:

Less than 10 kg = 100 mL/kg

10-20 kg = 1000 + 50 mL/kg for each kg over 10 kg

Greater than 20 kg = 1500 + 20 mL/kg for each kg over 20 kg

- Another regimen, this gives 3L of fluid / 24 h. It is only suited to adult patients with no significant comorbidity. It takes no account of patient age, size, cardiac function, or fluid loss.
    - 1L normal saline with 40mmol KCl over 8h.
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    - 1L 5% dextrose over 8h.

Replacement fluids: Crystalloids, blood products, and colloids are the replacement fluids typically administered to postoperative patients:

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Colloid solutions: can also be used for volume expansion. The main colloid used in postoperative patients is albumin, most commonly in the setting of severe malnutrition or liver failure. Examples of colloids are dextran, hydroxyethyl starch (or hetastarch), Haemaccel and Gelofusine.

Comparative summury of Crystalloids and Colloids solutions

Crystalloid solution	Colloid sollution
Half-life of 30-60 minutes	Half-life of several hours or days
Three times the volume needed for replacement	Replaces fluid volume for volume
Excessive use can cause peripheral and pulmonary oedema	Excessive use can precipitate cardiac failure
Molecules small enough to freely cross capillary walls, so less fluid remains in the intravascular spaces	Molecules too large to cross capillary walls, so fluid remains in intravascular spaces for longer
Inexpensive	More expensive than crystalloids
Non-allergenic	Risk of anaphylactic reactions

Nutrition in surgical patients

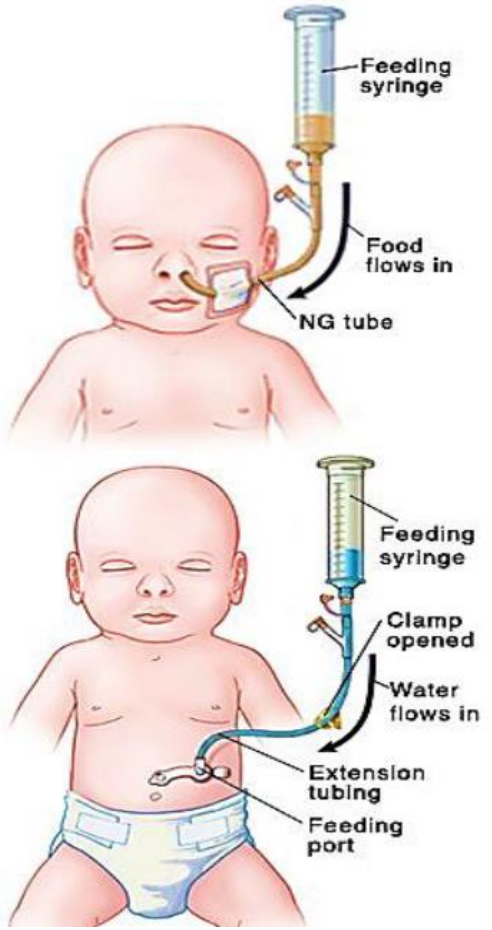
Timely nutritional support helps reduce acute catabolism and resultant skeletal muscle weakness due to increased metabolic demands. Anticipate those patients with higher than normal nutritional requirements (e.g. severe burns, severe sepsis, intestinal fistulas, advanced malignancy, immunosuppression).

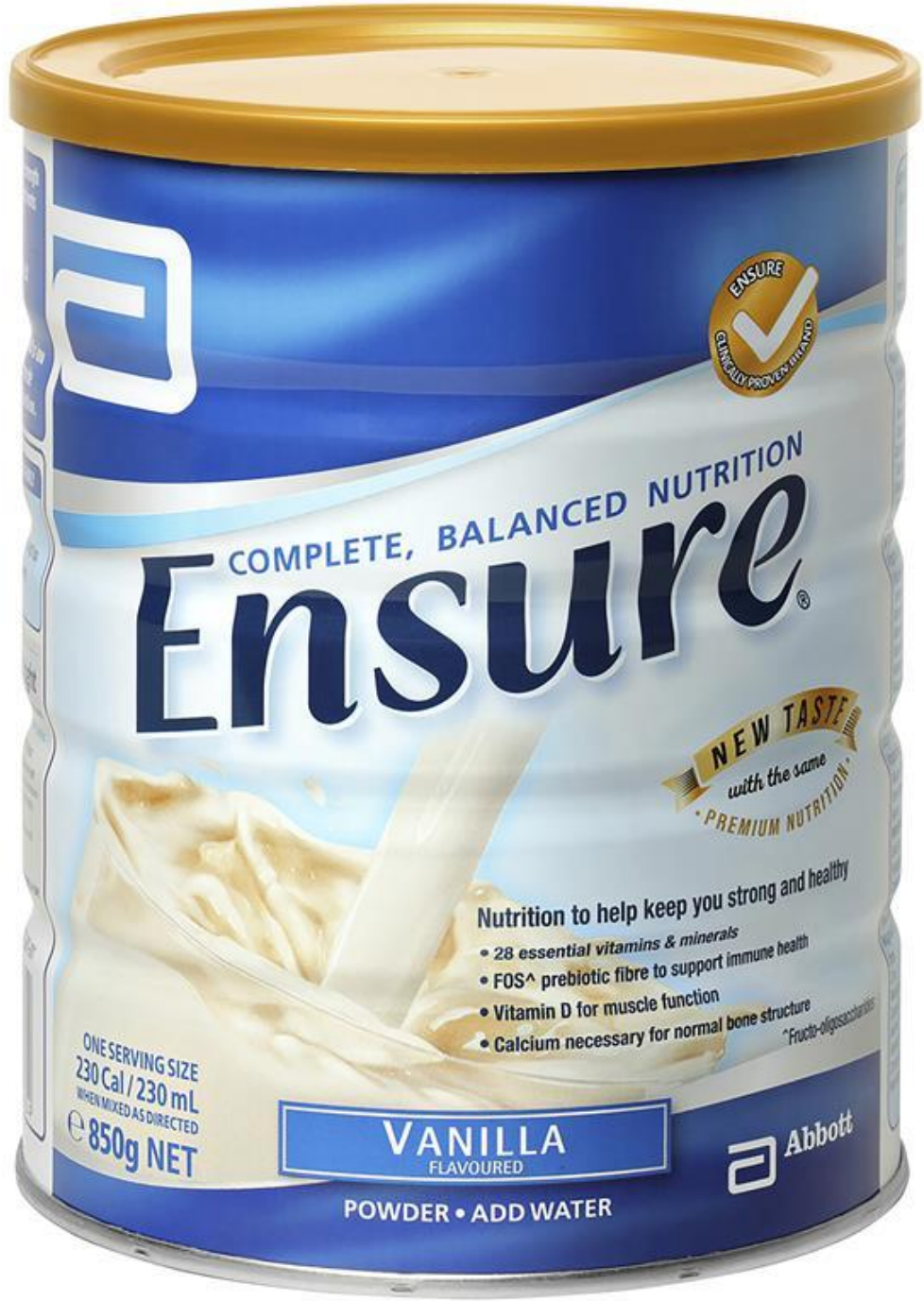
Effects of protein–calorie malnutrition

Reduced neutrophil and lymphocyte function, Impaired albumin production. Impaired wound healing and collagen deposition, and Skeletal muscle weakness.

Types of nutritional support

- Oral supplementation. (e.g. Ensures®). May be used in addition to promotion of conventional oral intake.
- Nasogastric (NG)/nasojejunal feeding. Often used in addition to oral supplementation.
- Feeding gastrostomy/jejunostomy (via a surgically implanted tube).
- Parenteral nutrition. May be central or peripheral.

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NEW TASTE
with the same
PREMIUM NUTRITION
Nutrition to help keep you strong and healthy
• 28 essential vitamins & minerals
• FOS^ prebiotic fibre to support immune health
• Vitamin D for muscle function
• Calcium necessary for normal bone structure
^Fructo-oligosaccharides
ONE SERVING SIZE
230 Cal / 230 mL
WHEN MIXED AS DIRECTED
850g NET
VANILLA
FLAVOURED
Abbott
POWDER • ADD WATER

Total parenteral nutrition (TPN)

TPN is a major advance in the treatment of surgical malnutrition.Common indications for TPN : unresolved GI tract dysfunction, Acute abdominal sepsis , and Inability for GI tract to absorb adequate nutrition

Routes of administration for TPN

A. Peripheral (PPN). Given via a medium calibre cannula in a peripheral vein. Maximum calorie input limited by the maximum osmolarity of the solution. Avoids the risks of central venous cannulation. Usually used for short-term supplementation

General risks of TPN/PPN

- ☒ Hyperosmolarity
- ☒ Lack of glycaemic control.
- ☒ Micronutrient deficiencies.
- ☒ Liver dysfunction, cholestasis, and pancreatic atrophy.
- ☒ Fluid volume overload.
- ☒ Specific catheter-related risks of TPN
- ☒ Complications of insertion (air-embolism, pneumothorax, vascular injury, dysrhythmias).
- ☒ Catheter thrombosis and thromboembolism.
- ☒ Central line infection, infective endocarditis, and bacteraemia.

Blood products and procoagulants

- Death from uncontrolled haemorrhage is one of the leading causes of operation-related mortality. The decision to transfuse red blood cells (RBCs) and other blood components is generally based on estimates of the amount of current and expected ongoing blood loss, and clinical signs of anemia (eg, tachycardia, hypotension, dilute-appearing blood in the surgical field, pallor).

1. **Blood:**

   A. In general, aim to maintain Hb at 7–9.0g/dL

   B. One unit of blood increases Hb by about 1g/dL in a 70kg adult.

   C. Blood is normally provided as packed red cells (1U= 350mL).

2. **Platelets**

   A. One unit of platelets increases platelet count by 109/L in a 70kg adult.

   B. Platelets are provided as units (1U= 50mL).

   C. Platelets do not need to be cross-matched, but they should be ABOcompatible

3. **Fresh frozen plasma (FFP)**

   A. One unit of FFP contains all the coagulation factors except platelets.

   B. 1mL of FFP per kg will raise most clotting factors by 1% in a 70kg adult.

   C. One unit of FFP = 150–250mL and 5–10mL/kg is normally given.


RED CELLS IN ADDITIVE SOLUTION
LEUCOCYTE DEPLETED
FOR NEONATAL USE
STORE AT 4 °C ± 2°C
PACK FIVE
Rh D NEGATIVE
LOT
Pack Type
REF


O
Negative for
Syphilis,Hbsag, HCV Ab,
HIV Ab/HIV RNA,
HCV RNA


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17 JUN 2002

4. Cryoprecipitate

A. One bag of ‘cryo’ contains 150–250mg fibrinogen and factors VII and VIII.

B. If cryopreciptate is unavailable, 5U of FFP contain the same amount of fibrinogen as 10U of cryoprecipitate.

C. One bag of cryoprecipitate = 20mL; 5–10 pooled bags are normally given.

D. ABO and rhesus compatibility are not relevant.