Operation

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What is surgery?

Surgeon is an internist who can also operate.
Basics in surgery

• Indication and contraindication

  – Indication:
    • Functional indication: plastic operations etc.
    • Relative indication: benign tumors
    • Absolute indication: malignant tumors
    • Vital indication: acute, life-threatening complication caused by a tumor (obstruction, bleeding, perforation etc.)
Preparation for OP

– General
  • Psychological
  • Nutrition
    – *Enteral nutrition* (1500-2000 kcal/day)
      » Peroral
      » Feeding tube (nasogastric, nasojejunal)
    – *Parenteral nutrition*
  • Hygienic preparation
    – *Shaving*
    – *antiseptic scrubbing*
    – *Cleaning bath/shower*
Preparation for OP

– General
  
  • Premedication
    – Reduce anxiety, tranquillization
    – Reduce the dose of narcotics required for the induction
    – Reduce secretion
    – Reduce vagal and sympatoadrenal reflexes
    – Decrease of gastric pH
    – Prevent postoperative nausea and vomitus
    – Amnesia
  
  • Medication
    – Hypertensive therapy
    – Insulin treatment
    – Cardiac drugs
Preparation for OP

– General

• Preoperative fasting

<table>
<thead>
<tr>
<th>...before OP</th>
<th>Enabled</th>
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<tbody>
<tr>
<td>2-3 hours</td>
<td>Clear fluid (BUT: no alcohol, milk, coffee)</td>
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<tr>
<td>4 hours</td>
<td>Breastfeed (in pediatric surgery)</td>
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<tr>
<td>6 hours</td>
<td>Milk, light meals</td>
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<tr>
<td>8 hours</td>
<td>Meat, fatty meals</td>
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– BUT! Slow emptying – trauma, stress, DM, alcoholism, GI disorders – PERSONAL RECONSIDERATION IS REQUIRED
Preparation for OP

– Special:

• Preparation of the GI tract
  – *Mechanical bowel cleansing*
    » Purgation
    » Enema (before colon resections)
  – *Decontamination*
    » With nonabsorbable, local antibiotics

• Correction of homeostasis
  – *Acid-base balance*
  – *Fluid and electrolyte balance*
  – *Haemostatus*
    » Correction of Htc
    » Correction of coagulation
Preparation for OP

– Special:

• **Insure route for intravenous administration**
  – Start puncion from the periphery
  – „Anaesthesiological vein”

• **Nasogastric decompression**
  – In case of increased risk of aspiration („filled stomach”)

• **Urinary catheter**
  – Surgical indication
    » OP in the pelvis
    » Laparoscopic colon resections
  – Anaesthesiological indication
    » Monitoring kidney function
    » Monitoring circulatory parameters
Preparation for OP

– Special:

  • **Antibiotic profilaxis**

    – Antibiotic prophylaxis in high-risk patients reduces postoperative infection of 25-75% in
      » Against bacteria typically occurring at the particular OP

    – Risk of infection > 10% - necessary
      » Abdominal emergencies
      » Elective colon resections
      » Malignancies of the upper GI tract

    – Risk of infection 5-10% – for consideration
      » Cholecystectomy

    – In case if implantation
      » Vascular grafts
      » Plastic surgery
      » Hernioplasty using mesh
Preparation for OP

– Special:
  • **Thrombosis profilaxis**
    – Mechanical methods - by stimulation of the physiological blood flow we decrease the increased risk for thrombosis formation caused by the stasis
      » *Early mobilisation, active or passive movement of the limb*
    • **Most important, irreplaceable method for preventing thrombosis!!!**
      » *Graded compression stocking*
    • After determination of the proper size and compression stage (II)
      » *Intermittent pneumatic compression devices*
Preparation for OP

– Special:

• **Thrombosis profilaxis**
  – Pharmacological prevention of *venous thromboembolism* (VTE)
    » *Unfractionated heparin*
      • Bind to antithrombin primarily inhibit thrombin and Xa, IXa, XIa, and XIIa factor activity
      • For both therapeutic and prophylactic use with monitoring the aPTT administrated either subcutaneously or intravenously
      • The rapid rise, termination and suspendability (protamine sulfate) of the effect makes it very important drug for treatment of bleeding.
Preparation for OP

– Special:

• **Thrombosis profilaxis**
  – Pharmacological prevention of *venous thromboembolism* (VTE)
    » *Low molecular weight heparin (LMWH)*
      • Inhibit the effect of factor Xa less than thrombin
      • Uniform absorption and longer duration of action allows for easier dosing
      • Rarely cause major bleeding complications, but in the absence of antidote its management is also difficult
      • Applicable in profilactic and therapic dose
    » *FXa inhibitors, direct thrombinblockers*
      • In case of contraindicated heparin therapy (allergy, heparin induced thrombocytopeny etc.)
Preparation for OP

– Special:
  • Thrombosis profilaxis
    – Pharmacological prevention of *venous thromboembolism* (VTE)
      » *K-vitamine antagonists*
        • The coumarin derivatives inhibit the synthesis of vitamin K-dependent coagulation factors (II, VII, IX, X).
        • Their impact develops and ends slowly – within days
        • Its effectivity is affected by many drugs and foods – administrate under close monitoring of INR
        • require the proper patient compliance.
Preparation for OP

– Special:

• Thrombosis profilaxis
  – Pharmacological prevention of arterial thromboembolism
    » Inhibition of platelet aggregation
      • Inhibit platelet aggregation by ADP-dependent manner via COX inhibition
      • With repeated administration in a low dose the effect is cumulated - so their exclusion normalize platelet function after 5-7 days.
The team

– **Surgical team**
  • Leading surgeon
  • Assistants
  • Scrub nurse

– **Anaesthesiological team**
  • Anesthesiologist
  • Anaesthesiologist assistant

– **Others**
  • Assistant of the scrub nurse
  • Management of the special technical features
Operation

- Incision
- Laparotomy
- Exploration
  - THE OPERATION
  - Revision - haemostasis
  - Drainage
  - Closure (peritoneum, abdominal wall, skin)
  - Bandage
Types of incisions
Intraoperative complications

– Types
  • Bleeding
  • Laesion of surrounding organs
  • Circulatory and respiratory failure
  • Homeostasis, haemostasis
  • Excretion failure
  • Hypotermia, hypertermia

– How to avoid?
  • Monitore the vital functions
  • Use precise, delicate, tissue-saving surgical technique
  • Avoid long operation time
  • Careful anesthesiology
Postoperative round of duties

- Attentive observation
  - Temperature, blood pressure, puls, respiration frequency, urine, stool
- Early mobilisation
- Checking drains
- Controlling wounds
- Controlling catheters
- Early enteral feeding
Postoperative round of duties

- Surgical – early
  - Bleeding
  - Fever
  - Anastomosis leakage
    - Technical complications - essential requirements of the anastomosis:
      » Tension free circumstances
      » Good blood supply
      » Water resistant suture line
      » Tight and accurate matching layers, inward-looking mucosa, serosa-serosa
      » Aseptic manipulation
      » No distal obstruction!
Postoperative complications

– Surgical - late

• Ileus
  – Paralytic
  – Mechanic
    » Adhaesion
  – Vascular

• Septic
  – Intraabdominal abscesses

• Fistula – late consequence of an anastomosis leakage
  – Intestinal
  – Biliar
  – Pancreatogen
Postoperative complications

– Surgical - late

• Wound healing
  – Factors reducing defenses:
    » Local:
      • Bad blood supply (devitalised tissue, necrosis)
      • Foreign body, haematomata!
    » General:
      • Diabetes, immunosuppression, steroid, age (newborn, elderly) malnutrition, liver disease, malignant tumors, obesitas, chronic alcohol consumption
Postoperative complications

– Surgical - late
  • Wound healing
    – Haematoma
      » Heparin (profilaxis or therapy)
      » Aspirin
      » Intraoperative hypotensio
      » Signs:
        • swelling, suffusion, bleeding, anaemia (hypotensio)
    – Seroma
      » After big wound surface: fat necrosis, lympha
Postoperative complications

– Surgical - late
  • Wound healing
    – Suppuration
      » Caused by overgrowth of bacteria:
        • inoculation: more than 1.000.000 bact.
        • Appropriate environment:
          • blood, seroma
          • Avascular or necroticus tissue
          • Foreign body ---> tissue reaction
          • Fatty tissue: bad blood supply
            • Diathermia
            • Tight sutures
Postoperative complications

– Surgical - late

  • Wound healing
    – Suppuration
      » Clear OP: rarely become infected
      » Potentially infected OP: mostly after opening of bowels - in 10%
      » Infected OP: In 30% 30% fertőzött sebbé válik, despite proper antibiotic treatment (abdominal abscess)
      » Direkt műtéti sebfertőzés a fő ok és nem az esetleges bakteriaemia
Postoperative complications

– Surgical - late

• Wound healing

  – Disruption
   » In 1%, mortality 20%
   » 50% after wound infection

  » General causes:
   • Malnutrition
   • Sepsis
   • Anaemia
   • Liver failure
   • Diabetes mellitus
   • Corticosteroids
   • Obesity
   • Ascites
Postoperative complications

– Surgical - late
  • Wound healing
    – Disruption
      » The strength of the abdominal wall sutures is provided by the musculoaponeurotic layer
      » Technical causes of disruption:
        • The suture breaks away
        • The suture cuts into the tissues
        • Unknoting
        • Elevated intraabdominal pressure (bowel distension, ascites, coughing, vomiting)
        • Haematoma (infected or not)
        • Metabolic disorders (diabetes, Cushing, uraemia, malignant disease, starvation)
        • Tissue weakness
Postoperative complications

– Surgical - late
  • Wound healing
    – Hernia formation
      » In 1% after per primam wound healing
      » In 10% after infected wounds!!
Postoperative complications

– Non-operative

• **Respiration**
  
  – Prerequisites of normal breathing: good ventilation, perfusion and diffusion
    
    » After surgery, all three, but especially the first two components may be affected
    
    » After thoracic and abdominal surgery worsen the respiratory motoric:

    » **Atelectasia**

    • In 70% after general anaesthesia (laparotomy, thoracotomy)
    
    • Secretion - bronchospasmus
    
    • Therapy:
      
      • Fizioterapy, body position, remoal of nasogastric tube, bronchoscopic suction, inhalation, drugs
Postoperative complications

– Non-operative

• Respiration
  – Aspiration
    » Aspiratio pneumonitis (bacterialis)
    » Aspiratio pneumonitis (kémiai anyagok)
    » Narcosis bevezetés - preventio
  – Postoperative pneumonia
  – Pleural effusion
  – Lung oedema
  – ARDS
  – Lung embolism
    » Thromboembolia profilaxis
Postoperative complications

– Non-operative

• Acut renal failure
  – Haemodialysis indication:
    » Serum Potassium > 6.5 mmol/l
    » Volumen overload
    » Serum creatinine > 900 umol/l
    » Metabolic acidosis

• Cardio-vascular complications
  – Arrhythmias
  – Heart failure
  – Acute myocardial infarction
  – Hypertension
Postoperative complications

– Non-operative

• Thrombosis and embolia
  – 1% of surgical patients die in pulmonary embolization
  – 50% of deep vein thrombosis without clinical symptoms
    » Patients died in pulmonary embolism without clinical symptoms
  – Risk factors:
    » age, obesity, contraceptives, cardiovascular diseases, pelvic surgery, orthopedics, immobility, long operation, malignant disease