*Postoperative Period*

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Postanesthesia care → [see p. 3905 >>](file:///D:\Viktoro\Neuroscience\USMLE%202\Intensive%20Care%20(3901-3950)\3905.%20Anesthesia,%20Pain%20management.doc#POSTANESTHESIA_CARE)

Ligonis po operacijos keliauja:

1. į **reanimaciją** - jeigu buvo ilga narkozė, reikia DPV, sunki būklė.
2. į **pooperacinę palatą** - joje guli, kol reikia intensyvios priežiūros, kol pradeda vaikščioti, normaliai maitintis.
3. atgal į **palatą** - po mažų operacijų (apendektomija, hernioplastika, incizijos).

* po operacijos **neleidžiama miegoti**.
* po laparotomijos galima **keltis** tuoj po operacijos - pjūviui nieko neatsitiks, bet geriau pirmą dieną pagulėti, nes gali pavesti *kardiovaskulinė sistema*; keltis reikia pradėti pamažu - pradžioje pabandyti atsisėsti lovoje; šiaip geriausia stovėti arba gulėti (sėdint - intraabdominal pressure↑).

N.B. ambulation must be as early as possible!

Prolonged complete bed rest causes ***loss of muscle mass (sarcopenia)*** in all patients: young adults - 1% of muscle mass/d, elderly - up to 5% / d.

Į ką reikia atkreipti dėmesį **vizituojant ligonį**:

**tuoj po operacijos** - sąmonė, kardiovaskulinė būklė, kvėpavimas, paklausti ar neskauda ir nepykina.

**1-ą dieną** - kardiovaskulinė būklė (AKS kritimas, tachikardija rodo kraujavimą), sekrecija iš drenų, ar pasišlapino.

**2-ą dieną ir vėliau** - jau gali pradėti reikštis operacijos ir pooperacinės komplikacijos (t-ra, pilvo skausmas ir patempimas, kosulys ir karkalai); žiūrima ar mažėja intoksikacija (valosi liežuvis, krenta tachikardija); sekrecija iš drenų; peristaltika.

Kokie daromi **tyrimai**:

* jei ligonis *nukraujavęs* - Hb (sekimas 6 ir 22 val)
* jei buvo *mechaninė gelta* - bilirubinas (+ α-amilazė)
* *diabetikams*, plasma glucose levels are closely monitored by finger-stick testing q 1-4 h until patients are awake and eating.

Airway

* + patients may have ***mild cough*** for 24 h after extubation (for smokers and patients with history of bronchitis, postextubation coughing lasts longer).
  + most patients postextubation benefit from *incentive inspirometer*.

Postoperative dyspnea:

* + 1. **Nonhypoxic** - caused by pain secondary to chest / abdominal incisions;

H: anxiolytics + analgesics.

* + 1. **Hypoxemia** - secondary to:
       1. **pulmonary dysfunction** (often due to atelectasis; but fluid overload and heart failure must be considered); H: oxygen.
       2. **oversedation**.

Pain control

[also see p. 3905 >>](file:///D:\Viktoro\Neuroscience\USMLE%202\Intensive%20Care%20(3901-3950)\3905.%20Anesthesia,%20Pain%20management.doc#PAIN_MANAGEMENT)

* + necessary as soon as patient is conscious.
  + 1st-line choice – **opioids** – start with:
    - 1. oxycodone / acetaminophen 2 tablets po q 4-6 h.
      2. morphine 2-4 mg IV q 3 h.
         * dose is subsequently adjusted as needed.
         * NSAIDs\* at regular intervals may reduce *breakthrough pain*, allowing opioid dosage to be reduced. \*if no renal disorder or GI bleeding
         * for more severe pain → IV patient-controlled, on-demand dosing.

***KMUK*** skausmas malšinamas promedoliu, tramadoliu, analginu - pr (pagal reikalą)

* + pradžioje skiriamas analginas; jei jis nepadeda → stipresni vaistai.
  + normoje promedolio gali reikti 3-4 dienas (jis paprastai skiriamas nakčiai, o dideliems skausmams ir dieną).

N.B. pain medication must be adequate but not excessive!

Hydration

* **fluid & electrolyte imbalance** should be corrected even before surgery if possible (BP tends to fall when anesthesia is induced).
* N.B. **dehydration** is common early after surgery (third-space sequestration). On 3-4th day, body begins to mobilize third-space fluids – if heart / kidneys are dysfunctional, **overhydration** may occur.

Golden rules:

* 1. ***All surgical patients are dry*** (never give Lasix for low urine output until 101% sure You hydrated them well). ***All medical patients are wet*** (esp. in heart, lung, kidney failures)
  2. For any patient - You can calculate correct IVF rate in 2 seconds: for first 20 kg give 60 mL/hr, for all kilos above 20 give 1 mL/hr; can reasonably decrease the rate for elderly or in heart, lung, kidney failures.

Example - 70 kg patient: 60 mL/hr (for 1-20 kilos) + 50 mL/hr (for next 50 kilos) = 110 mL/hr

Urination

* **pasišlapinti** turi per pirmą parą; jeigu ne - ieškoti priežasties:
  + 1. *jei nori šlapintis, bet negali* – kateterizuoti.
    2. *jei tuščia pūslė* - trūksta skysčių, "parėję" inkstai.
* for repetitive urinary retention:
  1. avoid ***causative drugs***
  2. have patients ***sit up*** as often as possible.
  3. bethanechol (for non-laparotomy patients without bladder obstruction) 5-10 mg repeated every hour up to maximum of 50 mg/d.
  4. ***Foley catheter***.

GI function

Bowel motility is normally arrested postoperatively - **postoperative ileus**

Normal bowel motility should resume:

by 3rd day after **laparoscopic** abdominal surgery;

by 5th day after **open** abdominal surgery.

* badas, po operacijų su endotrachėjine nejautra, turi tęstis minimum 8 val.
* ***pykinimas*** malšinamas metoklopramidu.
* iš esmės *nedaug atsigerti* galima duoti gana anksti - vis tiek nuryjamos seilės, vyksta skrandžio sekrecija.
* ligonio neturi troškinti, liežuvis turi būti drėgnas (negailėti skysčių i/v – 2-3 L per parą).

N.B. **dehydration** is common early after surgery (third-space sequestration).

On 3-4th day, body begins to mobilize third-space fluids – if heart / kidneys are dysfunctional, **overhydration** may occur.

* per os normaliai pradedama 2-3 parą, kai:

1. ***atsistato žarnyno veikla*** (po žarnyno operacijų) - išklausoma peristaltika, išeina laukan dujos.
2. ***dingsta stazė iš skrandžio*** (po skrandžio operacijų) - atsizonduoja nedaug šviesaus turinio iš skrandžio.

**Tolerance of diet** or **passing flatus / stool** represent return of normal GI function

* dietos: **bd** (badas) - **sk** (vanduo) - **O** (buljonas) - **5** arba **4a**
  + pvz.: bd, bd, bd/sk, sk/O, 5
  + po laparoskopinės cholecistektomijos, apendektomijos jau pirmą dieną bd/sk.
* jei 3-5-ą dieną neišeina dujos (pilvas išpūstas), peristaltika vangi – **paralytic (pathologic postoperative) ileus**:

paralytic ileus (etiopathogenesis) → [see p. 1914 >>](file:///D:\Viktoro\Neuroscience\USMLE%202\Digestive%20system%20(1801-2050)\1914.%20Intestinal%20Obstruction.doc#POSTOPERATIVE_ILEUS)

paralytic ileus (treatment) → [see p. 1914 >>](file:///D:\Viktoro\Neuroscience\USMLE%202\Digestive%20system%20(1801-2050)\1914.%20Intestinal%20Obstruction.doc#POSTOPERATIVE_ILEUS_treatment)

* postoperative ileus prophylaxis:
  + stop routine preoperative bowel preparation.
  + preoperative COX-2 inhibitors (?), probiotics, carbohydrate loading
  + thoracic epidural anesthesia
  + limited IV fluids administration
  + postoperative opioid antagonists & prokinetics
  + minimize postoperative narcotic use
* jei prasideda viduriavimas, dizurija - pūlinys Duglase (H: echoskopija).

Postoperative Fever

postoperative surgical infection – see 2203 p.

* temperatūra aukščiausia būna 16-18 val., todėl matuotina du kartus per parą - 7-8 ir 16-17 val. (esant reikalui ir dažniau).
* normoje *rektalinė* t-ra 0,5°C aukštesnė.
* **šaltkrėtis** lydi staigų t-ros kilimą, **karščio pylimas & prakaitavimas** lydi t-ros kritimą.
* chirurginei infekcijai pradžioje būdingas **subfebrilitetas**!

tik vėliau, prisidėjus pūlingų komplikacijų, t-ra pakyla **iki 40°C**.

N.B. ***aukšta t-ra susirgimo pradžioje*** mažina ūmaus chirurginio susirgimo tikimybę!

* riba, kai reikia jau numušti temperatūrą (ji tampa kenksminga) ≈ 38°C.

5W mnemonic:

Wind – **pulmonary complications** (**1-3** postoperative days):

**atelectasis** - usual problem (depressed respirations and cough from narcotics, incisional pain, abdominal distention); H: treat with coughing, deep breathing, ambulation, incentive spirometry, ± nasotracheal suction, bronchoscopy.

N.B. a/b are not indicated (unless infection is present)

**pneumonia** can supervene if atelectasis is not treated.

Water – **urinary tract infection** typically occurs on **3-5** postoperative days (Rx: a/b for 3-5 days, remove Foley catheter as early as possible)

W**ound** **infections** – fever begins on **5-8** postoperative days (streptococcal, clostridial infections may cause fever earlier!); two instances manifesting earlier:

Streptococcus viridans

Some intra-abdominal accidents (e.g. anastomotic leaks)

Walk – **DVT** and **pulmonary embolism** can occur any time after surgery.

Wonder drugs – almost any drug can cause drug fever!

Other – IV line infection (remove line → culture tip), anastomotic leaks (**7-8** postoperative days), postpericardiotomy syndrome (**5-7** postoperative days), etc.

Prophylaxis - as quickly as possible: remove all indwelling urinary catheters, intravascular catheters, wean from ventilation.

Postoperative delirium

* + all patients are briefly confused when they come out of anesthesia.
  + postoperative delirium increases risk of death.
  + risk factors for postoperative delirium:
    - 1. elderly (esp. demented)!!!
      2. anticholinergic drugs
      3. opioids
      4. high doses of H2 blockers.
      5. hypoxia
  + if delirium occurs:

1. assess oxygenation, electrolyte / fluid balance.
2. stop all nonessential drugs.
3. mobilize early.

Deep venous thrombosis prophylaxis

* + risk is small but significant (surgery itself increases coagulability + prolonged immobility).
  + routine thromboprophylaxis is recommended: **major general**, **gynecologic**, **orthopaedic**, **bariatric** surgery, **coronary artery bypass** surgery.
    - * + low risk - *laparoscopic surgery, knee arthroscopy* - decisions about thromboprophylaxis should be individual.

1. **Mobilization** (begin moving their limbs as soon as it is safe).
2. Heparin - start shortly after surgery.

Venous Thromboembolism Prophylaxis in Surgical Patients:

<http://www.medscape.com/viewarticle/717608?src=top10&uac=121060BZ>

Examples of orders

**Day of surgery (0-24 hr)**

1. **Mobilized** ~2 hr, initiated 6 hr postoperatively
2. Oral acetaminophen 2 g q 12 hr;

* additional bupivacaine, ibuprofen, and **opioid** (in that order) only for breakthrough.

1. Oral **fluids** ~ 1000 mL including 2 protein drinks.
2. Oral magnesium 1 g q 12 hr, cisapride 20 g q 12 hr (repeated during subsequent days).
3. Normal **food** allowed.

**Postoperative day 1 (24-48 hr)**

1. Urinary bladder catheter removed in the morning.
2. Mobilization ≥ 6 hours.
3. Normal **food** and oral **fluid** ≥ 2000 mL, including 4 protein drinks.
4. Plan discharge.

**Postoperative day 2 (48-72 hr)**

1. Epidural catheter removed in the morning.
2. Oral ibuprofen 600 mg q 8 hr.
3. Full mobilization and normal oral intake
4. Stop cisapride, continue magnesium for ~ 1 wk, unless diarrhea is present
5. Discharge after lunch (~ 48 hr postoperative)

**Postoperative day 8**

1. Checkup in outpatient clinic
2. Suture removal and further treatment dependent on histology

**Postoperative day 30**

Checkup in outpatient clinic

*Panaudota literatūra*:

NMS Surgery