

SURGERY NOTES

The following sections represent typical, uncomplicated postoperative courses for surgeries typically encountered as a medicine consultant. The information is selected from a medical, rather than surgical point of view. Clearly, every postoperative course is different. It may have been years since an internist has seen a postop surgical patient—therefore our goal is to give the internist a general sense of a patient’s postoperative course, and to highlight surgical issues that may impact other medical diagnoses and treatments. As always, it is no substitute for communicating with the surgery team.

ORTHOPEDIC SURGERY

TOTAL KNEE ARTHROPLASTY (TKA)

3 hrs / GA or regional / EBL 150-300cc

POD 0: IVF, diet advanced. PCA and Foley. Usually able to restart PO meds.

POD 1: Diet advanced if not yet done. Out of bed and stand with PT. Foley out if mobilizing well. Stop fluids? DVT prophylaxis.

POD 2: D/C PCA, change to PO pain meds. Drain, if present, usually out.

POD 3: D/C to home. Extended DVT prophylaxis on discharge.

Tips:

- “Minimally invasive” TKA: Also known as “quad sparing”. On occasion, patients may be discharged on POD2 if doing extremely well.
- “CPM” (continuous passive motion) machine is used for 24+ hrs postop.
- Often only a Hct is ordered for postop labs. You will need to order more if indicated.

Common issues to TKAs and THAs: see below.

TOTAL HIP ARTHROPLASTY (THA)

3 hrs / GA or regional / EBL 300cc (varies)

POD 0: IVF, diet advanced. PCA and Foley. Usually able to restart PO meds.

POD 1: Diet advanced if not done already. Stop fluids? DVT prophylaxis.

POD 2-3: D/C PCA, change to PO pain meds. Drain and Foley removed depending on drainage and mobilization.

POD 4: D/C to home. Extended DVT prophylaxis.

Tips:

- Often blood loss occurs to a greater degree postoperatively rather than intraoperatively.
- Compared with TKAs, more patients are discharged to a SNF.

Common issues to TKAs and THAs:

- Patients with comorbidities or complications or persistent drainage may have longer hospital courses.
- Revisions typically are more complex, take longer, and have more intraoperative blood loss.
- Drain is usually a hemovac (round cylinder, uses springs to provide suction) or autovac (aka hemovac autotransfusion system—filters and reinfuses drained blood).
- DVT prophylaxis is typically the surgeon’s choice, but there are differences between the American Academy of Orthopedic Surgeons (AAOS) and the Chest guidelines.
- Many patients have autologous blood in house and may be transfused routinely postoperatively.
- Be aware of hip precautions when examining patient—they may be prohibited from crossing legs initially. Check with Ortho if you need to move the patient for an examination.

TOTAL SHOULDER ARTHROPLASTY (TSA)

3 hrs / GA or regional / EBL 200cc (varies)

POD 0: IVF, advance diet. PCA. Restart PO meds.

POD 1: D/C PCA, change to PO pain meds. Drain out.

POD 2: D/C to home.

Surgery

Tips:

- CPM machine used ~24 hrs postop.
- Often the surgery service does not use heparin for DVT prophylaxis because the patients are ambulating.
- If a scalene block is used, adverse effects include hypotension, bradycardia, Horner's syndrome, and phrenic nerve injury with diaphragmatic paralysis.

HIP FRACTURE REPAIR

3 hrs / GA or regional / EBL 300cc

Tips:

- There are various options for operative repair, including intramedullary nail, dynamic hip screw, hemi- or total arthroplasty.
- Preoperative evaluation should include cardiovascular risk stratification, assessment for presence of medical factors contributing to fracture (e.g. seizure or syncope).
- Patients should be admitted to the orthopedic surgery service unless there is a comorbidity that would have required medicine admission in and of itself (e.g. decompensated CHF, suspected cardiac syncope).
- Surgery should not be delayed for minor medical conditions, e.g. poorly controlled hypertension without hypertensive urgency or emergency.
- If surgery is to be delayed, DVT prophylaxis should be encouraged, as there is risk of VTE from the fracture itself even without surgery.

SPINE SURGERIES: MAJOR SPINE OPERATIONS

10+ hrs / GA / EBL 3000+ cc

POD 0: ICU care on MICU service until stabilized. Remain intubated for airway protection, pain control. Often require additional transfusions.

POD 1-2: Extubate when stable; transfer to floor.

POD 3-7: DVT prophylaxis when able; mobilization using brace, drain care.

Tips:

- These are high risk operations due to their blood loss and duration. Often patients are referred to UWMC because other centers are not able to perform such operations.
- Medicine Consult follows the patients once they are transferred out of the MICU.
- EBL can reach as much as 10 liters.
- Often operations are accomplished in 2-3 stages.
- Patients face multiple complications in addition to VTE/MI/PNA:
 - DIC
 - Dilutional coagulopathy
 - Posterior ischemic optic neuropathy (blindness—rare, but devastating)
 - Dural leak
 - CSF leak (may be difficult to detect)
 - Hematoma
 - Secondary meningitis (can be subtle—may present with confusion, low grade fever, headache)
 - Facial/airway edema from prone position
 - Ileus
- Occasionally patients receive pulse dose steroids
- Rehab/SNF is common disposition.
- Spine precautions—patients usually require a brace.

SPINE SURGERIES: OTHER SPINE OPERATIONS

Lumbar spine decompressions/fusions are intermediate risk, typically involve a 3-4 day hospital stay, and are admitted directly to the floor.

C-spine decompressions often have a shorter stay e.g. 24-48 hrs.

Microdecompressions are typically limited stay procedures.

ORTHOPEDIC TUMOR SURGERIES

4+ hrs / GA / EBL highly variable.

Complex and varied, often referred from other facilities. Ranges from peripheral tumors to combined procedures with general surgery and urology in the pelvic and abdominal cavity. Many have long duration, high EBL, and long length of stay, similar to major spine operations.

Tips:

- Generally intermediate risk operations, but can be high risk depending on duration and blood loss.

- Tumors are often highly vascular, contributing to higher EBLs and drain output.
- Sudden increase in drain output after pelvic surgery may be a sign of ureter disruption.
- Surgery service may be reluctant to initiate heparin-based DVT prophylaxis due to wound drainage—discuss with primary team.

GENERAL SURGERY

GASTRIC BYPASS—LAPAROSCOPIC

4-5 hrs / GA / EBL 100-200 cc

POD 0: ICU for patients with OSA.

POD 1: Advance to Phase I diet. Transfer to floor, Foley out.

POD 2: Advance to Phase III, IV diet.

POD 3: Discharge home.

Tips:

- Because of patient's comorbidities, length of stay is often longer than this.
- Add back PO meds when phase III/IV diet.
- Meds will need to be crushed or in liquid form. Therefore, long-acting preparations cannot be given. Preoperatively, this should be anticipated and planned for.
- Typically transition from insulin infusion to SC insulin / PO meds when at Phase III/IV diet. Insulin needs may decrease dramatically after gastric bypass—however it is not always predictable and will need to be followed carefully.
- Tachycardia may be a sign of anastomotic leak. Occasionally beta-blockers are discouraged because may mask this complication.
- No NG tubes or manipulation of the NG tube if one is present.
- Patients are often give extended DVT prophylaxis after discharge.

GASTRIC BYPASS—OPEN

4-5 hrs / GA / 400cc (varies)

Similar to laparoscopic gastric bypass, but at least 5 days in the hospital, and higher EBL.

LAP BAND

1-2 hrs / GA / EBL minimal

POD 0: Limited stay, diet advanced.

POD 1: Discharge to home.

Tips:

- Typically well tolerated. Unclear by AHA/ACC guidelines what risk class, but we consider it intermediate.
- Unclear with such short length of stays how dramatically the effect on DM is.
- Access port is placed so that band is adjusted percutaneously. Typically patients receive 3 cc of saline intraoperatively and can be adjusted postoperatively in follow up by injecting additional saline to restrict size further.

ESOPHAGECTOMY

6 hrs / GA + epidural / EBL varies

POD 0: ICU. May have chest tubes.

POD 1-5: Mobilize, transfer to floor when able. Strictly NPO until passes UGI series POD 5 or later. Usually not on TPN unless remain NPO past POD 5.

Tips:

- Although intermediate risk by AHA/ACC criteria, can have many serious complications, including ARDS, pericarditis, pneumothorax, PNA, anastomotic leak. In our experience with the patients of higher medical risk, ICU stays are several days.
- Widened mediastinum on CXR may be due to postoperative changes; anastomosis maybe at stomach vs jejunum.
- Most patients have some degree of chest pain postop due to the location of the surgery.
- Transhiatal approach involves an abdominal incision and a left neck incision. Proximity to heart and great vessels may cause intraoperative hypotension and arrhythmias.
- Postop atrial fibrillation is very common; one of the main difficulties is treating it is the prolonged NPO status.

HERNIA REPAIR

Surgery

Varies greatly, from outpatient inguinal hernia repair under local anesthesia to major abdominal operation. Note that some lung disease e.g. severe COPD may be worsened with repair of a ventral hernia due to increased intraabdominal pressure.

WHIPPLE (PANCREATOCODUODENECTOMY)

8-12 hrs / GA + epidural / EBL 500-1000cc

Tips:

- Usually prolonged postoperative course, initially in ICU, with prolonged return of bowel function.
- Often J tubes are placed for enteral nutrition.
- Increased drain output may be from chylous or pancreatic or biliary leak.
- Some patients develop insulin-dependent DM postoperatively, depending on the extent of the pancreatic resection.
- If a patient returns from surgery very quickly, it likely means that there was unresectable disease and no further operation was performed. Always wait for the surgeon to discuss this with the patient if you see the patient before the patient realizes this.
- Complications include line infection, PNA, ARDS, PV thrombosis, lateral cutaneous nerve injury from retractors

LIVER RESECTION

6 hrs / GA + epidural / EBL variable

Tips:

- Extent of resection varies; often patients are very ill at baseline due to underlying liver disease.
- ICU postop; can have high EBL, hepatic dysfunction, ARDS.

GYNECOLOGIC SURGERY

TAH-BSO (ONCOLOGIC)

2-4 hrs / GA / EBL 100cc-1000cc

POD 0: NPO.

POD 1-2: Diet advanced, Foley out, change to PO pain meds.

POD 3: Discharge to home.

Tips:

- In some cases, it is unknown whether the tumor is benign or malignant preop.
- Tend to have earlier return of bowel function than general surgery cases that involve more of the GI tract. However, depending on tumor burden operations may be longer and involve bowel resection, lymph node dissection, and omentectomy, with higher EBLs and duration.
- Occasionally patients receive intraop radiation.
- Increased VTE risk because of malignancy.

PELVIC EXENTERATION (ONCOLOGIC)

10+ hrs / GA + epidural / EBL 750+ cc

Tips:

- ICU postop. Often extensive blood loss and third spacing. Often require additional resuscitation postop.
- May have prolonged ileus.
- Typically have ileostomy/colostomy and urostomy.
- Complications include sepsis/ARDS, urinoma/ureter disruption, VTE.

UROLOGY

CYSTECTOMY

May include cystoprostatectomy, formation of ileal conduit.

6+ hrs / GA + epidural / EBL 500-1000 (varies)

POD 0: NPO

POD 1-3: NPO, follow drain output.

POD 4-5: Bowel function may return.

Tips:

Generally no per rectum (PR) meds initially.

PROSTATECTOMY, RADICAL

4-7 hrs / GA / EBL 500-1000 cc

POD 0: NPO, floor care.

Typically 4-6 day length of stay if uncomplicated. Diet is advanced in first 1-3 days.

Main issue is attention to blood loss.

PROSTATECTOMY, TURP

3 hrs / GA / EBL 300 cc varies (hard to quantify)

LOS 1-2 days.

-obstructing clots

RENAL CELL CANCER RESECTION, IVC THROMBECTOMY.

8+ hrs / GA + epidural / EBL varies often >1000 cc

Patients are admitted to the ICU. Thoracic may perform part of the thrombectomy. May need MICU assistance or direct care depending on complexity of surgery and stability of the patient.

Tips:

Complications to watch for: PTX, pleural effusion, hemothorax, hepatic dysfunction, emboli from manipulation of thrombus, risk of VTE; other ICU complications.

NEPHRECTOMY, OPEN

5 hrs / GA +/- epidural / 300 cc

POD 1-3 diet advance if bowel function returns.

Tips:

- Increase in creatinine/ renal dosing if necessary
- generally earlier advance of diet if bowel not manipulated.
- may have drains

NEPHRECTOMY, LAPAROSCOPIC

4 hrs / GA / 100 cc

POD 0: diet may be advanced if good bowel function.

POD 1-2: Mobilization, diet advanced, in some cases may be discharged POD 1.

Tips:

- Increase in creatinine/ renal dosing if necessary
- generally earlier advance of diet if bowel not manipulated.

CYSTOSCOPY, TURBT, and LITHOTRIPSY are typically outpatient or limited stay procedures. Note that cystoscopy may have risk of increased vagal tone, hypotension, bradycardia despite being considered a low-risk procedure.

VASCULAR SURGERY

AAA REPAIR, OPEN

6 hrs / GA / 400-1000 cc

POD 0: ICU. May come out of OR still intubated.

POD 1-3: Stabilize, transfer to floor.

POD 4-6: Epidural out, then Foley out.

Tips:

- Variation in length of ICU stay. Often patients have extensive cardiovascular comorbidities.
- Nonoliguric acute renal failure is common with cross-clamping of the aorta across the renal arteries. Reviewing the operative note is helpful.
- Most patients are on IV metoprolol postoperatively for blood pressure control since almost all have HTN at baseline.
- Other severe complications include bowel infarction, spinal cord infarct.

Surgery

CAROTID ENDARTERECTOMY (CEA)

3-4 hrs / GA / 150 cc

POD 0: ICU

POD 1: D/C Foley, advance diet. Transfer to floor.

POD 2: D/C to home.

Although vascular surgery, considered less risk than other major vascular

ENT SURGERY

NEW TRACHEOSTOMY

2 hrs / GA / EBL min.

POD 0: ICU for airway monitoring.

POD 1: May be transferred to floor if doing well. (4NE)

Tips:

- May be straightforward or complex depending on the patient's anatomy and previous operations, if any.

LARYNGECTOMY / HEAD AND NECK CANCER SURGERY / FLAP

8+ hrs / GA / EBL variable

Tips:

- Can be extensive operations of long duration, although fluid shifts are typically minimal given the location.
- Most are in the ICU initially if a new tracheostomy is involved.
- Flaps from the thigh are common; you may see drains in multiple sites.
- Patients with prolonged or permanent inability to use oropharynx for nutrition will have a feeding tube or G-tube placed, often preoperatively.
- Alcohol withdrawal and COPD are common given the patient population's comorbid risk factors.

HEAD AND NECK DISSECTION / FLAP

4-12 hrs / GA / EBL variable

Tips:

- Can be extensive operations of long duration, although fluid shifts are typically minimal given the location.
 - May be admitted to the floor if shorter duration of operation and no tracheostomy.
 - Alcohol withdrawal and COPD are common given the patient population's comorbid risk factors.
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NEUROSURGERY

CRANIOTOMY

6-24 hours / GA / EBL variable

Tips:

- Variable course, depending on extent of surgery.
 - Initially admitted to ICU, may have ICP monitor, often still intubated.
 - First few days postop may have labile blood pressures, hyponatremia. Neurosurg team will often administer mannitol, salt tabs, and order serial CT scans.
 - Watch for ICU complications such as VTE, line infections, PNA.
 - May have a great deal of facial swelling postop.
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OPHTHALMOLOGIC SURGERY

CATARACT SURGERY

2-3 hrs / GA or local / EBL min.

Usually an outpatient procedure. A widely-cited study (N ENGL J MED 2000; 342: 168-175) randomized patients to ECG and lab tests versus no standard preoperative tests and found no difference in complication rates.

However, all patients did receive a preop H&P. We advocate an evaluation by a primary care provider and lab testing only as indicated preoperatively. Warfarin anticoagulation typically does not have to be held as long as the INR <3.0, but it's best to check with the surgeon.

DENTAL SURGERY

We are most commonly asked to evaluate patients with multiple medical comorbidities who are to undergo general anesthesia for dental extractions. Preoperative evaluation should focus on a complete H&P and ensuring there is no active or decompensated medical problems. Patients on warfarin typically remain on anticoagulation as long as the INR is <3.0 and there is not greater than average bleeding risk for the surgery.

