Acute Care SINS: Surgical Insights for the Non-surgeon

Chapter 2: Tubes, Drains, and Ostomies

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About the Authors

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Summary

“Surgical Insights for the Non-surgeon,” or SINS, is composed of several short chapters intended to cover fundamental surgical knowledge for non-surgeons. The authors focus on surgical pearls, operative insights, and applied anatomy. In Chapter 2 of this series, the authors outline tubes, drains, and ostomies, including their indications and possible complications.

Résumé

L'ouvrage « Surgical Insights for the Non-surgeon » ou SINS (aperçu de chirurgie pour le non chirurgien) se compose de plusieurs courts chapitres conçus pour couvrir les connaissances fondamentales en matière de chirurgie chez ceux qui ne sont pas chirurgiens. Les auteurs se concentrent sur des « trésors de sagesse » tirés de leur expérience personnelle en chirurgie, certaines idées en matière d'interventions, et sur l'anatomie appliquée. Dans le chapitre 2 de cette série, les auteurs passent brièvement en revue les tubes et les canules, les drains ainsi que les techniques de stomie, y compris les indications et les éventuelles complications.

Patients commonly return from the operating room with tubes, drains, and ostomies. It is important to understand where these were placed, and why. The usual indication is to remove a collection or potential collection. Regardless, the person who has placed the drain or tube gets to decide when it should be removed.

Tubes

Chest Tubes

Chest tubes are placed into the thoracic cavity to drain air (pneumothorax), fluid (pleural effusion), blood (hemothorax), or pus (empyema).

Orders for a chest tube:

- Underwater seal (–20 or –40 cm of H₂O) – creates continuous suction to draw out fluid or air and re-expand

the lung

- Straight drainage – still an underwater seal, but only excess fluid or air is released
- Clamped
 - Caution! Some surgeons never do this.
 - Only do once the pathology has resolved.
 - If there is an ongoing air leak, a pneumothorax/tension pneumothorax can result.
 - Some surgeons clamp a tube as a “test” prior pulling it.

What to look for in the Pleur-Evac:

- Fluctuation (Figure 1)
 - Demonstrates a change in chest cavity volume with respiration
 - No fluctuation is indicative of the following:
 - i. Kinked tubing

- ii. Clamped tubing
 - iii. Lung adhesions
 - iv. Flail chest
 - v. Lung completely expanded with little volume change between inspiration and expiration
- Bubbling/air leak (see Figure 1)
 - Have patient cough to promote an air leak.
 - Indicates the following:
 - i. There is air being released into pleural space
 - ii. Or air is passing into the chest from the external environment around the chest tube insertion site
 - iii. Or there is a loose tube or connection
 - Persistent bubbling may indicate a bronchopleural fistula; if it continues, surgical intervention may be required.
- Drainage
 - Amount – can typically remove a tube when there is <200 cc of drainage in 24 hours and when there is no bubbling/air leak
 - Type – for example, serosang, frank blood, pus

Complications of chest tubes:

- Subcutaneous emphysema
- Tension pneumothorax
- Air leaking around chest tube site
- Bleeding around site
 - Remove dressing to determine if bleed is from the following:
 - i. Skin edges
 - ii. Injured intercostals vessel (bright red arterial bleed)
 - iii. Within the chest cavity (in setting of a blocked chest tube)
 - Place pressure bandage
 - Ensure normal coagulation status

Figure 1. Pleur-Evac.

- Perforation of intrathoracic or intra-abdominal organs
 - Rare
 - Occurs if chest tube was “rammed in” or misplaced below the diaphragm
 - Abdominal radiograph shows intra-abdominal placement
 - Marked air leak, bleeding, or shortness of breath raises the possibility of the tube in a bronchus.
 - Computed tomography scan is helpful.

How to Remove a Pleural Drain

Equipment:

- Scissors
- 1 gauze soaked with petrolatum (Vaseline)
- 2 gauze that are 4 × 4 inches (10 x 10 cm)
- 1 large Opsite dressing or any airtight/impermeable dressing

Procedure:

1. Remove suction from the chest tube.
2. Place Vaseline-soaked gauze over the 2 pieces of 4 × 4 inch gauze.
3. Remove the chest tube dressing.
4. Cut the stitch that surrounds the chest tube.
5. Pull the tube out at maximal inspiration/while the person is in expiration (to prevent suction of air into the chest cavity).
6. Some practitioners place a purse-string stitch around the wound; in this case, once the tube is removed, this is pulled tight to close the hole.
7. Quickly place Vaseline-soaked gauze and 4 × 4 inch gauze over the incision.
8. Place a large Opsite dressing over the top.
9. Perform a chest radiograph in 4 hours post-chest tube removal.
10. Leave the dressing in place for 72 hours.

Figure 2. Foley tube.

Figure 3. Malecot tube.

Figure 4. Gastrostomy tube.

Figure 5. T-tube.

Figure 6. Pigtail catheter.

Other Tubes

Foley tube/urinary catheter (Figure 2):

- Not used only in the bladder!
- Can function as drainage tube/feeding tube

Malecot tube (Figure 3):

- Similar to a Foley catheter but with no distal balloon
- Has a bulbous tip composed of two or four wings
- Often called “red rubber tube” (even though some are latex)
- Can be used as a feeding tube

G-tube/gastrostomy tube (Figure 4):

- Surgically or percutaneously placed (via gastroscopy or fluoroscopy)
- Must react quickly if tube falls out since opening will close in <24 hours; can place a Foley as a temporizing method until a surgeon is available

J-tube/jejunostomy tube (see Figure 3; often a malecot tube is used):

- Surgically placed into the jejunum to provide enteral

nutrition

- If the tube comes out, follow the same procedure as with G-tubes, but only leave in Foley as a temporizing method
- Not safe to place a tube with a balloon since it can cause a mechanical obstruction (e.g., Foley)

T-tube (Figure 5):

- After common bile duct incision/exploration/drainage
- T-tube cholangiography commonly done prior to removal (7–10 days)
- Tube will drain bile (i.e., yellow/green drainage); this is normal
- If the tube comes out, call the surgeon.

Pigtail catheter (Figure 6):

- Often placed radiologically
- String through centre, attached to end, and pulled to create “pigtail”
- Remember: before removal, you must cut the string to release the pigtail
- Used to evacuate air, fluid, and pus

Table 1. Active Drains

Drain	Description	Reasons to Consider Removal	Appearance
Jackson-Pratt	<ul style="list-style-type: none"> • Oval shaped • Closed drainage system • Bulb at end of the tubing • Bulb squeezed for suction 	<ul style="list-style-type: none"> • <30cc/d • No active bleeding • No purulent drainage
Hemovac	<ul style="list-style-type: none"> • Round drain • Contains a spring • Compressed for suction 	As above
Sump drains	<ul style="list-style-type: none"> • Sump refers to pit where fluid collects • Consists of two tubes: one to allow fluid to be drained from a cavity and the other to allow air to enter the cavity (e.g., nasogastric tube) • Can act as a continuous irrigation system (e.g., necrotizing pancreatitis) 	<ul style="list-style-type: none"> • No further or minimal drainage • Process has resolved (e.g., gastric secretions emptying normally)

Table 2. Passive Drain

Drain	Description	Reasons to Consider Removal	Appearance
Penrose	<ul style="list-style-type: none"> • Flat rubber drain • Allows drainage around the opening (not through it) • Open drainage • Often covered with dry dressing 	Usually short term use, as drain can tract infections inward

Drains

Drains are divided into active drains (Table 1) and passive drains (Table 2) and open versus closed systems.

If the drainage tube becomes temporarily obstructed or is not draining properly:

- Ensure that there is a good seal around the insertion site
- Ensure there is no kink in the tubing
- May be able to “milk out” the clot:
 - Gently squeeze the tube between the thumb and index finger
 - Move along the tubing toward the suction bottle

Reasons to call the surgery team:

- Unable to re-establish suction in the drainage system
- Sudden change occurs in drainage colour, or if drainage becomes bloody again or milky white; drainage should gradually change from blood- to a straw coloured

Dislodged Drains

- *Do not* replace dislodged drains.
 - They were inserted under sterile conditions.
 - Replacing them may introduce infection.
- Inform the surgeon if a drain is dislodged.

Ostomies

An ostomy is a surgical opening into the bowel that is then brought out to skin.

Described by anatomic placement:

- Ileostomy (opening into the small bowel)
- Colostomy (opening into the colon)

Two main types of ostomies:

1. End ostomy – end of the bowel brought up to the skin surface as a stoma
2. Loop ostomy
 - Loop of bowel brought up to skin and an opening also created in the bowel
 - Results in proximal and distal openings
 - Often a “bridge” is placed under the loop to prevent the bowel slipping back into the abdomen.
 - The bridge is usually removed after 5–7 days (ask the surgeon first).

High-volume/output ostomy:

- Output of >1,000 mL/d
- More common with an ileostomy than a colostomy
- Can result in volume depletion and electrolyte abnormalities
- Rule out infection (gastroenteritis/*Clostridium difficile* colitis), and inflammation (recurrent inflammatory bowel disease)
- Rule out partial small bowel obstruction, dietary indiscretions, and short bowel syndrome
- Treat with fibre supplements (e.g., Metamucil), antiperistaltic agents (e.g., diphenoxylate-atropine [Lomotil], loperamide [Imodium], codeine), or somatostatin analogs

Complications of ostomies:

- Bowel obstruction
- Stomal ischemia
- Mucocutaneous separation
- Stomal stenosis
- Retraction
- Prolapse
- Parastomal hernia
- Fistula
- Variceal ileostomy bleeding
- Ulcerations
- Skin complications

General Internal Medicine (GIM) Academic Practice & Leadership Opportunities

Kelowna General Hospital, Kelowna, BC Interior Health

Kelowna General Hospital (KGH) is seeking three general internists to join one established academic internist at BC's 350-bed KGH. KGH offers a full range of clinical services and a campus that includes the recently opened state-of-the-art Centennial Building, a new ambulatory care facility, and an innovative Heart and Surgical Centre, currently under construction.

As a member of the **Division of Internal Medicine** you will provide comprehensive, patient-centered care on the hospital's 25-bed Medical Teaching Unit (MTU) where your presence will ensure that undergraduate students and residents have effective, stimulating learning opportunities. Clinical duties will also include consult services to in-patient wards and the Emergency Department (ED), as well as regular clinical practice in the Rapid Access Medical Assessment Clinic (RAMAC) for urgent consults from the ED and timely post-discharge follow-up visits.

If you are an excellent clinical and academic internist looking for a new challenge, ready to combine that experience with a leadership role as part of a new medical teaching service at one of BC's most progressive tertiary hospitals, this is an outstanding opportunity. It is a chance to help establish an Academic Division of General Internal Medicine from the ground up, in partnership with the University of British Columbia's Faculty of Medicine and Southern Medical Program (SMP).

Educational responsibilities encompass both direct-patient-care and non-patient-care environments, and include bedside and office teaching; clinical skills training; development of teaching materials; learner performance review and feedback; Objective Structured Clinical Exams (OSCEs) and oral exams; learner portfolio review, and attendance at SMP meetings. Division members will also fulfill four leadership roles: GIM Division Head, MTU Director, Internal Medicine Clerkship Site Leader, and Postgraduate Site Program Director. These roles will be shared equitably among the four division members.

As a preferred candidate you will possess outstanding communication, teaching, organizational and interpersonal skills that enable you to work collaboratively with other physicians, learners, hospital staff and administrators. You are innovative and enjoy the delivery of quality clinical care. You have demonstrated excellence in teaching and are excited to provide leadership to the undergraduate and postgraduate teaching programs. You have also undertaken additional studies in medical education, or have administrative experience with good organizational and time-management skills, and the ability to work in a complex university and hospital environment. Qualifications include an MD degree or equivalent, RCPSC Fellowship in Internal Medicine and eligibility for full licensure in the province of British Columbia. At least three to five years experience in GIM is preferred, although internists with sub-specialty training who have been practicing GIM part time, but who are willing to move to full time, will be considered.

Competitive compensation is supported through an alternate-payment plan combined with other remuneration sources and incentives. Successful candidates will be required to sign a practice-plan agreement for the clinical, academic and administrative services provided.

Applications will be accepted until suitable candidates are identified, with an ideal start date on or before July 1st, 2013, when the Southern Medical Program's first Clinical-Clerkship cohort begins. If interested, please send a confidential letter of interest and resume to: physicianrecruitment@interiorhealth.ca.

General information can be found at the following sites:

www.smp.med.ubc.ca * www.hellobc.com/kelowna.aspx

Information on Interior Health and KGH is available at www.interiorhealth.ca

You may also view Interior Health Physician Recruitment online at our website:

betterhere.ca