FLS Module 4: Postoperative Care and Complications

* Postoperative Care
	+ Postoperative Nausea and Pain
		- Risk factors: female gender, young age, previous problems with PONV, h/o motion sickness, nonsmoking status, volatile anesthetic agents/NO, opioid administration, procedure length
		- Prevention:
			* Anti-emetics: Serotonin 5-HT3 receptor antagonists, H1 receptor antagonists
			* Limit opioids
			* Local/regional anesthesia when possible, avoid NO with GA
		- Incisional pain
		- Shoulder pain
			* Self-limited, resolves in 1-3 days
	+ Wound Care
		- Procedure and patient specific
	+ Diet
	+ Conditions warranting limited activity:
		- Procedures requiring larger incisions (specimen extraction, HALS)
		- Large/complex hernia repairs
		- Impaired healing/immunocompromised:
			* Steroids
			* Chemo
			* Post-transplant immunosuppression
			* Infliximab
	+ Recovery and Discharge Instructions
* Complications
	+ Injuries not identified at the time of operation
	+ Partial thickness injuries 🡪 Full thickness injuries
	+ Hollow viscera Injuries:
		- Viscera most commonly injured:
			* Stomach
			* Small bowel
			* Colon
			* Bladder
			* Ureters
		- Typical mechanisms of injury presenting in the postoperative period
			* Electrosurgical burn
			* Full or partial thickness tear
			* Anastomotic leak
			* Devascularization/ischemia
	+ Solid Organ Injuries:
		- Viscera most commonly injured:
			* Liver
			* Spleen
			* Kidney
			* Pancreas
		- Typical mechanisms of injury presenting in the postoperative period
			* Capsular tear
			* Veress needle (uncommon)
			* Retraction injury
			* Failure of hemostasis
	+ Vascular complications:
		- Superior/inferior epigastric vessels
		- Mesenteric arteries/veins
		- Abdominal wall or intraperitoneal hematomas
		- Usually self-limited, but may require transfusion or additional surgical intervention
	+ Nerve Complications:
		- Positioning
		- Traction
		- Division
		- Entrapment
	+ Wound Complications
		- Seroma
		- Infection
		- Hematoma
		- Hernia

**MODULE 4 SCRIPT**

**Module 4 – Postoperative Care and Complications 🡪 Postoperative Care:**

A high index of suspicion for complication is necessary when a patient does not follow the expected course of recovery.

**Module 4 – Postoperative Care and Complications 🡪 Postoperative Care 🡪 Post-op Nausea and Pain Management:**

1. It has been reported that laparoscopic surgery is more commonly associated with post-operative nausea and vomiting when compared to open surgery. This most likely reflects the fact that most laparoscopic procedures are intraabdominal and performed with general anesthesia. The cause of postoperative nausea and vomiting is multifactorial and includes patient factors, the anesthetic technique, the operative procedure itself, postoperative pain, and perioperative pain management. Post operative nausea and vomiting are not only uncomfortable but also put the patient at risk for pulmonary aspiration, wound complications, and internal tissue approximation failure, particularly related to diaphragmatic or hiatal hernia repair.
2. Risk factors for postoperative nausea and vomiting have been extensively described in the literature. Listed here are commonly agreed upon factors. It is best to stratify each patient’s risk for post operative nausea and vomiting and apply the best treatment strategy for the individual patient.
3. Prevention of postoperative nausea and vomiting will make the patient’s recovery smoother and potentially safer. A recent review of 737 studies involving more than 100,000 patients concluded that many pharmaceutical regimens have a modest effect but the side effect of these drugs have not been well studied. Treatment options for the practitioner are included here. It is generally agreed upon that the best approach should stratify each patient’s risk and either not treat or apply an individualized multimodality treatment plan based on the patient’s risk.
4. Post-operative pain after laparoscopic surgery is usually mild and easily treated when compared to open abdominal operations. Unique to laparoscopy is the frequent recurrence of referred pain to the shoulder. This is thought to be due to diaphragmatic irritation due to the pneumoperitoneum and lasts from 1-3 days post operatively. Shoulder pain is more common and probably more intense with operations that directly involve the diaphragm such as hiatal hernia repair. A review of 42 randomized trials assessing pain management after laparoscopic cholecystectomy concluded that post-operative pain is multifactorial, and some strategies may produce clinically relative reductions in pain. These strategies are not well defined but in general include a multimodality approach. The presence of unusually excessive pain after laparoscopic surgery at the incision site or the shoulder should prompt the surgeon to investigate whether or not a postoperative complication is the source of the pain.
5. Common strategies for postoperative pain prevention and management include intraoperative administration of local anesthetic to the surgical sites, limiting insufflation pressure and evacuating the pneumoperitoneum, and perioperative multimodal analgesic therapy. The effect on heated and humidified insufflation gas on postoperative pain is controversial.

**Module 4 – Postoperative Care and Complications 🡪 Postoperative Care 🡪 Wound Care:**

1. The small wounds of laparoscopic surgeries are easy to maintain. Dressings and wounds should be inspected just prior to discharge to determine wound integrity and to ensure the patient is leaving with a clean dry dressing. Common wound dressings used in laparoscopic surgery include skin strips, adhesive bandages, or liquid skin adhesives. Patients are directed to keep the wounds dry for 24-48 hours. Any specific wound care and dressing instructions should be given prior to discharge. Showers and/or bathing are typically allowed 24-48 hours after the procedure unless wounds stay moist and other considerations intervene. Upon discharge, patients are instructed regarding the various signs of wound complications; redness, increasing pain, swelling, or discharge from the wound.

**Module 4 – Postoperative Care and Complications 🡪 Postoperative Care 🡪 Diet:**

1. Post operative diet will be both procedure and patient specific. Typically, there is a longer period of time to resume a regular diet after procedures performed under general anesthesia compared to local anesthesia. In general, patients should resume their usual diet as tolerated, limited by nausea, bloating, abdominal pain, or vomiting. Procedures around the gastroesophageal junction, such as esophageal myotomy or fundoplication, generally require soft foods for a few weeks due to temporary dysphagia. After procedures for morbid obesity, it is common to restrict the diet to liquids or soft foods for 2 weeks post operatively. Resumption of diet usually follows the range indicated for the procedures listed.

**Module 4 – Postoperative Care and Complications 🡪 Postoperative Care 🡪 Activity Restrictions:**

1. Most surgeons do not place any restrictions on their patients’ activities following laparoscopic procedures since the typical trocar insertion results in little, if any, muscle damage. In general, restriction of activity after laparoscopic procedure should be limited by the patients’ pain. Patients must be educated that they are the best judges of comfortable levels of activity. There are circumstances that may warrant limiting strenuous activity for up to several weeks postoperatively. These include larger incisions for extracting larger specimens, hand assisted laparoscopic surgery procedures, patients with tenuous abdominal wall closure, and patients with impaired wound healing.

**Module 4 – Postoperative Care and Complications 🡪 Postoperative Care 🡪 Recovery and Discharge Instructions:**

1. Preoperatively, patients should be informed of the expected operative and postoperative time course. After the procedure, the patient and/or their companion should be informed of the operative findings, any complications during the procedure, and whether or not the procedure was successful. Upon discharge, patients should be given verbal as well as written instructions that clearly state what constitutes normal vs abnormal recovery symptoms, as well as those that necessitate the notification of their physician. It is a good idea to include, in writing, any specific care instructions for a given procedure. The physician’s contact number should be included in addition to any follow-up information. Planned long term follow up is particularly important for patients undergoing surgical treatments of morbid obesity and cancer.

**Module 4 – Postoperative Care and Complications 🡪 Postoperative Complications:**

1. Many major and minor complications can be recognized intraoperatively but many others can present during the post operative period. These complications include injuries not identified at the time of the operation, partial thickness injuries that progress over time to full thickness injuries, and other complications secondary to the laparoscopic operation.
2. Hollow viscera, commonly at risk for injury during abdominal and pelvic laparoscopy, include the stomach, small bowel, colon, and the urinary tract. Mechanisms include non-visualized electrosurgical burn, small partial or full thickness tears in the organ wall, delayed necrosis secondary to devascularization or ischemia, and anastomotic leak. These complications will frequently present within 1-7 days postoperatively with symptoms of increasing pain, fever, tachycardia, and leukocytosis.
3. Injury to solid organs, such as the liver, spleen, kidney, and pancreas, can also present in the postoperative period. Most commonly, this is bleeding that was either not appreciated during the operation or thought to be hemostatic with delayed bleeding postoperatively. The pancreas can be inadvertently injured during splenectomy, left adrenalectomy, or colon surgery resulting in pancreatic ascites, or development of a pseudocyst. Patients who present with new onset of hypotension, tachycardia, and anemia should raise suspicion for a solid organ injury. If the patient is hemodynamically stable, computerized tomography scanning may help differentiate the source of suspected visceral injury.
4. Major vascular complications will typically present intraoperatively with tachycardia and hypotension as discussed in intraoperative considerations. Vascular injuries presenting in the postoperative period tend to involve smaller vessels such as the epigastric or mesenteric arteries and veins. These injuries will typically present either as abdominal wall or peritoneal hematomas and are frequently accompanied by an unanticipated drop in the patient’s hemoglobin level. While bleeding from these vessels is frequently self limited, additional surgery may be required in the setting of continued bleeding, requiring transfusion, extensive discomfort, infection of the hematoma, or hemodynamic instability.
5. Nerve injuries can be the result of patient positioning, traction or division during dissection, or entrapment by sutures, tacks, clips, staples, or prosthetic mesh materials. Nerve injuries can lead to postoperative loss of sensation, motor function, and/or chronic pain. Surgeons should optimize prevention of nerve injury through careful attention to positioning, thorough knowledge of anatomy, careful dissection, judicious use of energy sources, and consideration when placing sutures, tacks, clips, or staples.

Despite the typically small incisions, wound complication can still arise following laparoscopic surgery. Seromas, particularly following laparoscopic hernia surgery, are usually self limited and of little consequence. Infections and hematomas occur infrequently but are typically easily managed by opening the wounds to allow for drainage. The development of an incisional hernia is still a possibility with laparoscopic surgery despite the relative small size of the incisions. Five mm port sites are less likely to be complicated by an incisional hernia than 10-12 mm port sites. For this reason, it is generally recommended to close the fascia for ports greater than 10 mm in diame