



Self-Expanding Metal Stent (SEMS)

General Information

Objectives

- I. Discuss the background of Self-Expanding Metal Stents**
 - A. Reasons for using Self-Expanding Metal Stents
 - B. Variety of SEMS Material

- II. Describe Self Expanding Metal Stents**
 - A. Indications
 - B. Contraindications
 - C. Complications

- III. Explain the Procedure**
 - A. Preparation of equipment
 - B. Pre-procedure care
 - C. The procedure
 - D. Post- procedure care

I. Background of Self-Expanding Metal Stent (SEMS)

- A. There are Self- Expanding Metal Stents for esophageal, tracheobronchial, duodenal, biliary and colonic placement. Most of these stents at the present time are permanent (there is a self-expandable plastic stent that is used for an esophageal benign lesion that is removable) and inserted for palliation of a patient with an obstructive neoplasm. These obstructions left untreated prevent the normal passage of oral intact through the GI tract or can cause blockage of bile flow in the bile duct. These stents placed within a malignant stricture expend a greater radial force against the tumor, allowing the lumen to become patent once again. This improves the patient's quality of life.
- B. There are making continual technological advancements with SEMS. They now are composed of a variety of materials: stainless steel, nitinol and plastic. They come in a variety of sizes and lattice width. These stents can come covered with a coating over the mesh or uncovered. Covered stents prevent tumor ingrowth but have a greater potential for migration. Uncovered stents enmesh with the GI wall and are less likely to be displaced. Thermal coagulation can be used on tumor ingrowth to melt away new obstruction in a permanent stent, or another stent can be placed inside the original one.
- C. SEMS are loaded on their own delivery device. Because each manufacturer's stent design and delivery system is different, staff should be educated on the stent and method of deployment prior to its use. Stent deployment should be slow, with attention on the fluoroscopic image as it is being released. Some stents can be recaptured/repositioned if 50% or less of the stent has been deployed.

II. Self-Expanding Metal Stent (SEMS)

- A. *History:* Self- Expandable Metal Stents for the biliary system and for the esophagus were first used outside of the USA. The biliary SEMS became available in the United States in the late 1980s early 1990s, when it was proven that a SEMS remained patent longer than a plastic biliary stent. Esophageal SEMS were introduced soon afterward in the states. Duodenal and colonic SEMS were introduced many years after that. When SEMS were first developed they were an uncovered wire mesh stent. Now they make both an uncovered SEMS and a covered SEMS.
- B. *Indications:* A SEMS is used in patients that have an unresectable tumor causing a stricture in the gastrointestinal tract. It can also be used for tracheo-esophageal fistulas, gastric outlet obstructions resulting from a tumor of the stomach, duodenum or pancreas, peptic ulcer strictures resulting from esophageal reflux, or perforations in the esophagus. In the biliary system this stent is used to relieve jaundice, and for palliative treatment of a bile duct obstruction/stricture due to an unresectable infiltrating tumor.

C. *Contraindications:* Contraindications for using a metal stent in a patient would be if they have had recent chemotherapy, a medical condition that takes priority over placing the stent, cancers less than 2 cm. below the upper esophageal sphincter, if tumor/stent is causing compression of the trachea/bronchus, an inadequate dilation of the stricture, or if the patient has a long tortuous stricture.

D. *Complications:* The complications of placing an SEMS are: reaction to the sedation, hemorrhage, perforation of esophagus, duodenum, colon or bile duct, aspiration, stent migration, stent obstruction due to tumor ingrowth/overgrowth, fistula formation/ulceration and the SEMS may fracture during or after placement.

III. **Procedure**

With the patient under sedation a scope is passed and the stricture is visualized. Dilation of the stricture may or may not take place under fluoroscopy. Radiopaque markers are placed under fluoroscopy to identify the proximal and distal edges of the stricture.

A guidewire will be placed through the scope, and through the stricture. The scope will then be removed. The SEMS device is advanced over the wire, and when it is in between the two markers it is deployed.

Note: If this a biliary wall stent, the wallstent goes over the wire and through the scope and into the bile duct.

After deployment, the delivery system and guidewire are removed.

Special Considerations:

1. Proper placement of an esophageal SEMS should be at least 2-3 cm below the cricopharynx.
2. If the SEMS bridges the GE junction anti-reflux medication should be started.
3. A patient with an esophageal SEMS needs to notify their physician if they experience dysphagia, dyspnea or a persistent cough.
4. A patient with a biliary SEMS needs to notify their physician if they have signs of pruritis, pain, or jaundice.
5. Bowel control measures and dietary modifications may be necessary with colonic/rectal SEMS placement.
6. Patients need to know that the wall stent does not affect the metal detectors in the airport.
7. An Endoprosthesis Registration form needs to be completed for tracking purposes after stent placement.

Pre-Procedure

1. Prior to procedure a signed consent is needed, the NPO status determined, a history taken, and an antibiotic given following the Facility's protocol.
2. Explanation of the procedure to the patient or designee, in terms that are easy to understand.
3. Female patients of childbearing age should be assessed for pregnancy.
4. Explanation of the risks and advantages of using fluoroscopy.

B. Pre-Procedure

1. Anticipation of the procedure by having all the equipment immediately available not only for the procedure but also for an emergency situation (airway equipment, emergency drugs).
2. Review your facility's policy and procedure manual and the *SGNA Manual of Gastrointestinal Procedures* if it has been a while since you have assisted with deployment of a SEMS.
3. Have radiopaque markers to delineate the proximal and distal margins of the stricture.
4. Have proper attire for a fluoroscopy case - review your facility policy/procedure and SGNA position statement on *Radiation Safety in the Endoscopy Setting*.

C. During Procedure

1. Continuous monitoring of the patient during the procedure.
2. Review the deployment procedure.
3. Have dilation equipment available in case pre-placement dilation is necessary.
4. After the scope is passed through the stricture a guidewire is then passed through the scope and through the stricture. Radiopaque markers will be placed under fluoroscopy to show the proximal and distal margins of the tumor, and the scope is removed leaving the guidewire in place.
5. The SEMS delivery system is advanced over the guidewire and placed in proper position using fluoroscopy, between the radiopaque markers.
6. The stent is deployed per manufacturer's instructions.
7. After the stent is fully deployed, the delivery system and guidewire are removed.

D. Post-Procedure

1. Pointers for the Nurse and Associate:
 - A. Monitor the patient for procedural complications.
 - B. Monitor patient for abdominal distension/pain.
2. Pointers for the RN - Post Procedure:
 - A. Instruct the patient or designee on the signs and symptoms of stent occlusion.
 - B. Discharge patient when meets discharge criteria.