

ENDOSCOPIC MANAGEMENT OF MALIGNANT GASTROINTESTINAL OBSTRUCTIONS

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Abstract: Most of the gastrointestinal malignancies present due to luminal compromise. Presentations include dysphagia, gastric outlet obstruction, constipation or acute colonic obstruction and jaundice. The standard treatment in early and medically fit patients includes surgery and / or radiotherapy. As most of the patients at presentation have advanced disease or are medically unfit, they need palliation for relief of symptoms. Placement of self expandable metallic or plastic stents, appears to be a safe, highly successful and effective alternative. Most of the studies report a technical success of over 95% and clinical success of over 85%. Morbidity is acceptable and mortality is rare. Common complications of stenting include migration, maldeployment, blockage, bleeding, perforation and infection.

Key words: GI Malignancy, Enteral stenting, Colonic stenting, Biliary stenting, Self expandable metal stent, Polyflex stent.

INTRODUCTION

Esophageal cancer is among the common cancers of gastrointestinal tract. In the East and Asia, squamous cell carcinoma is more common while in the USA and Europe, adenocarcinoma is overtaking SCC and is now more common due to increase in the incidence of Barrett's esophagus¹. Except in cases picked up during surveillance programme or endoscopy done for other indications, the patients present late in the course. Presence of extreme dysphagia, odynophagia, hoarseness, cough during swallowing or neck nodes and liver masses indicates advance disease. Dysphagia due to luminal compromise is the most important single symptom which needs to be relieved.

ESOPHAGAL STENTING

Though surgery and radiotherapy appear to be the definitive modes of treatment in appropriate cases, large number of patients are suitable for palliation only either due to advanced disease, comorbid medical problems or personal preference. Though many ablative techniques like laser, photodynamic therapy, ethanol injection and APC, have been used for palliative intent, their effect is short term, complications are higher and require special equipment and training^{2,3,4,5}. In many patients, esophageal obstruction can be caused by lung cancer or metastatic lymph nodes. Placement of stent across the obstruction appears logical, simpler, cost-effective and widely available technique (Fig.1). Esophageal stents are made of metal alloys, compressed and constrained on a delivery device. They are passed over the guidewire, positioned across the stricture and released. The procedure is done under conscious sedation under endoscopic and fluoroscopic guidance. Predilatation is usually avoided though in certain cases it may be required prior to stenting. The stents are available in various sizes and lengths and in covered and uncovered versions. They differ in their design, material, mesh and degree of foreshortening. The most common stents used are Ultraflex (Boston Scientific, Boston), Wallstent (Boston Scientific) and Z stent from Wilson Cook⁶.

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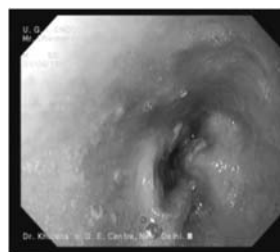


Fig.1a: Malignant stricture mid esophagus

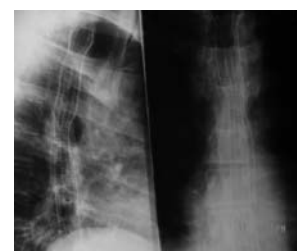


Fig.1b: Post stenting

Most of the series report a technical success of nearly 100% and a clinical success defined as improvement in dysphagia score in over 85% of cases^{7,8,9}.

Majority of the patients are able to take soft diet. The results are more rewarding in mid esophageal strictures. Placement of covered metallic stent is the treatment of choice in patients with tracheoesophageal fistulae (Fig.2) with most of the series reporting over 90% success in sealing the fistulae¹⁰.



Fig.2a: Tracheo-oesophageal fistula



2b. Post stenting (Ultraflex)

Comparisons between various brands of stents have shown no significant difference in technical and clinical success or the complication rates¹¹. Malignant strictures in the upper esophagus and near gastroesophageal junction need special consideration^{12,13}. Stenting near cervical esophagus can cause foreign body feeling, aspiration or pain. The tumour should be at least 2cm below upper esophageal sphincter and use of short proximal flare stent may be better. Stenting across GE junction is invariably associated with reflux. In such cases, use of anti reflux stent along

with proton pump inhibitors may be better. Recently a new type of self expandable plastic stent, Polyflex (Boston Scientific) has become available. It is made of polyester monofilaments covered with silicone membrane. It is a removable stent. Several clinical trials have shown it be safe and effective for malignant esophageal strictures and tracheoesophageal fistulae^{14, 15}. (Fig.3)

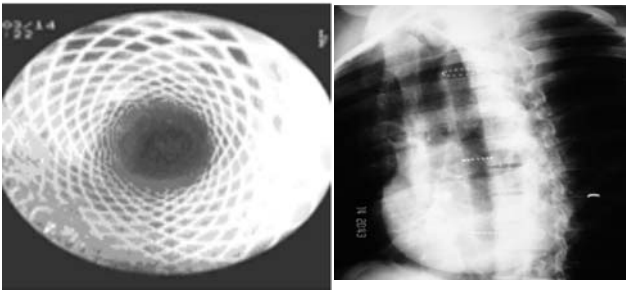


Fig.3 : Polyflex oesophageal stent

Complications : Though, esophageal stenting is highly successful technique, it is associated with complications. These include maldeployment, migration, bleeding, perforation, stent blockage by tumour ingrowth (in cases of uncovered stents) or overgrowth or food bolus impaction, chronic reflux and fistula formation. Stent migration can be prevented by using uncovered or partial covered stent. It is treated by removal of the migrated stent (if technically possible) and placement of new stent. Stent blockage can be treated by ablative procedure or by placing another stent.

ENTERAL STENTING

This includes placement of *metallic stent* in the stomach, duodenum, proximal jejunum and anastomotic sites. Common causes of gastric outlet obstruction (GOO) are cancer of stomach, duodenum, pancreas, gall bladder, cholangiocarcinoma and metastatic disease^{16, 17}. Patients usually present with post prandial fullness, vomiting and visible peristalsis or are diagnosed during investigations like endoscopy, contrast studies or CT scan. Forty percent of gastric cancer and 90% of pancreatic cancer patients with GOO have advanced disease. The standard treatment of these cases has been surgical resection and anastomosis or gastrojejunostomy. But because of advanced nature of disease, poor nutritional status and associated comorbid conditions, surgery carries high morbidity and significant mortality. The alternative to surgical treatment is placement of self expandable metallic stents (SEMS). Enteral stenting is a very safe and highly effective method in patients with unresectable malignant tumours causing GOO, with adequate palliation achieved in most cases (Fig.4). In a randomized prospective study, Flori et al¹⁸ showed that stent placement offered a better outcome, including a shorter hospital stay and more prompt resumption of oral diet compared to surgery. The *common enteral stents* used are 1. *Wallstent* - Boston Scientific; sizes 18,20,22 mm, length 60, 90mm, uncovered 2. *Wallflex Duodenal*-Boston Scientific, size 22mm , length 60, 90, 120mm, uncovered, have proximal flare 3. *Hanarostent Duodenal* - MI tech Seoul, size 18mm ; length uncovered 80, 110, 140 mm; covered 60, 90, 110 and 140mm; 4. *TTS Niti-S Pyloric-Taewoong Medical Co.*, Seoul; size 18mm; length

covered/uncovered 60, 80 and 100mm

Most of the stents used nowadays have TTS (through the scope) assembly. Before attempting stenting, it is important to know the length, level and degree of narrowing using contrast studies. The procedure is done endoscopically under fluoroscopic guidance. For enteral stenting, either a therapeutic duodenoscope or colonoscope can be used. The guidewire is passed across the stricture followed by advancing the stent assembly over the guidewire and positioning and releasing the stent across the stricture. Predilatation is preferably avoided. For distal duodenal and jejunal obstruction, double balloon enteroscope can be used for stenting. (Fig.4)



Fig.4: Enteral stenting for Gastric outlet obstruction with duodenal stricture

Results

Most of the series have reported a technical success of over 95% and a clinical success of around 90%. This is relatively a safe procedure with complication rate between 10 to 33%^{19,20}. Complications include stent dysfunction, tumour ingrowth and overgrowth, migration, bleeding and perforation. Stent block by tumour can be managed by restenting.

Concomitant biliary obstruction is frequently seen in patients with GOO. This occurs more commonly before duodenal obstruction but may develop later on. Biliary stenting, if indicated, should be performed prior to enteral stenting¹⁶.

COLONIC STENTING

Colonic obstruction, presenting either acutely as abdominal pain, distension and non passage of flatus and stool or chronically with increasing constipation is common with malignant colorectal strictures. The common causes of malignant obstruction include rectal and colonic cancers, pelvic malignancies and metastatic diseases. 8 to 29% of patients with colorectal cancer present with acute or chronic obstruction²¹. The patients at presentation are sick, dehydrated, have distended abdomen and the colon proximal to stricture is dilated and friable. The standard treatment in patients with acute colonic obstruction is diversion colostomy with or without resection with second stage closure of colostomy. But these surgical procedures in sick patients with unprepared bowel carry high morbidity and mortality²². Similarly, large number of patients with chronic obstruction have advanced disease at presentation or suffer from comorbid medical disease, which precludes surgery. In these situations, placement of *self expandable metallic stent* seems sensible option. Colonic stenting appears safer, highly successful and cost effective procedure (Fig.5).



Fig.5a: Cancer sigmoid colon

5b. Colonic stent (Wall stent)

The commonly used **colonic stents** are

1. *Enteral Wallstent* – Boston Scientific, sizes 18, 20, 22mm, length 60 and 90mm, are uncovered
2. *Wallflex Colonic*- Boston Scientific, size 22, 25mm, flare 27 and 30mm, length 60, 90 and 120mm, uncovered
3. *Colonic Z – stent*- Wilson Cook Medical, size 25mm body and flare 35mm , length 40, 60, 80, 100 and 120mm
4. *Ultraflex Precision Colonic Stent*- Boston Scientific, sizes body 25mm flare 30mm, length 57, 87 and 117mm, uncovered
5. *Niti-S Colorectal*- Taewoong-Medical, Seoul, size body 20mm and head 28mm, length 60, 80, 100mm, covered and uncovered
6. *Hanarostent Colorectal*- MI Tech Co. Seoul, size 22mm, length 80, 110 and 140mm, covered and uncovered^{23, 24, 25, 26, 27.}

Technique : The procedure is done after proper bowel preparation especially in chronic obstruction cases. It is important to have the information regarding the level, the length and severity of stricture and degree and tortuosity of proximal loops. During colonoscopy, guidewire is passed across the stricture followed by the stent assembly. In cases of larger diameter stent assembly, the stent is passed fluoroscopically. Colonic stenting is difficult in right and transverse colon lesions compared to left sided strictures. (Fig.6)



Fig.6: Colonic stenting for malignant recto-sigmoid stricture

In patients with acute colonic obstruction considered for preoperative stenting, stenting results in fewer operative procedures, reduced stoma requirements, lower mortality and also reduced costs.

Complications

Early complications of colonic stenting include improper placement, migration, bleeding, and perforation. Late complications are tumour ingrowth and overgrowth and migration especially if patient is given chemotherapy. (Table)

Table: Outcome of Colonic Stenting

Results			
Indication	Technical success (%)	Clinical Success (%)	Complication Rate (%)
Palliative stenting	92-93	90-91	4-5
Preoperative stenting	92	72-85	4-5
Complication reflect bleeding, perforation and pain			

BILIARY STENTING

Extrahepatic biliary obstruction secondary to malignant disease is a common clinical problem. It manifests as increasing jaundice, anorexia, weight loss, pruritis, steatorrhea and vitamin K deficiency. The common causes of biliary obstruction include cancers of pancreas, gall bladder, bile duct, duodenum and metastatic disease. The relief of obstruction is required not only for symptoms relief but also to improve liver function and make patient fit for definitive therapy, if required²⁸. The biliary obstruction can be relieved by surgery, by endoscopic methods or by percutaneous techniques. *Palliative surgery*, in the form of choledocho- or hepaticojejunostomy, carries high morbidity and mortality. It may be offered to patients who are young, medically fit and have expected survival of more than 8 to 9 months or in those cases who are found unresectable during laparotomy. *Endoscopic placement of stents* across the stricture is more effective and safer alternative^{29, 30}. This involves cannulation of papilla, contrast injection and visualisation of the pancreatic and biliary system. The same information can also be had with MRCP which guides in selective cannulation and opacification of ductal system to be drained, especially in hilar blocks. The stents can be plastic or metallic. The plastic stents are made of polyurethane or Teflon, are available in 7, 8, 10, 11.5 and 12F sizes and varying lengths. Ten French stents are most commonly used³¹. (Fig.7)

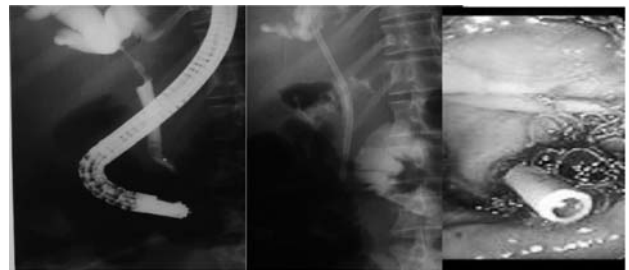


Fig. 7: Plastic stenting in CHD stricture

The main *drawback of plastic stents* is early occlusion occurring in 3 months, requiring repeated exchange. Various methods to prolong their patency like use of aspirin, ursodeoxycholic acid, antibiotics, hydrophilic coating of inner surface have not shown any advantage. They should be used in patients with expected survival of less than 3 to 6months or there is uncertainty about the diagnosis. The self expandable metallic stents are made of stainless steel, nitinol or other alloys. They come preloaded on a catheter kept in constrained position by the outer sheath. The stent assembly is 7 to 8F in size and is passed through the biopsy channel of the endoscope. The diameter of the stent is 10mm and length varies from 6 to 10cm. it can be covered or uncovered.

Because of the larger diameter, patency rates are much longer compared to plastic stents and also they are much easier to deploy^{32, 33}.

They are mainly indicated in patients with an expected survival of more than 6 months and hilar strictures. In patients with lower CBD blocks or type I Bismuth hilar strictures, single plastic or metallic stent is sufficient. (Fig.8)

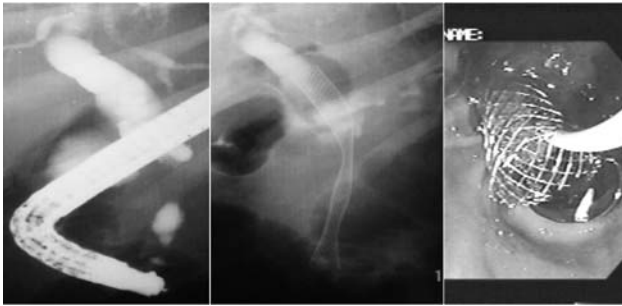


Fig 8: Biliary metallic stenting in mid CBD stricture

In order to improve the patency of metallic stents, covered stents can be used for lower end biliary strictures³⁴. Covered stents are avoided in hilar and upper CBD strictures because of the risk of cholecystitis and blockage of contralateral lobe. In patients with hilar blocks, unilateral stenting with SEMS is sufficient to provide adequate drainage compared to double duct stenting, (Fig.9)

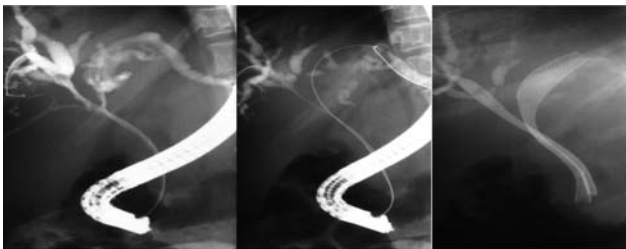


Fig.9: Biliary double duct metallic stenting in hilar block

provided the contralateral ductal system has not been injected with contrast. MRCP may play an important role in guiding stenting in hilar strictures. De Palma group³⁵ studied unilateral stenting in patients with type II, III, IV biliary strictures guided by the MRCP. Successful stenting was achieved in 97% of cases. Newer techniques used to improve outcomes include brachytherapy, photodynamic therapy and high frequency intraductal ultrasound.

CONCLUSION

Placement of self expandable metallic stents across malignant gastrointestinal strictures approves to be highly effective and safe palliative procedure especially in advanced and medically unfit cases.

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