INTERVENTIONAL ENDOSCOPY & ENDOUROLOGY SERIES: PART 1

This overview introduces interventional endoscopic procedures currently performed in the author's practice, along with indications toward potential future applications.

Interventional Endoscopy: The Essentials

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Interventional endoscopy involves the use of endoscopic techniques in combination with other imaging modalities (eg, fluoroscopy, ultrasonography) in the treatment of various disease processes identified in endoscopically accessible locations.

The combination of endoscopy and fluoroscopy allows visualization of and accessibility to an orifice. The morbidity, mortality, and invasive nature associated with some traditional surgical techniques (eg, ureterotomy, biliary rerouting, nasopharyngeal surgery, cystectomy) make minimally invasive interventional techniques particularly appealing, as they are associated with lower morbidity, new alternative options, and shorter hospital stays.

A New Perspective

A C-arm fluoroscopy unit is typically ideal for veterinary interventional endoscopy. This unit is mobile, accommodates various tangential views without patient movement, and allows patient positioning for optimal endoscopic viewing. Portable ultrasonography is also useful for percutaneous needle access into structures (eg, gallbladder, renal pelvis). Different procedures may require guide wires, catheters, or stents of varying types (eg, size, shape, material, stiffness, length). Various flexible and rigid endoscopes can guide the user as needed. Lasers (eg, Holmium:YAG, diode, shockwave, ultrasonic, pneumonic) have been used to fragment stones in the renal pelvis, ureter, bladder, and urethra and to endoscopically ablate tissues (eg, ectopic ureters, polyps, hemorrhagic lesions).

Respiratory Interventions

Nasopharyngeal Stenosis

Nasopharyngeal stenosis is a pathologic nasopharyngeal narrowing typically located caudal to the choanae, resulting in static inspiratory stertor. Nasopharyngeal stenosis can occur congenitally or secondary to an inflammatory condition (eg, aspiration, chronic rhinitis), surgery, trauma, or space-occupying lesion. Fixing the stenosis has traditionally involved surgery or serial balloon dilatation. Of note, although balloon dilatation is minimally invasive and uses interventional fluoroscopy and endoscopy, it can result in restricture within days to weeks. In the author's experience, stenting (**Figure 1**, next page) may allow more permanent fixation when balloon dilatation fails; results in both dogs and cats have been promising. Patients are usually released the same day as the procedure with antifibrotic doses of glucocorticoids (eg, prednisone 0.5 mg/kg q12h, tapered over 6–8 weeks) and antibiotics.

MORE ▶

Tracheal Tumor & Polypectomy or Laser Ablation

Because tracheal tumors are often located in the intrathoracic trachea, surgical removal via resection and anastomosis can be associated with significant morbidity. However, polypoid masses (eg, tracheal polyp [**Figure 2**], extramedullary plasmacytoma, leiomyoma/leiomyosarcoma) can be effectively resected by using electrocautery snares during biopsy, allowing concurrent diagnosis and treatment. If the mass is broad based and not amenable to polypectomy, a laser (diode or CO_2) or stent can help open the airway. Tracheal stents are safe, are highly effective, can be placed quickly, and can be useful in treating nonresectable masses.

GI Interventions

Esophageal Balloon Dilatation & Esophageal Stenting

Esophageal strictures can be secondary to inflammatory conditions, such as reflex esophagitis (commonly postanesthesia), caustic substance ingestion, complications from medications (eg, doxycycline tablets) coming into contact with esophageal mucosa for a prolonged time, esophageal foreign bodies, congenital anomalies, and esophageal neoplasia (space-occupying lesion). Stricture recurrence after routine endoscopic-guided balloon dilatation is common.

Fluoroscopy–endoscopy together assist in balloon dilatation of esophageal strictures in humans, thereby improving visualization when breaking up the stricture.

Esophageal stenting should be reserved for when balloon dilatation alone fails, as it is associated with multiple complications, including discomfort with persistent esophageal distention, stent migration, proliferative tissue ingrowth around the stent ends, or stricture in-growth through the stent. Permanent stenting for benign disease is, therefore, not ideal in the esophagus. Pliable stents with a peristalsis-friendly shape (ie, dumbbell and self-expanding stents) can be placed, but irritation and high migration rates are still risks. Stents are, however, well tolerated for nonresectable esophageal malignancies.

Esophageal/Naso/Gastro–Jejunal Feeding Tubes

In humans, enteral methods of feeding are preferred over parenteral because of the lower complication rates and the benefits on gut mucosal integrity and barrier function. Although it is controversial in veterinary patients, jejunal feeding may be preferred in patients that are unconscious, have regurgitation–reflux concerns (eg, mechanically ventilated patients), have pyloric outflow obstructions, are intolerant of gastric feeding or show intractable vomiting, or when pancreatic exocrine duct bypass is desired because of pancreatitis.

Although jejunal feeding has classically involved surgical or laparoscopic assistance, endoscopically placed percutaneous endoscopic gastrostomy (PEG)-jejunal feeding tubes and fluoroscopically placed nasojejunal feeding tubes have been investigated.

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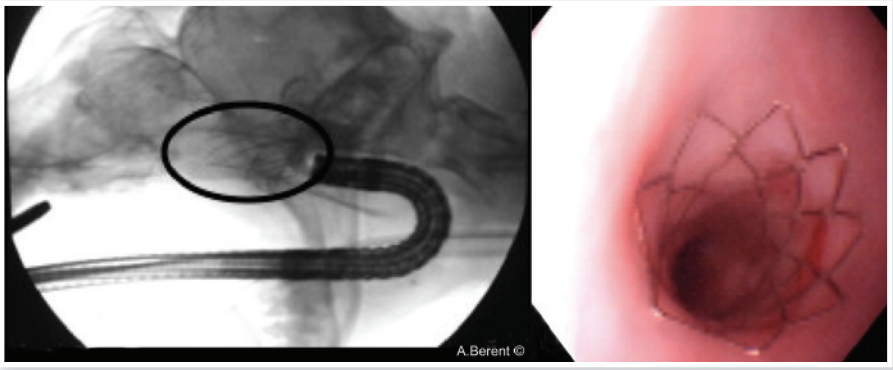
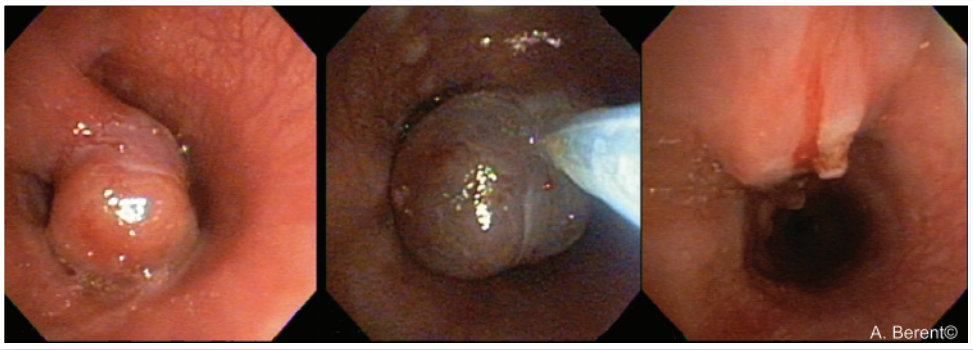


Endoscopic- and fluoroscopic-guided placement of a nasopharyngeal stent (circle) in a cat with a nasopharyngeal stenosis

2



Tracheal polyp in a dog during endoscopic polypectomy

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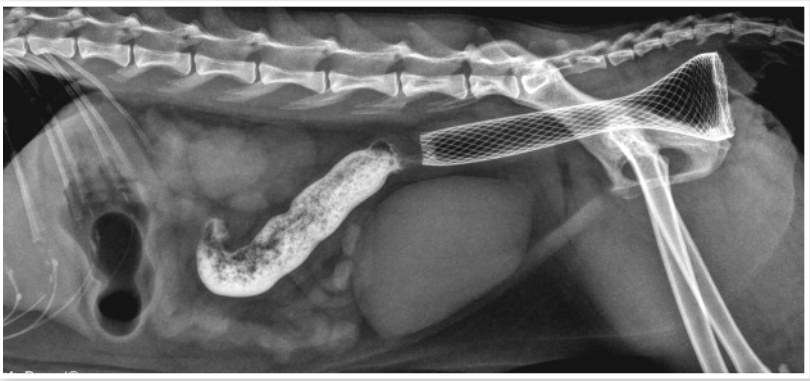

Lateral radiograph of a feline patient after a colorectal stent was placed for colonic stricture

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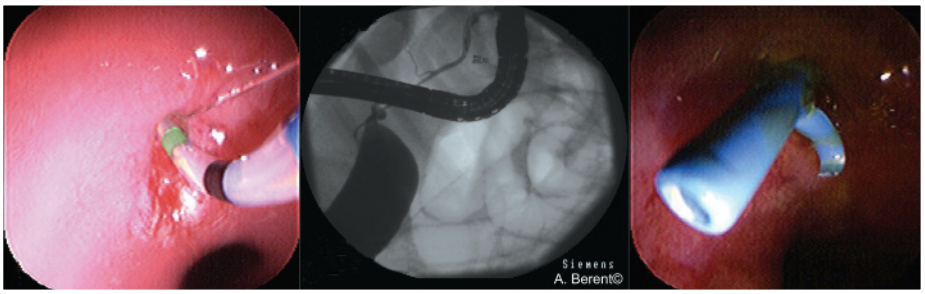

Endoscopic retrograde cholangiopancreatography in a canine patient during common bile duct stent placement

For More

Look for future installments of this series in upcoming issues.

Tubes can be placed into the jejunum through the nares or esophagus using fluoroscopy with or without endoscopy, eliminating enterotomy or gastrostomy complications. In addition, endoscopic wire placement across the pylorus during an upper GI endoscopic procedure can be fast, effective, and relatively inexpensive (compared with surgical placement) and can remain in place for more than 2 weeks.

Colonic Stenting

Although rare in small animals, colonic obstructions may occur secondary to neoplasms, strictures, or granulomatous lesions. Colonic stents (vs strictures) are most commonly used to treat neoplasms in human patients at high surgical risk or with low likelihood of surgical cure. In addition, colonic stenting has been used as a mechanism for bowel preparation before resection and anastomosis when deobstipation is necessary; clinical success has been seen in up to 95% of human patients.

In the author's experience, colonic stents have been placed in veterinary patients primarily for tumors or strictures (after resection and anastomosis or postradiation therapy). In all cases, colonoscopy is performed to visualize and obtain a biopsy followed by fluoroscopy to guide stent placement over a guide wire (**Figure 3**); patency can be reestablished immediately. The stent has been seen to be incorporated into the colonic mucosa within 4 days.

Biliary Interventions

Endoscopic Retrograde Cholangiopancreatography & Biliary Stent Placement

Extrahepatic biliary obstructions can induce life-threatening metabolic derangements; surgical treatment is often indicated but risky, as mortality ranges from 25% to 70% in dogs and can be greater than 75% in cats. Rapid and effective decompressive procedures may be safer than surgery. In humans, endoscopic retrograde cholangiopancreatography is an interventional endoscopic technique used for diagnosis and treatment of biliary tract disease, pancreatitis, or pancreatic obstructive lesions. Biliary stents have been successfully placed in dogs in the author's practice.

The major duodenal papilla can be visualized using a side-view duodenoscope and cannulated with a sphincterotome catheter. A guide wire can be advanced into the common bile duct under fluoroscopic guidance after retrograde cholangiogram–pancreatogram; a polyurethane or metallic stent is advanced over the wire into the common bile duct via endoscopy–fluoroscopy, transverses the major duodenal papilla, and exits into the duodenum. This stent can be in place until the obstructive lesion resolves (eg, for pancreatitis) or as a permanent treatment for strictures or neoplasia. This approach bypasses the need for rerouting biliary surgery for extrahepatic biliary obstructions (**Figure 4**). ■ cb

See **Aids & Resources**, back page, for references & suggested reading.