INTRODUCTION

Mankind was groping in the darkness of luminal diseases of the gastrointestinal (GI) tract, till scientists discovered the magical instrument ‘endoscope’. But it took almost two centuries for various scientists from all over the globe to develop the perfect endoscopic equipment, starting with a rigid pipe with candle light and external air pump and so on.

What was required was a thin, long flexible durable tube with provision for light, to take biopsy from suspicious tissues and at the same time, keep it maintenance-free. Professor R Schindler who is aptly called as the “father of the gastroscope”, popularized a rigid scope in 1922, but the flexible one was developed by Dr Basil Hirschowitz from USA in 1957. Thus, the era of flexible endoscopy was born (Figures 1 and 3).

In 1983, Welch incorporated the video chip technology and after that there was no stopping of the progress in the field of gastroenterology and therapeutic endoscopy, with equipment such as colonoscope, side viewing endoscope, enteroscope, echo endoscope (endoscopic ultrasound) (Figure 2), capsule endoscope, balloon enteroscope, scopes with advanced technology such as narrow band imaging and the Robotic endoscopic system coming into vogue. Thus there is now a great hope and scope at the end of the tunnel (endoscopy) for diagnosis, offering prognosis and treatment for various disorders of the GI tract.
**Gastroenterology**

surveillance. Even though diagnostic endoscopy is absolutely safe, it is contraindicated in severe cardiorespiratory diseases and impending GI tract perforation.

**Advanced Diagnostic Endoscopy**

New technologies namely magnification endoscopy, high definition endoscopy, double autofocusing facilities, narrow band imaging, autofluorescence technology and endoscopic cystoscopy have emerged as most promising technological advancements to find out early mucosal changes of cancers of the GI tract. The discovery of capsule endoscopy by Dr Paul Swine in collaboration with Israeli scientists has created a new era of accessing the long inaccessible small intestine of 6 meters length.

**Prognosis of Gastrointestinal Tract Diseases**

Endoscopy is not only a diagnostic tool but also a prognostic assessor, for example, in duodenal ulcer bleed. The prognosis can be assessed as per the Forrest classification. Rebleeding rates can be easily assessed and management protocol can be adopted accordingly.

In case of caustic injury, the depth of damage and plan of treatment can be executed as per the endoscopic findings. The same is true with the assessment of ulcerative colitis by colonoscopy.

**Therapeutic Gastrointestinal Endoscopy**

The field of endoscopy has expanded from diagnostic and prognostic horizon, to therapeutic options, and a new field of interventional gastroenterology has been born during the last 2 decades. It has several advantages over open techniques like laparotomy namely, minimal invasiveness, short duration hospitalization, possibility of carrying out the procedure in patients with compromised cardiorespiratory status and above all as a scarless technique.

It is needless to say that interventional gastroenterology, namely therapeutic endoscopy (or) endoscopic surgery has become the most sought after field by both the patients and doctors. There is tremendous scope for therapeutic endoscopy which will be discussed below:

**Hemostasis**

- **Variceal**: Banding/glue injection/sclerotherapy/loop (Figures 4 and 11)
- **Nonvariceal**: Thermal/(contact and noncontact methods); injection therapy (Figure 10)
- **Stricture dilatation**: Balloon/Bougie
  - Stenting: Esophageal/enteral/colonic (Figure 5)
  - Plastic/self-expanding metallic (Figure 6).
- **Achalasia cardia**: Pneumatic dilatation
  - Polypectomy (Figure 7)
  - Foreign body removal
  - Percutaneous endoscopic gastrostomy (PEG).

**Biliary and pancreatic diseases**: Endoscopic retrograde cholangiopancreatography (Figure 9):

![Figure 3: Endoscopic photography](image)

![Figure 4: Glue injection](image)

![Figure 5: Colonic stenting](image)
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Section 6

Figure 6: Ampullary growth—plastic stenting

Figure 7: Colonic polypectomy

Figure 8: Common bile duct stone

Figure 9: Worm in common bile duct

Hemostasis

Till 1980, diagnosing a patient of variceal bleed due to cirrhosis of liver was akin to writing a death warrant. The pendulum swung favorably toward us with the practice of sclerotherapy with polidocanol and sodium tetradecyl sulfate. The complications related to sclerotherapy such as fever, chest pain, pleurisy, etc. were nullified with the advent of banding technology, a relatively safe procedure. However, the greatest nightmare for any gastroenterologist has been gastric fundal variceal bleeding which could be torrential. Now, this can be effectively managed with tissue adhesives, namely N-buty1-2-cyanoacrylate glue which polymerizes on contact with blood.5

The nonvariceal bleed due to ulcers and erosions are being effectively managed presently with argon plasma coagulation and injection therapy [Injection of dilute epinephrine (1:10,000) using sclerotherapy needle is commonly done to achieve hemostasis in ulcer bleed].

Stricture Dilatation

Stricture anywhere in the GI tract, benign (or) malignant can be safely and effectively dilated either using bougie (Savary-Gilliard) dilations or through the scope (TTS) balloon, namely controlled radial expansion balloon TTS with the success rate varying from 90% to 95% (Figure 12).

Stents

Self-expanding metallic stent has revolutionized the management of inoperable obstructive cancerous growth of the esophagus, pyloroduodenal junction, bile duct (Figures 13 and 14) small
intestine and colon. It has circumvented the miserable and mostly unacceptable techniques, namely feeding jejunostomy, feeding gastrostomy, colostomy, etc.

**Achalasia Cardia**

Major surgeries can be avoided by pneumatic balloon dilatation technique. Recent arrival of peroral endoscopic myotomy seems to be more promising with controlled dissection of the muscles of the esophagus.

**Foreign Body Removal**

Foreign bodies of any nature: sharp, blunted, rounded, long, corrosive/noncorrosive, soft and hard can be removed endoscopically, thereby avoiding laparotomy (Figure 15).

**Percutaneous Endoscopic Gastrostomy**

Percutaneous endoscopic gastrostomy is the most acceptable procedure for patients of neuromuscular diseases/stroke who have transfer dysphagia requiring prolonged Ryle’s tube intubation. Transfer dysphagia is the difficulty to push the food from pharynx to upper esophagus due to neuromuscular disorders of laryngeal muscles (Figure 17).

**Endoscopic Retrograde Cholangiopancreatography**

Endoscopic retrograde cholangiopancreatography has created a new window to access the biliary duct and pancreatic duct for both benign and malignant disorders such as stone removal, stricture dilatation, stenting and sealing of biliary/pancreatic ductal leaks. Pseudocyst can also be easily drained endoscopically (Figure 16).

**Endoscopic Ultrasonography**

Endoscopic ultrasonography has completely changed the perspective of assessing hepatobiliary pancreatic disorders and luminal diseases too. Radial sector scope is useful for diagnostic purpose and staging of esophageal, duodenal and rectal malignancies. However, the linear array scope is dedicated for needle biopsy, aspiration from lymph node, cysts and malignant tumor (Figure 18).
Spy Glass
Spy Glass is another armamentarium in this field which can access into the biliary tract, like a baby scope to take biopsy, in indeterminate biliary strictures and to fragment large stones using holmium laser.

Learning Curve and Complications
The therapeutic endoscopy field appears to be very glamorous and promising. However, it has a long learning curve without which one can encounter high incidence of complications related to the therapeutic endoscopy, mainly perforation, bleeding, pancreatitis, sepsis, etc. The young aspirants should undergo a dedicated training program after adequate professional qualification.
CONCLUSION
So it is very obvious that we have more than enough evidence to announce the dawn of a completely new era for diagnosing and treating luminal GI tract diseases. Endoscopic tools have transformed the field of gastroenterology from mere hope to tremendous scope, with endoscopic tools, to relieve the sufferings of mankind.

REFERENCES