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"Barrett's Esophagus"

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ABSTRACT

Barrett's esophagus is a condition in which there is an abnormal metaplastic change in the mucosal cells lining the lower portion of the esophagus. This change is considered to be a premalignant condition because of its potential to further transition to esophageal adenocarcinoma, an often-deadly cancer[1]. The majority of BE cases are acquired, with the precipitant being long-standing gastroesophageal reflux disease (GERD). Rare families have an increased incidence of developing BE through autosomal dominant inheritance of certain susceptibility alleles, known as the familial Barrett esophagus phenotype. BE predisposes patients to the development of dysplasia and esophageal adenocarcinoma (EAC), a cancer with high morbidity and mortality[2]. Approximately 3% to 5% of patients with Barrett esophagus will be diagnosed with esophageal adenocarcinoma in their lifetime[3] . Screening for Barrett's esophagus remains selective based on risk factors, a screening program in the general population is not routinely recommended. Diagnosis of BE is established with a combination of endoscopic recognition, targeted biopsies, and histologic confirmation of columnar metaplasia[4]. Several treatment modalities for advanced disease and cancer have been developed and studied to effectively treat disease, from endoscopic resection and ablation to more aggressive surgical options[4].

Key words: Barrett's esophagus , metaplasia, esophageal adenocarcinoma, gastroesophageal reflux disease, autosomal dominant inheritance, endoscopic ablation

INTRODUCTION

Barrett esophagus (BE) is a pre-malignant condition characterized by conversion of the normal esophageal squamous epithelium into metaplastic columnar epithelium[2]. The condition is named after Australian thoracic surgeon Norman Barrett (1903–1979), who in 1950 argued that "ulcers are found below the squamocolumnar junction represent gastric ulcers within 'a pouch of stomach drawn up by scar tissue into the mediastinum' representing an example of a 'congenital short esophagus'[1]. Barrett's esophagus is a transformative process, in

which metaplastic columnar epithelium replaces the endogenous stratified squamous epithelium in the lower portion of the esophagus . This adaptation is a consequence of chronic gastroesophageal reflux disease (GERD) which damages the endogenous stratified squamous epithelium and over time has the potential to predispose to the development of adenocarcinoma of the esophagus . It is estimated that 5.6% of adults in the United States have Barrett's esophagus . It is usually discovered during endoscopic examination of middle-aged and older adults; however, the majority of cases are unrecognized[4] . Management of Barrett esophagus primarily consists of acid-suppressive medications to reduce underlying GERD symptoms and surveillance endoscopy every 3 to 5 years. In patients with Barrett esophagus and dysplasia or early cancer, endoscopic therapy consisting of resection and ablation successfully treats 80% to 90% of patients[3].

WHAT IS BARRETT'S ESOPHAGUS?

Barrett's esophagus is a condition in which the normal squamous epithelium of the distal end of the esophagus is replaced with metaplastic specialized intestinal-type epithelium as a sequela of chronic GERD[5].

CAUSES AND RISK FACTORS

The exact cause of Barrett's esophagus isn't known. While many people with Barrett's esophagus have long-standing GERD, many have no reflux symptoms, a condition often called "silent reflux."[6]

Risk factors[6]

Factors that increases the risk of Barrett's esophagus include:

- **Family history.**
- **Being male:** Men are far more likely to develop Barrett's esophagus.
- **Being white:** White people have a greater risk of the disease than do people of other races.
- **Age:** Barrett's esophagus can occur at any age but is more common in adults over 50.
- **Chronic heartburn and acid reflux:** Having GERD that doesn't get better when taking medications known as proton pump inhibitors or having GERD that requires regular medication can increase the risk of Barrett's esophagus.
- **Current or past smoking.**
- **Being overweight**

SIGNS AND SYMPTOMS

Barrett's esophagus does not cause symptoms. It may be associated with complications of associated GERD. The patient may experience any of the following symptoms for more than two weeks[7]:

- Heartburn
- Indigestion
- Blood in vomit or stool
- Difficulty swallowing solid foods
- Nocturnal regurgitation (acidic or bitter liquid coming up to the chest or mouth during the night)

DEGREE OF TISSUE CHANGE

Tissue changes may be classified as[6,7]:

- **No dysplasia:** Barrett's esophagus is present but no precancerous changes are found in the cells.
- **Low-grade dysplasia:** cells shows small signs of precancerous changes.
- **High-grade dysplasia:** cells shows many changes. High-grade dysplasia is thought to be the final step before cells change into esophageal cancer[6].

DIAGNOSIS[7]

Diagnosis of Barrett's esophagus begins with a comprehensive physical examination

Other diagnostic procedures include[7]:

- Upper endoscopy with biopsy
- Chromoendoscopy
- Virtual Chromoendoscopy[4]
- Volumetric Laser Chromoendoscopy (VLE)[4]
- Wide-area transepithelial sampling (WATS)[4]

TREATMENT[6]

Treatment of barretts esophagus includes[8]

1. Treating the cause to stop it from progressing : Chronic acid reflux, the most common condition leading to Barrett’s esophagus, is treatable. Healthcare providers usually recommend a combination of diet and lifestyle changes and acid-blocking medications. Medications called proton pump inhibitors (PPIs) are very effective in protecting your esophagus from acid reflux and helping the tissues heal[8]
2. Regular surveillance to check for pre cancerous change: have periodic endoscopy exams to check on your metaplasia
3. Removing precancerous tissue if necessary

Treatment for Barrett's esophagus depends on the extent of abnormal cell growth in your esophagus and your overall health.

No dysplasia

- **Periodic endoscopy to monitor the cells in the esophagus.** If biopsies show no dysplasia, patient will probably have a follow-up endoscopy in one year and then every three to five years if no changes occur.
- **Treatment for GERD.** Medication and lifestyle changes can ease your signs and symptoms. Surgery or endoscopy procedures to correct a hiatal hernia or to tighten the lower esophageal sphincter that controls the flow of stomach acid may be an option.

Low-grade dysplasia

If low-grade dysplasia is found, it should be verified by an experienced pathologist. For low-grade dysplasia, doctor may recommend another endoscopy in six months, with additional follow-up every six to 12 months.

But, given the risk of esophageal cancer, treatment may be recommended if the diagnosis is confirmed. Preferred treatments include:

- **Endoscopic resection,** which uses an endoscope to remove damaged cells to aid in the detection of dysplasia and cancer.
- **Radiofrequency ablation,** which uses heat to remove abnormal esophagus tissue. Radiofrequency ablation may be recommended after endoscopic resection.
- **Cryotherapy,** which uses an endoscope to apply a cold liquid or gas to abnormal cells in the esophagus. The cells are allowed to warm up and then are frozen again. The cycle of freezing and thawing damages the abnormal cells.

If significant inflammation of the esophagus is present at initial endoscopy, another endoscopy is performed after three to four months of treatment to reduce stomach acid.

High-grade dysplasia

High-grade dysplasia is generally thought to be a precursor to esophageal cancer. For this reason, doctor may recommend endoscopic resection, radiofrequency ablation or cryotherapy. Another option may be surgery, which involves removing the damaged part of esophagus and attaching the remaining portion to stomach.

LIFESTYLE AND HOME REMEDIES[6]

Lifestyle changes can ease symptoms of GERD, which may underlie Barrett's esophagus. Consider[6]:

- Maintaining a healthy weight.
- Eliminating foods and drinks that triggers heartburn, such as chocolate, coffee, alcohol and mint.
- Stopping smoking.
- Raising the head of bed. Place wooden blocks under the bed to elevate the head.

ADVANCED TECHNIQUES TO DETECT BARRETT'S ESOPHAGUS[4]

1. Virtual chromoendoscopy: Virtual chromoendoscopy uses technology built directly into the endoscope.
2. Volumetric laser chromoendoscopy: uses optical coherence tomography with infrared light to produce high-resolution, cross-sectional imaging of tissue in real-time without the need for contrast
3. Wide-area transepithelial sampling (WATS) is a three-dimensional (3D), computer-assisted technique which has been used as an adjunct to traditional forceps biopsy.
4. Endoscopic ultrasound (EUS)
5. Artificial intelligence (AI): Over the last 20 years, there has been a tremendous increase in the development of artificial intelligence (AI) in the field of gastroenterology and hepatology, which heavily relies on imaging[4]

CONCLUSION

Barrett's esophagus (BE) is a change in the distal esophageal mucosal lining, whereby metaplastic columnar epithelium replaces squamous epithelium of the esophagus. This change represents a pre-malignant mucosal transformation which has a known association with the development of esophageal adenocarcinoma. [4]The development of cost-effective screening tools and technical advances in detection of metaplasia and neoplasia is imperative to identify those at risk. The area of Barrett's esophagus therapeutic management is rapidly evolving. Endoscopic eradication therapies have been shown to be effective and new therapies continue to be developed as advances are made[4].

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