

## Zenker's Diverticulum

Frank Schweiger MD

CSGNA Meeting  
September 23-26, 2015  
Moncton, NB

## Disclosures

None pertaining to this talk

## Objectives

- To outline the epidemiology and pathophysiology of ZD
- To introduce the various treatment options
- To introduce endoscopy as a viable alternative therapy for ZD

## Zenker's Diverticulum

- 1767 - first described by Ludlow
- 1877 - 23 patients reported by Zenker and von Ziemssen
- 1995 - Flexible endoscopic treatment first described



Friedrich Albert von Zenker  
1825 - 1898



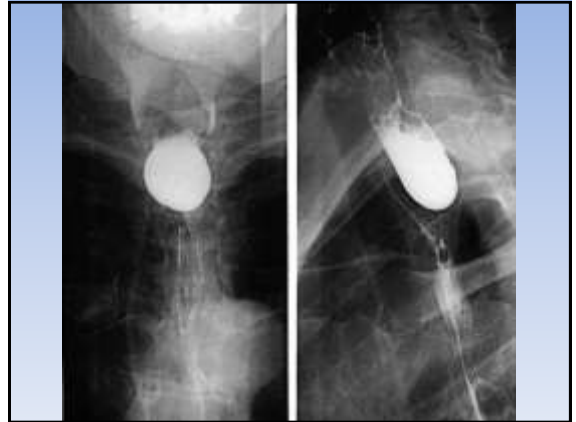
## Zenker's Diverticulum

- Annual Incidence : - 2: 100,000
- Prevalence - 1 : 1,000 – 1 : 10,000  
- 1 : 1000 UGI series
- 2 times more common in males
- Typically 7<sup>th</sup> – 8<sup>th</sup> decade
- Rare in Africa and Asia
- More frequent in Northern Europe

Bizzotto A et al. Acta Otorhinolaryngol Ital 2013

## Definition

- Zenker's Diverticulum is a sac-like mucosal outpouching of cervical esophagus through the Killian triangle
- Pulsion hypopharyngeal false diverticulum made up of mucosa and submucosa



## Zenker's Diverticulum

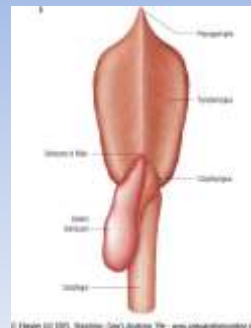


Killian's triangle is an area of weakness which is not supported by constrictor muscles

ZD is a posterior pharyngeal pouch with the neck proximal to the cricopharyngeus muscle

Increased luminal pressure force the tissues through the weak spot.  
Pathophysiologic abnormalities of the cricopharyngeus

## Zenker's Diverticulum



## Zenker's Diverticulum: Presenting Symptoms

- Dysphagia
- Regurgitation
- Choking
- Sensation of a lump in the throat
- Aspiration
- Voice changes
- Chronic cough
- Halitosis
- Weight loss and malnutrition

## Zenker's Diverticulum – Complications

- Squamous cell carcinoma : 0.4 – 1.5 %
- Ulceration
- Bleeding
- Aspiration pneumonia
- Unpredictable absorption of medication
- MZA capsule retention
- Difficulties with tracheal intubation, ERCPs, EGDs, TEE, NG tubes
- Perforation

## Zenker's Diverticulum

- Zenker's Bridge:**
- septum between the diverticulum and the esophageal lumen
  - consists of mucosa, submucosa, connective tissue and a muscle layer



## Laterally displaced variant (Killian-Jamieson's diverticulum)



## Bilobed diverticulum



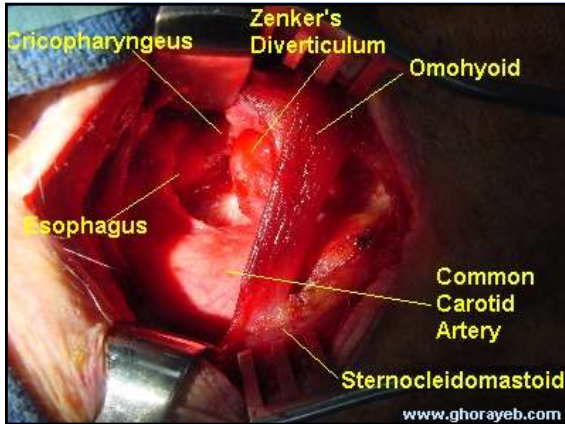
## Zenker's Diverticulum Treatment

- **Small asymptomatic or minimally symptomatic** --- follow
- **Open surgical procedures (esp. if > 5 cm)**
  - Resection (Diverticulectomy) - large diverticula
  - Inversion - medium size
  - Suspension (Diverticulopexy) - medium size
  - always includes cricopharyngeal myotomy
- **Complications:**
  - leaks with mediastinitis
  - esophagocutaneous fistula
  - recurrent laryngeal nerve injury
  - parapharyngeal abscess

## Results of Open Surgery

- Mayo Clinic: 888 patients
- Excellent or good outcome: 93 %
- Complication rate: 30 %
- Mortality: 3 %
- Mean Recurrence: 5 %

Bizzotto A et al. Acta Otorhinolaryngo Ital 2013



### Zenker's Diverticulum Treatment

- **Endoscopic Techniques:**
  - Endoscopic stapling diverticulotomy
  - Endoscopic CO2-laser myotomy
  - Endoscopic harmonic scalpel diverticulotomy

### Endoscopic Treatment of Zenker's

- Goal is to *divide the party wall* and perform a *diverticulotomy*. Zenker's sac persists (NOT resected) but food is now able to drain into the esophagus without collecting in the pouch.

Endoscopic View of Zenker's Pouch During Surgery

### Before and After

### Zenker's Diverticulum Treatment

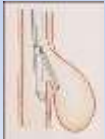
- **Endoscopic Techniques:**
  - Rigid diverticulosopes

### Zenker's Diverticulum Treatment

- **Endoscopic Techniques:**

Rigid diverticulosopes

**Surgical staplers :** Predominant technique



Good neck flexibility,  
Favourable dentition  
General anaesthesia  
Large diverticula (not for < 3 cm)  
Bleeding, perforation, leaks

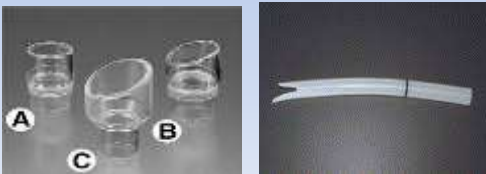
### Zenker's Diverticulum Treatment Results of endoscopic stapling procedures

- Effective in 92 % of cases
- Complication rate : 4 %
- Mortality < 1 %
- Mean recurrence rate : 12 %
- Conversion to open surgery : 5 %

Leong SC et al. Eur Arch Otorhinolaryngol 2012

### Flexible Endoscopic Therapy

- First introduced in 1995 by C.J. Mulder (Endoscopy)
- Cap-assisted vs Diverticuloscope-assisted

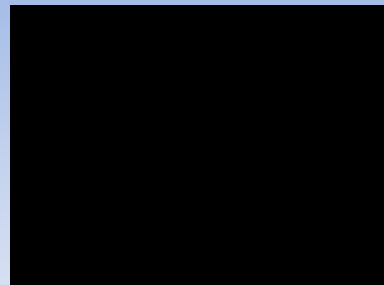


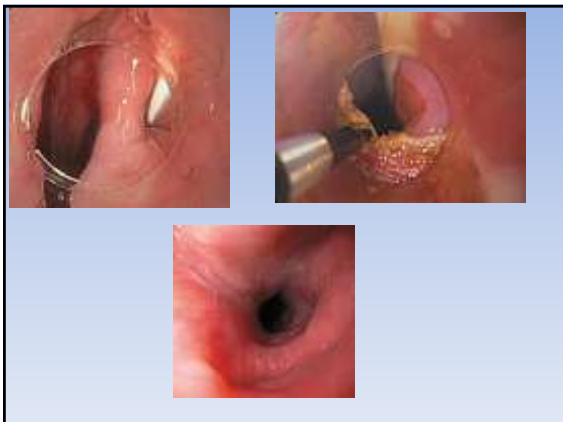
### Flexible Endoscopic Treatment of Zenker's Diverticulum

- No need for GA; done in Endoscopy unit
- Possible in elderly patients with multiple comorbidities
- Generally not for diverticula > 6 cm
- Outpatient 6 hours; inpatient 24-48 hours
- Procedure time : 30 – 45 minutes
- Po after 12 hours

### Flexible Endoscopic Treatment of Zenker's Diverticulum

- Conscious sedation (midazolam+ opiates, propofol)
- Low risk
- Post-procedural air in up to 27 % - Mayo Clinic
- Severe complications : rare





### Flexible Endoscopic Treatment of Zenker's Diverticulum

- Equipment :
  - Needle knife sphincterotome (APC, Hot Bx, Hook Knife,
  - Stag Beetle knife)
  - Transparent cap
  - Diverticuloscope
  - Clips

### Moncton Hospital Experience Feb 2011 – Present

#### Pre-procedure :

- Outpatient; NPO after midnight
- CBC, electrolytes, Creat, PT/PTT, group & hold x 2 u PRBC
- iv cephalosporin (1 dose) (?)
- Chlorhexidine mouthwash

### Moncton Hospital Experience Feb 2011 – March 2015

#### Post-procedure :

- Admit overnight
- D/C NG tube in am and start po liquids
- Home
- Telephone in 4 – 6 weeks

### Moncton Hospital Experience Feb 2011 – March 2015

- N = 19; Female 10 Male 9
- Age 51 – 93 (Median Age 78)
- Good outcome : 15
- Unknown outcome : 2
- Recurrence : 3
- Repeat procedure : 2
- Complications : 2 – both minor & treated conservatively

### Endostapling versus Flexible endoscopy

- Hospital stay
  - Dysphagia symptom score
  - Complication rates
- } similar outcomes
- Procedure time – longer for endostapling
  - Clinical success (dysphagia score) : 84 – 100 %
  - Clinical recurrence rate : 20 %
  - Complications : mediastinitis, cervical abscesses 4%  
microperforation : 0 – 10 %

### Endoscopic Treatment for Zenker's Diverticulum: Long-term Results

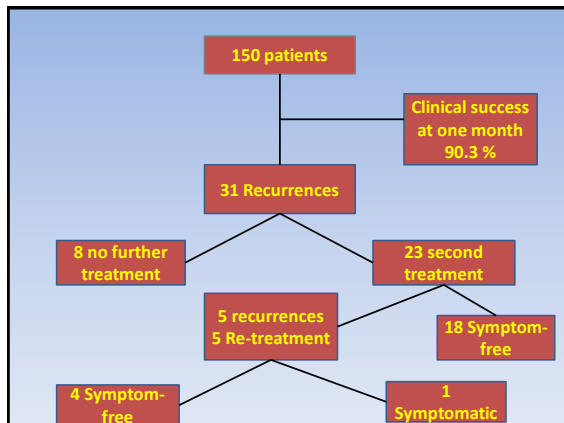
- 150 patients treated between 2002 and 2011
- Median size was 3 cm (1-8 cm)
- Used a soft plastic diverticuloscope, cap and clips
- Propofol or general anaesthesia
- Median F/U was 43 months (13-121)
- Clinical success at one month : 90.3 %
- Four adverse events – all managed conservatively (2.2%)

Huberty V et al. GIE 2013;77:701-7

### Endoscopic Treatment for Zenker's Diverticulum: Long-term Results

- Dysphagia at 1 month (103) : 1.88 to .29 (p<.01)
- Dysphagia at end of F/U (134) : 1.88 to .34 p<.05)
- Regurgitation 73 % to 11 %
- Chronic cough 23 % to 2 %
- Symptom Recurrence in 31 pts 23.1 %

Huberty V et al. GIE 2013;77:701-7



### Summary

- Zenker's Diverticulum is uncommon and increases with age
- Diagnosis is by imaging or endoscopy
- Surgery is the most effective treatment but has higher procedure-related morbidity and hospital stay
- Flexible endoscopic treatment is safe and effective and represents a viable option vs surgery
- Flexible endoscopy is minimally invasive and most suitable for older and high risk patients
- Direct comparison between studies and results at this point is inappropriate (too many variables)
- Choice between different options depends on local expertise and preferences