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Gastroscopy in patients with hiatal hernia with and without gastroesophageal mucosal prolapse

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Abstract: There are still many doubts in the literature regarding gastroesophageal mucosal prolapse (GEMP) and its clinical course. We still do not know what determines mucosal wedging in esophagogastric junction, and what is the role of the anatomy of that site. To investigate that problem we performed 120 upper digestive tract endoscopies in which a hiatal hernia was diagnosed. Patients referred to our unit with different complaints most frequently of typical or atypical gastroesophageal (GE) reflux symptoms. The aim of that study was to assess hernia dimensions in patients with and without GEMP diagnosed during endoscopy. Additionally we analyzed the type and prevalence of gastrointestinal symptoms reported by patients to confirm the observation that GEMP symptoms differ from gastroesophageal reflux disease (GERD) symptoms. Methods. One-hundred and twenty patients were included in this study. All of the patients were diagnosed with a hiatal hernia during routine gastroscopy. Using standardized methodology the region of the hiatal hernia was photographed, and hernia longitudinal and transverse dimensions were measured. Results. The study group comprised 57 females (52.5%) and 63 males — mean age (SD) 58.5 ± 18.4. Most of the patients had standard GERD symptoms (n = 96; 80%). The average length of hiatus, in patients with GEMP (n = 24; 20%) was 3.56 ± 0.59 cm, and the average width was

2.32 ± 0.62 cm (n = 96; 80%) vs. 4.64 ± 0.74 cm and 2.98 ± 0.68 cm respectively in patients without GEMP (p <0.001). Conclusions. GEMP occurs in smaller sized hiatal hernias. We confirmed that disease symptoms of the majority of patients with GEMP differ from patient with GERD but without GEMP. However this difference was not significant enough to allow to differentiate between diagnoses based solely on the symptoms.

Key words: gastroesophageal reflux disease (GERD), gastroesophageal mucosal prolapse (GEMP), hiatus hernia.

Introduction

Gastroscopic examinations of patients presenting with GERD symptoms or epigastric pain have revealed prolapses of gastric mucosa into the esophagus, particularly during stretching [1, 2]. It is proposed that stretching is actually the cause of the gastric prolapse and leads to subsequent mucosal injury [2] (gastroesophageal mucosal prolapse — GEMP). The most prominent endoscopic features of this condition include a swollen and bleeding fold of mucosa prolapsing into the esophagus [2]. GEMP in patients with a hiatal hernia was first described by Enderlen in 1903 and later on was repeatedly confirmed in several radiological and endoscopical studies. It occurs when a portion of the gastric mucosa herniates into the distal esophagus and produces characteristic symptoms. Myllarniemi and Saario in 1985 proposed to consider this pathology as a totally separate entity from GERD and sliding hiatal hernias [3]. Retrosternal pain, dental erosions and nocturnal sour refluxes are characteristic for those patients, and these symptoms differ from other, typical for GERD associated hiatal hernias [4]. GEMP diagnosis is in most cases based on upper gastrointestinal endoscopy, and less frequently on a barium swallow study. There are still many doubts in literature about GEMP pathology, and its clinical course. The relationship to GERD and hiatus hernia has not been fully explored. We still do not know what determines mucosal wedging in the esophagogastric junction. We also do not know if individual gastrointestinal characteristics like gastrointestinal anatomy, its' sensitivity and peristalsis may participate in provoking or affecting GEMP, or if the hiatal hernia dimension or shape, may change the course of this disease. The majority of authors believe that the main cause of GEMP is based around the pathology of the esophagogastric region that leads to impaired function of His valve. According to the above mentioned theories the broadening of the diaphragmatic esophageal hiatus causes the prolapsus of the gastric mucosal valve into the esophageal lumen. The aim of that study was to assess hernia dimensions in patients with and without GEMP diagnosed during upper digestive tract endoscopy. We hypothesize that designation of specified hiatal hernia dimensions may help endoscopists distinguish between

hernias with and without GEMP. Additionally we analyzed the type and prevalence of gastrointestinal symptoms reported by patients to confirm the observation that GEMP symptoms differ from GERD symptoms.

Material and methods

One-hundred and twenty patients were included in this study. All of the patients were diagnosed with a hiatal hernia during routine gastroscopy performed at the Endoscopy Unit in Busko Zdrój (country hospital) and Kazimierza Wielka (outpatient clinic "Maxmed") between 2010–1012. Each patient was admitted with the chief complaint of typical or atypical gastroesophageal reflux symptoms. The following data were recorded: age, sex, symptoms (both typical and atypical for GERD), the degree of esophagitis length and width of the hiatal hernia. Exclusion criteria were the same as general contraindications for gastroscopy.

Endoscopic procedure

Endoscopy of the upper digestive tract was performed using fiber optic endoscopes (Video Gastroscope, Pentax) under local anesthesia. All the endoscopy procedures were performed by the same endoscopist (AG) who is highly experienced in performing gastroscopy (15 years of experience). Prior to gastroscopy, the patients underwent a standard preparation procedure. A hiatal hernia was diagnosed when (1) the separation between the squamocolumnar junction and the diaphragmatic impression was greater than 2 cm, and (2) when in the endoscope retroflex position the diameter of the hernia sac's neck cardia was higher than 2 cm during thorough observation with air insufflation. Assessment of esophagitis was based on Los Angeles classification [5]. In each case when a hiatal hernia was endoscopically diagnosed a digital photography was taken under following strict rules. The camera in the endoscope tip was set exactly opposite the cardia from the retroflex view. A distance of 4 cm between the camera and gastric cardia was always kept. Hiatus dimension were assessed post-endoscopy, using the acquired image, with interpolation for endoscope width (9.8 mm). Every time both the longitudinal and transverse dimension were measured. In the case of GEMP the measurement was performed only after the prolapsed mucosa backed up into the stomach [4].

Statistical analysis

The obtained data were analyzed using Statistica 10.0 PL software (licensed to the Jagiellonian University Medical College). Descriptive statistics were used (mean, standard deviation, percentage distribution). The Students t-test and Mann-Whitney

U test were used to assess continuous variables. A p-value below 0.05 was considered statistically significant.

Ethics

All patients gave their written and informed consent prior to inclusion into the study. The research protocol was approved by the Jagiellonian University Ethics Committee (registry number KBET/123/B/2013). The study has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Results

Overall the study group comprised 57 females (52.5%) and 63 males (46.5%) with a mean age (SD) of 58.5 ± 18.4. Most of the patients had standard GERD symptoms (n = 96; 80%). Twenty-two patients (18.3%) reported additionally other complaints (mostly pain in the thorax). Esophagitis was not present in 18 (15%) patients. Grade I esophagitis was recognized in 42 (35%) patients, grade II esophagitis (single or multiple non-confluent erosions) were seen in 34 (28%) patients. Severe esophagitis with multiple confluent erosions (grade III) was observed in 26 (22%) patients. The average length of all (n = 120) diagnosed hernias hiatus was 4.48 ± 0.84 cm, and the average width was 2.89 ± 0.72 cm. The average length of hiatus hernia, in patients with GEMP (n = 24; 20%) was 3.56 ± 0.59 cm, and the average width was 2.32 ± 0.62 cm. In patients without GEMP (n = 96; 80%) the average length of the hiatus hernia was 4.64 ± 0.74 cm, and the average width was 2.98 ± 0.68 cm. Both hiatus hernia length and width differed significantly ($p < 0.001$) between hernias with and without GEMP.

Table 1 presents the frequency of typical and atypical GERD symptoms, associated with GEMP (+) and GEMP (–) hernias. The most common atypical symptom was chest pain.

Table 1. The frequency of typical and atypical GERD symptoms, associated with GEMP (+) and GEMP (–) hernias.

Hernia	GERD (%)	Other symptoms (%)	Total
Hiatal hernia	96 (80)	24 (20)	120
GEMP (–)	75 (78)	21 (22)	96
GEMP (+)	11 (46)	13 (54)	24

GEMP (–) — hiatal hernia without gastroesophageal mucosal prolapse; GEMP (+) — hiatal hernia with gastroesophageal mucosal prolapse.

Discussion

The aim of that study was to assess hernia dimensions in patients with and without GEMP diagnosed during upper digestive tract endoscopy. We hypothesize that designation of specified hiatal hernia dimensions may help endoscopists distinguish between hernias with and without GEMP. Additionally we analyzed the type and prevalence of gastrointestinal symptoms reported by patients to confirm the observation that GEMP symptoms differ from GERD symptoms. We believe that such knowledge may have practical aspect helping the gastroscopist to assess in what situation he should suspect the presence of GEMP.

Hiatal hernia dimensions may be recognized during endoscopy when the apparent separation between the squamocolumnar junction and the diaphragmatic impression is greater than 2 cm [6]. This method however is often described as inaccurate. There is no standardization regarding the degree of air insufflation or at which phase of respiration the measurement should be made. It is also difficult to be certain that the tip of the endoscope is precisely at the Z line or at the diaphragmatic crus. Another approach is possible using the retroflex position — the diameter of the hernia sac's neck cardia corresponds to the hernia hiatus dimension [4, 5, 7]. We chose this method as it is more accurate and easier to implement [8].

A retrospective study carried out by Aramini *et al.* [1] on 516 GERD patients measured revealed the presence of GEMP in 13.5% of patients. Only 29% of patients with a prolapse had a sliding hiatal hernia indicating that the presence or absence of the hernia did not influence the clinical presentation [1]. One can find reports that state that GEMP may occur even without the presence of a hiatal hernia. However, in our study, hiatal hernia always accompanied GEMP.

Our data revealed also that there exists a statistically confirmed size difference between hiatal dimension of hiatal hernias with and without GEMP. Comparison of hiatal hernia dimension in patients with GEMP and without it, suggest that GEMP occurs in smaller hernias. We believe that if the hiatal hernia is broad it does not hinder mucosal movements and the mucosal flap does not incarcerate in the esophageal junction. On the other hand, in our material a prolapse was not generated when a hernia was too small to be diagnosed. To our best knowledge this is the first study to report on hiatal hernia dimensions in relation to GEMP (Fig. 1).

Hernias with gastric prolapse appear to present a variation of the pathological mechanisms associated with sliding hiatal hernias, notably enlargement of the hiatus and esophageal valve dysfunction. However we suspect that enlargement must be limited. Under normal physiological conditions, the gastric mucosal fold and the angle of His create a valve that functions as a protective antireflux mechanism preventing gastric enzymes from entering the esophagus. In some situations the valve itself may protrude into the esophagus. Symptoms of such condition are primarily caused by

mechanical trauma resulting from the fold being constricted in the esophagus, and to a lesser degree by the acid reflux [1, 2, 4, 9]. There is no doubt that sliding hiatal hernia causes GERD. However, there is still no consensus regarding symptoms typical for a hiatal hernia with mucosal prolapse. Most often epigastric and retrosternal pain with a need to belch to decrease or resolve pain were described [1]. Dysphagia and reflux symptoms are also common [1]. In comparison to GERD symptoms, pain experienced by patients with a gastric prolapse was accompanied by a radiating burning sensation running from the stomach to the throat [1]. Some studies report a decrease in the occurrence or intensity of esophagitis suggesting that the protruded gastric mucosa protects the esophagus from excess acid reflux [1, 2]. In this study we have confirmed that in the case of hiatal hernia with GEMP, symptoms of most patients differ from GERD. Those differences are however clinically insignificant, and do not allow to differentiate between hiatal hernias with and without GEMP solely on the base of patient reported symptoms.

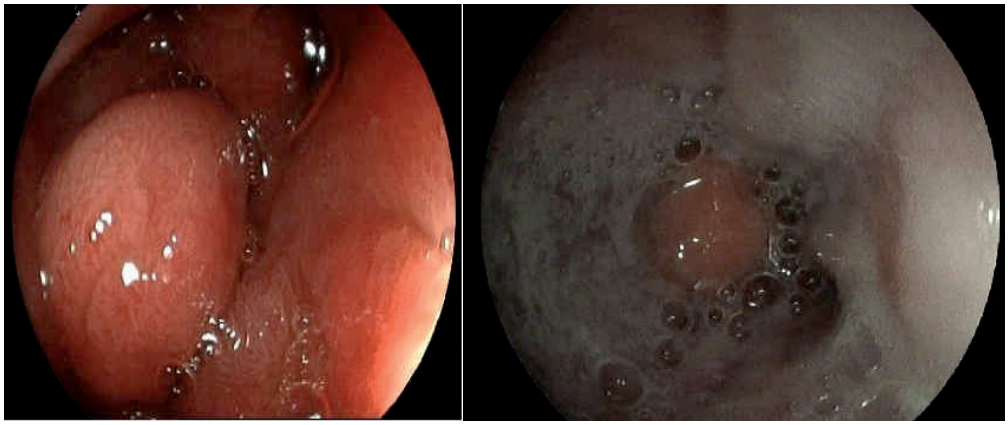

Fig. 1. Picture of mucosal fold prolapse during gastroscopy.

Endoscopic assessment of hiatal hernia has unfortunately also some drawbacks. Those arise from patients response to endoscopy and because of technical conditions of the procedure. Insertion of fiberscope may push the esophagogastric region with the hernia distally in the gastric direction. On the other hand stomach insufflation and air distension may cause hernia broadening push up the mucosa from the hernia. This rises concerns that assessment of hernia dimension based on gastroscopy measurements alone may be inaccurate because it may produce differing results during the course of the examination (Fig. 2). Other factors that may influence hiatal hernia measurements during endoscopy include esophageal peristalsis, intragastric pressure, swallowing of the saliva, and sedoanalgesia [4]. To prevent this from influencing

our results we made sure that during each examination sufficient air insufflation was applied to produce adequate compression during the time the images were acquired.

Further studies are planned to perform prospective observations on a larger patient group to compare symptoms of patients with and without GERD and analyze symptom prevalence according to hiatus hernia dimensions.

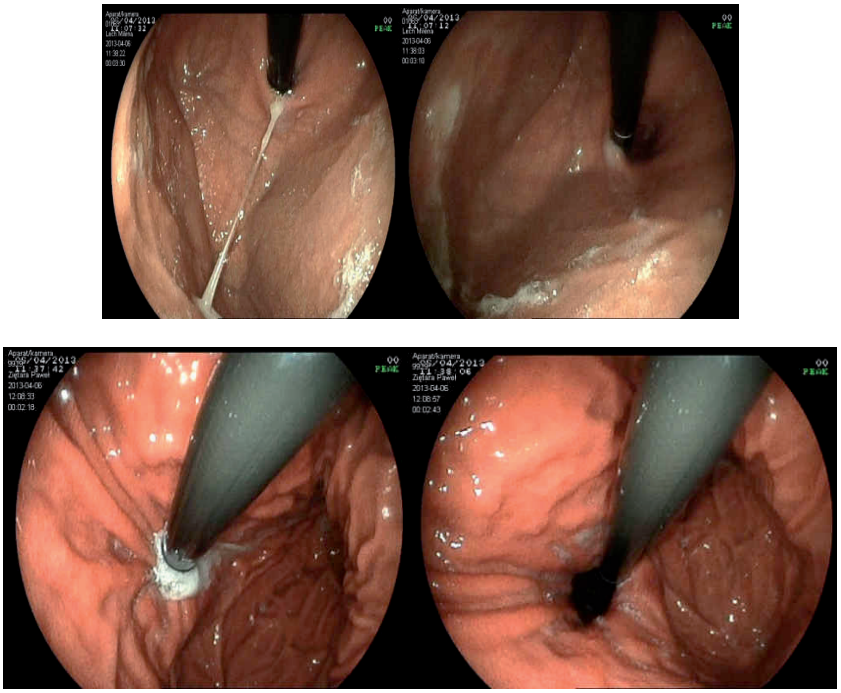

Fig. 2. Hiatal hernia dimensions changes during gastroscopy.

Concluding, basing on the analyzed material, GEMP occurs in smaller sized hiatal hernias. The prolapse was not generated when the hernia was too small or too broad. We confirmed that disease symptoms of the majority of patients with GEMP differ from patient with GERD but without GEMP. However this difference was not significant enough to allow to differentiate between diagnoses based solely on the symptoms.

Conflict of interest

None declared.

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