**THE CONTRIBUTION OF MAGNIFICATION CHROMOENDOSCOPY TO THE DIAGNOSIS OF GASTRIC ATROPHY, INTESTINAL METAPLASIA AND GASTRIC DYSPLASIA**

**INTRODUCTION**

Atrophic gastritis, intestinal metaplasia (IM) and gastric dysplasia are premalignant states whose proper recognition and monitoring leads to a more frequent detection of early gastric cancer.

The aim of the study is to evaluate the contribution of the cromoendoscopy with magnification in diagnosing premalignant gastric lesions.

Patients included in the study are among those who addressed the Clinic of Gastroenterology Mures County Hospital, who underwent upper gastrointestinal endoscopy (EDS) and cromoe ndoscopy with magnification (ECM). We used as statistical methods the chi-square test, considering a value of p <0.05 significance that shows statistical significance of the results.

Examining histopathological findings obtained by biopsy, both EDS and the ECM, we obtained that for corporeal atrophic gastritis there is a statistical significance difference between the 2 methods of investigation detecting premalignant lesions (p = 0.0072). In addition, ECM has proved more effective at revealing both antral IM (p = 0.0325) and corporeal IM (p = 0.028), due to the removal of targeted biopsies from areas captured pit-pattern tube.

**CONCLUSIONS**

Cromoenoscopy with magnification improves the detection of intestinal metaplasia and dysplasia.

Key words: premalignant lesions, white light endoscopy, magnification chromoendoscopy, pit-pattern

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**BACKGROUND:**

Gastric cancer remains one of the main causes of cancer mortality in the world, with significant geographic, ethnic, social and economical variations in its distribution [1].

Gastric cancer is subdivided into two distinct pathological entities, with different characteristics: the diffuse form and the intestinal form. The intestinal form is a many-factor process whose evolution has been mostly clarified [2]. The model in phases of formation of the gastric neoplasm, elaborated mainly by Coreea and its collaborators [3], proves that there is a temporal sequence in the course of premalignat modifications, which can lead, through the combined action of environment and feeding-habits factors, to the development of gastric cancer in its intestinal form. Initially, the inflammation caused by the Helicobacter Pylori infection and the exposure to environmental factors (canned meat, bile secretions, high-salt diet) cause the apparition of the active chronic gastritis. For some of the patients, the repeated aggression of the irritating factors will result in the loss of gastric glandular cells and the installation of atrophic gastritis, and later on of intestinal metaplasia, dysplasia, early gastric cancer and advanced gastric cancer.

Atrophic gastritis, intestinal metaplasia and dysplasia are preneoplasic gastric lesions; their identification and the correct hospitalization of the patient help the well-timed detection of early neoplastic lesions.

The purpose of this work is to evaluate the advantages of the magnification chromoendoscopy in the identification of premalignant gastric lesions.

**OBJECT OF STUDY AND METHOD**

The patients included in this study are people who addressed the Gastroenterology Clinic of the Mures District Hospital for dyspeptic symptoms, who underwent a regular upper GI endoscopy with biopsy sampling and who were diagnosed with neoplastic lesions by histologic evaluation of the gastric biopsy specimens.

Out of these were selected the patients investigated with magnification chromoendoscopy (MEC). The selection criteria for the performance of MEC were the following: the aspect of gastric atrophy observed during the regular endoscopy; the histologic diagnosis of intestinal atrophy and/or metaplasia (resulted from the analysis of the biopsy samples taken during the regular endoscopy). We obtained the informed consent of the patient. This study left out the patients whose medical condition did not allow biopsy or the administration of Propofol for short-term anaesthesia.

Magnification endoscopy is an investigation which allows the examination of the mucosa by magnifying the image. We used an Olympus GIF-Q 160Z endoscope, which offers a 115 times amplification by using a system of mobile lenses and permits the examination of the mucosa’s details (pit-pattern) and of the vascular architecture.

Chromoendoscopy consists in the application onto the gastric mucosa of a pigment: methylene blue or acetic acid. After laying on the surface of the mucosa a mucolitic agent (N-Acetylcysteine), we applied the pigment by spraying through a catheter, 10-20 ml of methylene blue, we waited 3 minutes then we washed it out. This substance is absorbed by the zones with intestinal
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metaplasia, facilitating their identification. The magnifying endoscopic examination showed the modifications of pit-patterns in the mucosa and permitted the extraction of the biopsy samples needed from that area.

The patients’ demographic data have been filed: age, sex, geographic environment, personal and hereditary history (especially the information related to gastric illnesses) and medicine usage (non-steroidal anti-inflammatory drugs, antibiotics and proton pump inhibitors).

We used the chi-square test in order to compare the two methods, attributing top a value lower than 0.05 as statistically significant.

RESULTS

Out of the 34 patients, 20 (58.82%) were male and 14 (41.17%) were female; 27 (79.41%) were living in the city and 7 (20.58%) were living in the countryside. 30 of them were infected with Helicobacter Pylori, as the histopathologic examination revealed.

We analyzed by magnification two different endoscopic aspects regarding the gastric mucosa: the aspect of the orifices of the gastric glands, the architecture of the subepithelial capillary network and of the collecting thin veins in the submucosa. After detecting the zones with modified mucosa by means of regular endoscopy, I analyzed, through magnification, these specific areas and their neighbouring zones. This way I have obtained, for the same patient, several areas with different pit-patterns.

The aspect of atrophic gastritis shown by the magnification endoscopy is characterized by the lack of the subepithelial capillary network and the visibility of the collecting thin veins in the submucosa. The zones affected by intestinal metaplasia capture the methylene blue, and after removing the excessive pigment, the absorbing zones are clearly delimited. The modifications of the microvessels and the variations in their caliber, as well as the detection of an irregular pi-pattern correspond to areas of mucosa with dysplasia. In some cases the premalignant lesions have been identified (intestinal metaplasia and gastric atrophy) and in other cases they have been revealed by means of the histological examination of biopsies made with concomitant lesions (atrophy, intestinal metaplasia, dysplasia) at the same patient.

In the conventional endoscopy of the 34 examined patients we have detected atrophic gastritis with different topographic localizations. 83 biopsies have been taken with an average of 4.79 biopsies on patient. Finally the histological analysis pointed out the following lesions: 33 cases (97.05%) of atrophic gastritis, 24 cases (70.58%) with antrum localization and 27 cases (79.41%) with corpus localization. Among these, 16 patients (47.05%) were diagnosed with pangastritis and intestinal metaplasia has been detected in 25 (73.25%) patients on antrum level and in 29 patients (85.29%) on corpus level.

As regarding the atrophic gastritis, the histopathological results obtained after EDS and CEM have been concordant in 21 cases on the antrum level and in 20 cases on the corpus level. CEM revealed 3 more cases of antrum GA and 7 cases of corpus GA, resulting that on the corpus level there is a statistically significant difference of premalignant lesions detection (p=0.0072) between the 2 methods of research. (Figure 1)

In intestinal metaplasia (IM) on antrum level the 2 investigations have been concordant in 14 cases and in 10 cases the intestinal metaplasia has been revealed only in CEM (p=0.0325). On the corpus level the IM revealed more concordant, in 15 cases the intestinal metaplasia has been revealed only on CEM and in 2 cases the IM has been revealed in EDS without being found within the results of the biopsies taken in CEM. However CEM proved to be more efficient in revealing IM on the antrum level (p=0.0325) as well as on the corpus level (p=0.028), due to the taking of sample aimed biopsies from the areas captured with tubular pit-pattern (Figure 2).

This study revealed only one case of soft dysplasia, in a biopsy taken by CEM.

DISCUSSIONS:

The detection of gastric cancer in an early phase leads to a better prognosis for patients [4]. Therefore the identification and determination of a supervision system for gastric preneoplastic lesions is important. Since the gastric premalignant lesions are multifocal and may arise within the apparently normal mucosa, the identification of such lesions is not easy using conventional methods. The superior digestive endoscopy mostly identifies the atrophic gastritis but does not reveal the other 2 malignant lesions: the intestinal metaplasia and dysplasia. The same difficulties are also encountered if the gastric mucosa must be mapped in order to determine the extension of the lesions [5,6]. This is why CEM has been proposed as a useful method for the detection and supervision of gastric premalignant lesions [1].

The normal aspect of the gastric mucosa revealed in the magnification chroendoendoscopy has been described for the first time by Yagi [7] and Yao [8], and the modifications occurred in intestinal metaplasia and dysplasia have been described by Dinis-Ribeiro et al. [9].
Chromoendoscopy is a pretty simple technique using methylene blue in order to point out the modifications of the gastric mucosa. These modifications examined with magnification enable us to take samples of biopsies from the respective areas and to establish a histopathologic diagnosis as correctly as possible. In a study published in 2009, Tagliavi et al., performed on 33 patients shows the fact that chromoendoscopy is obviously superior to EDS in diagnosing the IM [10].

Areia M et al. in Gastrointest Endosc in the year 2008 presents the results of a prospective study performed on 42 patients concluding that CEM presents in the detection of IM a sensitivity of 76% and a specificity of 89%, and for the detection of dysplasia a sensitivity of 100% and a specificity of 99%. [2].

In 2007, Anagnostopoulos GK et al presented the results of a study performed on 95 patients, which proved that for the detection of corpus atrophy the sensitivity of CEM is of 90% and the specificity of 96% [11].

CONCLUSIONS:
The white light endoscopy cannot diagnose and differentiate these 3 premalignant lesions: atrophic gastritis, intestinal metaplasia and dysplasia.
The magnification chromoendoscopy improves the detection of intestinal metaplasia and dysplasia.

This endoscopic method allows the reveal of various areas with modified irregular pitt-pattern and the taking of samples of aimed biopsies.

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Reference

2. SLEISENGER and FORTRAN'S -Gastrointestinal and Liver Disease, 8th Ed. Saunders, An Imprint of Elsevier:1139-1146; 2006;
8. YAO, K., OISHI, T.-Microgastroscopic findings of mucosal microvascular architecture as visualized by magnifying endoscopy. Digestive Endoscopy; 13: S27-33; 2001;
11. 1ANAGNOSTOPOULOS, G.K., YAO, K., KAYE, P., et al.-High-resolution magnification