SJIF Impact Factor: 6.711

WORLD JOURNAL OF ADVANCE HEALTHCARE RESEARCH

ISSN: 2457-0400
Volume: 9.
Issue: 5
Page N. 206-220
Year: 2025

Original Article www.wjahr.com

ENDOSCOPIC AND HISTOPATHOLOGIC FINDINGS IN ADULT PATIENTS ATTENDING GASTROENTEROLOGY CENTER IN RIZGARY TEACHING HOSPITAL - ERBIL, IRAQ

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Article Received date: 17 March 2024 **Article Revised date:** 07 April 2024 **Article Accepted date:** 27 April 2025

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ABSTRACT

Background: Esophagogastroduodenoscopy is one of the most commonly performed endoscopic procedures., it provides valuable information in patients with upper gastrointestinal conditions. **Aim of the study:** To explore the results of Endoscopy and histopathology of adult patients in relation to their clinical findings. **Subjects and methods:** A cross-sectional study using retrospective data was conducted on 200 patients attending gastroenterology center in Rizgary Teaching Hospital in Erbil City/Iraq for the period from 1st of February 2024 to the 30th of June 2024. The data of the formal record of every patient was utilized related to their sociodemographic characteristics and their clinical presentations. The results of endoscopy reports gave the provisional diagnosis while the results of histopathology considered the final diagnosis for the included patients. **Results:** In this study, the most common clinical presentation was epigastric pain, anemia and dyspepsia (77.5%, 43% and 39% respectively). The most frequent diagnosis revealed by Esophagogastroduodenoscopy was gastropathy/gastritis in nearly half of the patients, followed by gastric ulcer (20.5%), and Gastroesophageal reflux disease (17.5%). Results of histopathology showed the most frequent diagnosis was gastric ulcer (34.5%), followed by duodenal ulcer (28.5%) and gastropathy/gastritis (19%). Concerning the diagnostic performance of Esophagogastroduodenoscopy; the sensitivity ranged from 42.1% in duodenal ulcer to 100% in GERD, as regards to its specificity, it ranged from 55.6% in gastropathy/gastritis to 100% in malignancy and duodenal ulcer. **Conclusions:** Epigastric pain, anemia and dyspepsia, were the most frequent clinical presentation of patients referred for Esophagogastroduodenoscopy. It`s sensitivity found to be 100% in diagnosing patients with Gastroesophageal reflux disease while its specificity was 100% in diagnosing malignancy and duodenal ulcer.

KEYWORDS: Esophagogastroduodenoscopy, Histopathology, Clinical presentation, Sensitivity, Specificity.

1. NTRODUCTION

1.1 Background

Esophagogastroduodenoscopy (EGD) is one of the most commonly performed endoscopic procedures. When carried out correctly, it offers patients with upper gastrointestinal (GI) disorders important information.[1] Kussmaul is generally credited with the first gastroscopy in 1868. Although unrecognized at the time, the illumination problem was solved around 1878 by Thomas Edison, but 25 years elapsed before the incandescent lamp was incorporated into endoscopes.[2]

Endoscopes extend the eyes of the physician into the patient's body. They are widely used in gastrointestinal (GI) diagnostics and minimally invasive surgery. Endoscopes can be classified into **3 types:** rigid, flexible, and capsule endoscopes. Rigid and flexible endoscopes are traditionally held and manipulated by the physician to visualize the region of interest, while capsule endoscopes move passively along with the GI peristalsis.[3]

The Upper GI flexible fiberoptic endoscope was first used in 1968 and proved a major breakthrough in the diagnosis of esophago-gastro-duodenal lesions and the histological confirmation of biopsy as most purposeful tool in definitive diagnosis.[4]

The procedure known as esophagogastroduodenoscopy involves utilizing a flexible, illuminated fiberoptic

endoscope or videoscope to visually inspect the upper gastrointestinal system. The mouth is the starting point of the upper gastrointestinal system, which also includes the esophagus, stomach in the shape of a J, and duodenum.[5]

A flexible bundle of glass fibers in the original pure fiber optic device collects the lit picture at one end and transfers it to the eye piece.[6]

The end of the more recent video endoscopes is equipped with a small, optically sensitive computer chip. After that, electrical signals are sent up the scope to the computer, which projects the image onto a big video screen. These scopes have an open tube that can be used to pass other tools through to collect tissue samples, remove polyps, and carry out other examinations.[7]

Typically, esophagogastroduodenoscopy (EGD) is done as an outpatient procedure. It is carried out for therapeutic or diagnostic purposes. A liquid or spray is frequently used to anesthetize the throat. The usual purpose of intravenous sedation is to calm the patient and induce temporary amnesia.[8] The examination is performed without the need for intravenous drugs in certain patients who are able to relax and whose gag reflex is under control. After that, the endoscope is carefully placed inside the upper esophagus. If necessary, additional instruments can be inserted through the endoscope to carry out tasks including removing a polyp or tumor and obtaining a biopsy specimen.[9]

While most EGD side effects are minor, there is occasionally a brief, moderate throat irritation that lasts after the examination. the serious risks are quite rare. One such instance is severe bleeding, particularly after removing a sizable polyp or while under the influence of anesthetic. Others are tears or perforations. Rarely, a diagnostic mistake or oversight could take place.[10]

1.2 Anatomical considerations

1.2.1 The esophagus

The esophagus is located posterior to the trachea and begins distal to the cricoid cartilage and ends at the cardiac orifice of the stomach. It ranges in diameter from 4 to 6 mm and in length from 9 to 10 cm in the term infant to approximately 25 cm in the adult. The change in the mucosa color from pale- to reddish-pink marks the transition from the esophagus and gastric epithelium (Z line).[11]

1.2.2 The stomach

The stomach is usually located beneath the diaphragm and is approximately 40 cm distal to the incisors in an adult. The area of the stomach where the esophagus enters is known as gastric cardia. The portion of the stomach above the junction of the esophagus and stomach is known as fundus. It is visible in a retroflexed endoscopic view. The majority of the stomach is known as stomach body. Along the lesser curvature of the stomach is the incisura which divides the gastric body from the antrum. Endoscopically, the transition from the body to the antrum is from rugae to flat mucosa. The pylorus is the muscular opening between the lower end of the stomach and duodenum bulb.[12]

1.2.3 The duodenum

The duodenum extends from the pylorus to the duodenojejunal angle. The duodenum bulb is an expanded region immediately distal to the pylorus. The duodenum then forms a C-shaped loop and endoscopically turns posteriorly and to the right for 2.5 cm, then inferiorly for 7.5 to 10 cm (descending portion), then anteriorly and to the left for approximately 2.5 cm, and finally connects to the jejunum at the level of ligament of Treitz.[13]

1.3 Rationale of the study

Symptoms of chronic upper abdominal pain or dyspepsia are common and many of these problems can be managed clinically while some of them need EGD or histopathological study to reach the final diagnosis.

This research is conducted to clarify how we can correlate the clinical findings of patients with upper abdominal complain with what could be detected in EGD and the results of biopsy. Since this subject was not done previously in Erbil city or just few researches were conducted in Iraq thus raise the need to achieve such a study.

1.4 Aim of the study

To explore the endoscopic and histopathological results of adult patients attending Gastroenterology center in relation to their clinical presentations.

Specific objectives of the study

1. To list the most common clinical complain of adult patients referred for EGD.
2. To identify the diagnostic results of EGD and that of histopathology of the included patients
3. To explore the EGD and histopathological results in relation to the sociodemographic characteristics of the studied patients.
4. To estimate the sensitivity, specificity, PPV and NPV of EGD in diagnosing different gastric health problems

2. Review of literature

(EGD) is a diagnostic endoscopic procedure that includes visualization of the oropharynx, esophagus, stomach, and proximal duodenum. It is one of the most common procedures that a gastroenterologist performs.[5] If properly performed, it is generally a safe and well-tolerated procedure.[14,15]

2.1 Preparation before esophagogastroduodenoscopy

Routine endoscopy in children and adults is usually performed in an outpatient setting using parenteral or general anesthesia. Occasionally, endoscopy is necessary at the hospital bedside or in an operating

room.[16]

2.1.1 Diet

Preparation for elective upper endoscopy procedure involves a period of fasting. As per American Society for Anesthesiologists (ASA) guidelines, patients should fast a minimum of 2 hours after ingestion of clear liquids and 6 hours after ingestion of light meals. In emergency situations or in conditions where gastric emptying is impaired, the potential for pulmonary aspiration of gastric contents must be considered to determine: (1) level of sedation, (2) whether endotracheal intubation should be considered to protect the airway or (3) whether the procedure should be delayed.[17]

2.1.2 Medications

Most medications can be continued and are usually taken with a small sip of water before endoscopy, although diabetes medications need to be adjusted due to the period of fasting before the procedure. American Society for Gastrointestinal Endoscopy (ASGE) guidelines should be followed for decisions regarding the management of anti-thrombotic agents or for the use of antibiotic prophylaxis in at-risk patients before the endoscopy.[18]

2.1.3 Sedation and Monitoring

Sedation is used in most patients not only to minimize discomfort but also to provide amnesia for the procedure. All patients undergoing upper endoscopy require pre-procedural evaluation to assess their risk for sedation and to manage potential problems related to pre-existing health conditions.[18] The choice of sedation varies from conscious sedation delivered by the proceduralist or monitored anesthesia care provided by an anesthesiologist, and preferences for one type of sedation over another are largely based on training and available local resources.[19]

For routine upper endoscopy, many endoscopists utilize intravenous sedation using propofol. For therapeutic endoscopic procedures such as foreign body removal or in patients in whom cooperation is not anticipated, including very young patients, general anesthesia may be required. ASGE guidelines recommend routine monitoring of vital signs in addition to clinical observation for changes in cardiopulmonary status during all endoscopic procedures performed under sedation.[20]

2.1.4 Informed consent

Patients, parents, or legal guardians should provide informed consents before the EGD and for the administration of sedation.[21]

2.2 Technique of esophagogastroduodenoscopy

2.2.1 Handling the endoscope

The endoscope is mostly held in the left hand. The control section of the endoscope should rest comfortably in the palm of the left hand. The thumb controls up or down movement of the tip of the endoscope using a large wheel. The index finger and, at times, the middle finger control the suction, air, and water valves. The right hand is used to advance and withdraw the endoscope and its axial rotation. The right hand is also used to insert instruments such as biopsy forceps, cytology brushes, needles for injection, hemostatic clips, polypectomy snares, foreign body retrieval instruments, and syringes for irrigation via the biopsy channel.[22]

2.2.2 Esophageal intubation

For EGD, patients are typically placed in left lateral decubitus with neck flexed forward. A bite block is placed in the mouth before the endoscope is inserted into the oral cavity. The endoscope is introduced into the mouth and to the base of the tongue under direct visualization. The tip of the scope is then gently angulated downward until the vocal cords, epiglottis, both piriform sinuses, and cricoarytenoid cartilages are visualized. The scope is then passed behind and to the right of the arytenoid cartilage towards the upper esophageal sphincter. The upper esophageal sphincter is passed under direct visualization, often with application of gentle pressure while insufflating air.[23]

2.2.3 Esophagus and Esophagogastric junction intubation

After intubating the esophagus, the scope is advanced down the esophagus lumen while simultaneously examining the mucosa for any inflammation, ulcerations, furrowing, varices, narrowing or strictures. The location of the esophagogastric junction should be noted. The squamocolumnar junction, also referred as Z-line, is the area where the squamous epithelial lining of the esophagus (pale pink colored) meets the columnar lining mucosa of the stomach (salmon-colored). The level of the Z-line should also be noted. If the Z-line is displaced proximal to the gastroesophageal junction, biopsies should be taken to evaluate for Barrett esophagus.[24]

2.2.4 Stomach intubation

The stomach is entered after passing the esophagogastric junction. Once the stomach is entered, any residual gastric secretions should be suctioned, and air is insufflated to improve visualization. The endoscope is then advanced while torquing to the right. The endoscope is advanced along the lesser curvature towards the pylorus, but to fill the greater curvature with the endoscope is usually necessary before the cannulation of the pyloric canal. The pylorus is a small opening with radiating folds around it. To pass through the pylorus, the endoscope is positioned in front of the pylorus, and a little air and gentle pressure should be applied against the orifice.[25]

2.2.5 Duodenum intubation

After passing through the pylorus, the endoscope enters the duodenum bulb. The duodenum bulb should be examined on endoscope insertion rather than during withdrawal as passage of the instrument can cause possible mucosal changes. After all, four quadrants of the

bulb are inspected the scope is advanced to the posterior aspect of the bulb; here the duodenum turns right sharply and takes downward turn. To pass the superior flexure of the duodenum and enter the second part of the duodenum, the instrument is advanced using the dials and shaft torque, usually down and to the right followed by an upward spin of the dial. The superior flexure of the duodenum is often passed blindly and examined on the way back.[22]

The lower part of the second portion of the duodenum is reached by straightening the endoscope, in other words, pulling the endoscope slowly backward while maintaining the view of the lumen. This maneuver reduces the loop along the greater curvature of the stomach and, paradoxically, advances the endoscope into the distal duodenum. The duodenum distal to the bulb has distinctive circular rings called valvulae conniventes. The ampulla of Vater is found in the second portion of the duodenum and examined while withdrawing the endoscope.[22]

After careful examination of the duodenum, pylorus, and antrum, the endoscope is retroflexed to visualize the gastric cardia and fundus. The endoscope is then returned to a neutral position. Once the stomach has been fully inspected, and biopsies, if necessary, are obtained, the endoscope is then withdrawn. Before leaving the stomach, air should be suctioned. The esophagus is again examined on withdrawal of the endoscope. The average duration of a diagnostic EGD is 5 to 10 minutes under optimal sedation conditions.[22]

Tissue sampling is obtained from suspicious lesions during EGD, although many gastroenterologists perform routine biopsies from designated sites, as a clinically significant disease may be present in an apparently normal looking mucosa. Specimens obtained include biopsies, brushings of mucosal surface, and polypectomy. Specimens are sent for histological, cytological, or microbiologic analysis based upon the type of the sample and clinical situation.[26]

2.3 Complications of EGD

Complications following EGD are rare, occurring in less than 2% of patients.[27] These could be related to sedation, endoscopy, and complications related to diagnostic or therapeutic maneuvers. The most frequent and serious complications of sedation are cardiopulmonary.[28]

Adverse events from over sedation include hypoxemia, hypoventilation, hypotension, airway obstruction, arrhythmias, and aspiration. The complications following diagnostic EGD include infection, bleeding, duodenal hematoma, and bowel perforation.[29] The risk of bleeding following EGD with biopsy is 0.3%. Post mucosal biopsy bleeding can occur as intraluminal hemorrhage or intraluminal hematoma.[30]

A duodenal hematoma is a rare complication of EGD with an unknown incidence and seems to occur more often in children than adults.[31] Bowel perforation occurs in less than 0.3% of cases, and infection is rarely reported. Complications typically are identified in the first 24 hours after the procedure.[32] Bleeding presents with hematemesis or bloody output from the gastrostomy tube.[30]

Perforation is identified due to fever, tachycardia, abdominal pain or discomfort. An abdominal x-ray should be done to reveal extra-luminal air. Conservative therapy with bowel rest and antibiotics is the typical treatment, although some patients might require surgical repair.[32,33]

2.4 Clinical indications of esophagogastroduodenoscopy

Upper gastrointestinal endoscopy is indicated for a number of diagnostic, screening and therapeutic purposes.[7]

Diagnostic Indications for EGD include evaluation for signs or symptoms suggestive of upper gastrointestinal (GI) disease (such as dyspepsia, dysphagia, noncardiac chest pain, or recurrent emesis).[34] evaluation of persistent symptoms such as persistent heartburn, difficulty swallowing, nausea, vomiting, abdominal pain, or unexplained weight loss.[35]

Moreover, EGD can be of great value in exploring the underlying cause and extent of upper gastrointestinal bleeding, ulcers, or inflammation.

EGD is also used in diagnosis and monitoring of common conditions other than gastritis and peptic ulcers including celiac disease.[36]

Meanwhile indications for EGD include several perspectives, it can be used for screening for silent lesions such esophageal cancer in patients with chronic acid reflux or surveillance for upper GI cancer in high-risk settings such as Barrett esophagus or polyposis syndromes, selected cases of portal hypertension for the screening of varices.[34,35]

Moreover EGD is valuable in extracting biopsy of suspicious areas for further analysis and diagnosis.[37] Biopsy for suspected upper GI disease (such as malabsorption syndromes, neoplasms, or infections).[34]

Furthermore upper gastrointestinal endoscopy is indicated for a number of therapeutic purposes including therapeutic intervention (such as retrieval of foreign bodies, control of hemorrhage, dilatation or stenting of stricture, ablation of neoplasms, or gastrostomy placement).[7,34] In case of suspicions masses in the upper gastrointestinal tract, EGD can help in detection and removal of polyps, tumors, or abnormal growths in the upper digestive tract.[37]

We can summarize indication of EGD as diagnostic or therapeutic as follows;

2.4.1 Diagnostic indications of EGD[27]

- Persistent upper abdominal pain or pain associated with alarming symptoms such as weight loss or anorexia.
- Dysphagia, odynophagia or feeding problems.
- Intractable or chronic symptoms of GERD.
- Unexplained irritability in a child.
- Persistent vomiting of unknown etiology or hematemesis.
- Iron deficiency anemia with presumed chronic blood loss when clinically an upper gastrointestinal (GI) source is suspected or when colonoscopy is normal.
- Chronic diarrhea or malabsorption.
- Assessment of acute injury after caustic ingestion.
- Surveillance for malignancy in patients with premalignant conditions such as polyposis syndromes, previous caustic ingestion, or Barrett esophagus.

2.4.2 Therapeutic indications of EGD[38]

- Foreign body removal.
- Dilation or stenting of strictures.
- Esophageal variceal ligation.
- Upper GI bleeding control.
- Placement of feeding or draining tubes.
- Management of achalasia (Botulinum toxin or balloon dilation).

2.5 Contraindications of esophagogastroduodenoscopy[27]

2.5.1 Absolute Contraindications of EGD.

- Perforated bowel.
- Peritonitis.
- Toxic megacolon in an unstable patient.

2.5.2 Relative Contraindications of EGD

- Severe neutropenia.
- Coagulopathy.
- Severe thrombocytopenia or impaired platelet function.
- Increased risk of perforation including connective tissue disorders, recent bowel surgery or bowel obstruction.
- Aneurysm of the abdominal and iliac aorta.

2.6 Esophagogastroduodenoscopy results evaluation

Esophagogastroduodenoscopy has become a key element in the diagnosis of esophageal, gastric, and small-bowel disorders. Beside the evaluation of dysphagia, GI bleeding, peptic ulcer disease, medically refractory GERD, esophageal strictures, celiac disease, and unexplained diarrhea.[16]

Esophagogastroduodenoscopy is more sensitive and specific than radiography examinations in diagnosing diseases such as inflammations, ulcers, and neoplasms. According to studies, extended inspection times during EGD lead to increased identification rates of high-risk stomach lesions.[16]

The most common findings of EGD include gastritis, esophagitis, gastric ulcer, duodenal ulcer, biliary gastritis, gastric mass. Normal findings were also seen in varying percentages in different studies done.[39]

Esophagogastroduodenoscopy (EGD) is the most sensitive method for early detection of gastric cancer.[40]

Several studies done in Korea and Japan have demonstrated the effectiveness of endoscopy screening with a 30% reduction in gastric cancer mortality as a result of cancer detection attributed to endoscopy screening.[41]

Meanwhile early cancer and some lesions are often subtle and are rarely recognized during EGD examination. Several studies have estimated that a significant minority of esophageal and gastric cancers are missed by endoscopy.[42]

Establishing causes of upper GIT diseases leads to more efficient treatment and consequently decreases morbidity and mortality rates.[43]

2.7 Histopathological evaluation

Histopathological evaluation involves the examination of tissue samples obtained during an EGD procedure under a microscope to identify any abnormal cellular changes, inflammation, infection, or evidence of disease.[44]

To facilitate diagnosis of different lesions, endoscopy and histology are complementary. Endoscopic biopsies are performed not only for the diagnosis of the disease but also for monitoring its course, determining its extent and responses to therapy and for early detection of complications. Upper gastrointestinal tract is a common site for neoplasms, especially malignant tumors. Worldwide, gastric adenocarcinoma is the second most common cancer.[45]

During endoscopy, if biopsy is required; then it can be taken and tissue diagnosis can be successfully done from sites that were previously inaccessible without major resection. Endoscopic biopsy not only used to diagnose disease but also used for monitoring the course, extent of disease, response of the therapy, and early detection of complications. This is reflected by rising trend in obtaining mucosal biopsies from UGIT.[46]

The histopathology report from an EGD procedure may provide valuable information about various conditions affecting the esophagus, stomach, and duodenum. Common findings in EGD histopathology reports include:

1. Inflammation: presence of inflammation in the lining of the esophagus (esophagitis), stomach (gastritis), or duodenum (duodenitis) may indicate conditions like gastritis, gastroesophageal reflux disease (GERD), or infection (e.g., H. pylori).[47]

2. Ulcers: identification of ulcers in the esophagus, stomach, or duodenum may indicate peptic ulcer disease, stress ulcers, or other conditions leading to mucosal damage.[48]
3. Polyps: detection of polyps in the gastrointestinal tract may be indicative of benign growths, hyperplastic polyps, or in some cases, precancerous or cancerous lesions[48]
4. Barrett's esophagus: presence of specialized intestinal metaplasia in the lining of the esophagus may suggest Barrett's esophagus, a condition associated with an increased risk of esophageal cancer.[49]
5. Dysplasia or malignancy: identification of dysplastic cells or cancer cells in the tissue samples may indicate the presence of precancerous or cancerous lesions in the upper digestive tract.[50]

Interpreting the histopathology findings from an EGD procedure requires expertise from a pathologist who can provide a detailed analysis and diagnosis based on the specific cellular changes observed in the tissue samples. This information is crucial for guiding further management and treatment of gastrointestinal conditions.[44]

Importance of Esophagogastroduodenoscopy in clinical settings

Several previous studies reported the significance of ESD in diagnosis of upper gastrointestinal disorders. Barret et al., (2021)[51] conducted a prospective study on the diagnostic yield of upper gastrointestinal endoscopy in France. The study included 1770 EGDs of which 896 (32.8%) EGDs were normal. Hiatal hernia and esophagitis were the most frequent esophageal diagnoses, in 496 (18.1%) and 374 (13.7%) cases, respectively. Barrett's esophagus was diagnosed in 109 (4%) patients. Among gastric lesions, endoscopic gastritis was reported in 572(20.9%) patients, ulcer, polyps, and suspected malignancy in 78 (2.9%), 62 (2.3%), and 19 (0.7%), respectively. 1597 (58.4%) EGDs included mucosal biopsies, and 141 (5.1%) were associated with a therapeutic procedure.

Another study was conducted by Bin-Gadeem et al., (2020)[39] in Yemen who described the clinical presentation of patients, endoscopic findings and interventions. The authors aimed also to analyze the endoscopic findings of the most common clinical presentation. A total of 350 EGD reports were evaluated. The most common indication for EGD was epigastric pain and the most common endoscopic finding was gastritis. Of all endoscopic examinations, 8.6% were performed in malignancies with different sites and stages.

Furthermore, Duah et al., (2022)[43] documented the indications and endoscopic findings of patients undergoing EGD at the regional hospital in Ghana. Indications and findings of 571 patients who had undergone EGD were included. Dyspepsia was the commonest indication, occurring in 399 (69.88%) patients. The commonest endoscopic diagnosis was gastritis, which occurred in 408 (71.45%) patients. Amongst the 399 dyspeptic patients, gastritis was the commonest finding in 315 (78.95%) followed by duodenitis in 264 (66.17%). The commonest cause of upper gastrointestinal bleeding was found to be gastritis (29.50%).

3. Subjects and Methods

3.1 Study design

A cross-sectional study using retrospective data.

3.2 Study Setting and Duration

This study was carried out at gastroenterology center in Rizgary teaching hospital in Erbil City/ Iraq for the period from 1st of February 2024 to 30th of June 2024.

3.3 Study sample

A convenient sample of 200 adult patients aged ≥ 18 years of both sexes who referred to gastroenterology center for diagnostic EGD during the last 10 months were recruited.

3.4 Inclusion criteria

Patients with complete records including their sociodemographic data, clinical presentation, results of EGD and that of histopathology.

3.5 Exclusion criteria

Patients referred for therapeutic EGD or for follow up

3.6 Ethical considerations

Formal approvals were obtained from scientific committee of Arab board of health & specializations (appendix I). Then an official permission was obtained from the directorate of health of Erbil and from Rizgary teaching hospital. permission from the manager of gastroenterology center to use the electronic records of the recruited patients was also obtained after giving commitment that assure the anonymity and confidentiality of the utilized data so as not to be used only for scientific purposes.

3.7 Data collection

3.7.1 Source of data

The formal health records (appendix II) that already completed by the medical staff of the center for every patient and saved electronically in specific computer were utilized. The reports of the results of both the EGD and histopathology of the specimens taken during EGD that documented and saved electronically had been also used in this study.

3.7.2 Methodology

- The data of the formal record (Appendix 2) of every patient covers the sociodemographic characteristics including age, sex, and smoking status beside it cover the details of clinical presentation related to

upper abdominal problems that considered the indication for referral for EGD.

- The results of EGD reports were reviewed and accordingly the provisional diagnosis for every patient was determined.
- The final diagnosis of different gastric health problems was reached according to the results of histopathology.
- The performance of endoscopy (sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV)) in diagnosing different gastric health problems were assessed in relation to the results of histopathology being the gold standard test.

3.8 Statistical analysis

Data were managed and analyzed using SPSS (Statistical Package for Social Science) version 27 (IBM, Illinois, USA). All data were presented as frequencies, and proportions. Chi-square test is used to assess the significancy of associations. P value of 0.05 considered the level of significancy in this study.

Calculation of sensitivity, specificity, PPV and NPV was done according to the following equations:

Sensitivity = true positive / true positive + false negative

Specificity = true negative / true negative + false positive

PPV = true positive / true positive + false positive

NPV = true negative / true negative + false negative

4. RESULTS

4.1 Sociodemographic characteristics

The current study included 200 patients admitted for EGD (table 1). Patients included were males 94 (47%) and females 106 (53%), 77(38.5%) aged (26 – 45) years, 66 (33%) aged (46 – 65) years and 40 (20%) aged> 65 years, moreover 74 (37%) were smokers.

Table 1: Sociodemographic characteristics of the studied sample.

		No	%
Age	18 – 25 years	17	8.5
	26 – 45	77	38.5
	46 – 65	66	33
	> 65	40	20
Gender	Male	94	47
	Female	106	53
Smoking	Smoker	74	37
	Non-smoker	126	63

4.2 Clinical presentation

The most common clinical presentation (table 2) was epigastric pain, anemia and dyspepsia (77.5%, 43% and 39% respectively). This was followed by anorexia, melena, acid reflux and bloating (27%, 26.5%, 26% and 21.5%) respectively, while weight loss represent 19%.

Table 2: Clinical presentation of the studied sample.

Variables		No	%
Pain	Epigastric	155	77.5
	Abdominal	29	16
	Chest	16	8
Anemia		86	43
Dyspepsia		78	39
Anorexia		54	27
Melena		53	26.5
Acid reflux		52	26
Bloating		43	21.5
Weight loss		38	19
Dysphagia		26	13
Vomiting		23	11.5
Persistence dry cough		16	8
Hematemesis		14	7
Nausea		15	7.5
Diarrhea		7	3.5
Constipation		5	2.5

4.3 Diagnostic results

The most frequent diagnosis revealed by endoscopy (EGD) as shown in (Figure 1) was gastropathy 103 (51.5%), followed by gastric ulcer 41(20.5%), GERD 35 (17.5%), duodenal ulcer 24 (12%/) and malignancy 8 (4%).

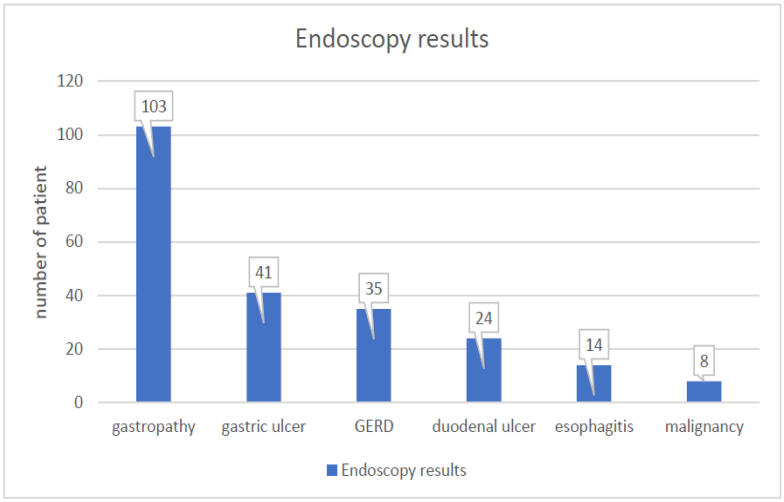

Figure 1: Diagnostic results of endoscopy EGD of the studied sample.

On the other hand the results of histopathology (Figure 2) of the specimens obtained by EGD showed that the most frequent diagnosis was gastric ulcer 69 (34.5%), followed by duodenal ulcer 57 (28.5%), gastropathy 38 (19%), GERD 21 (10.5%), malignancy 17 (8.5%) and esophagitis 13(6.5%)

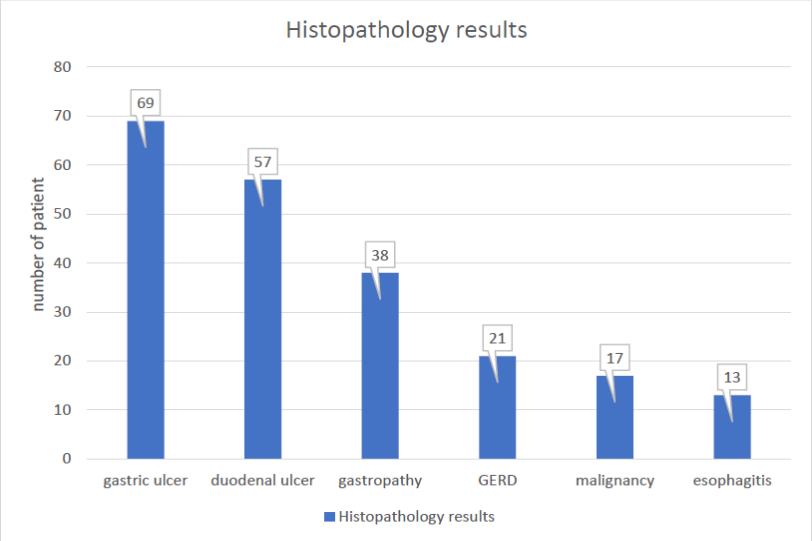

Figure 2: Results of histopathology of the studied sample.

4.4 Associations

Table 3 showed the association between sociodemographic characteristics of the study sample and the results of endoscopy and revealed significant association (p value 0.023) between age and malignancy as 5(62.5%) patients aged more than 65 years out of 8 (100%) were diagnosed to have malignancy, while 57.1% and 54.2% of patients diagnosed to have esophagitis and duodenal ulcer were belong to the age group 26-45 years. Moreover, there was significant association (p value 0.013) between gender and duodenal ulcer as 17 (70.8%) out of 24 (100%) of patients diagnosed to have duodenal ulcer were male. On the other hand, no significant association had been found between smoking and the results of endoscopy.

Table 3: Association between sociodemographic Characteristics and Diagnostic result of endoscopy.

		Gastric ulcer	GERD	Duodenal ulcer	Esophagitis	Malignancy	Gastropathy
Age (years)	**18–25**	6(14.6%)	4(11.4%)	0 (0%)	0 (0%)	0 (0%)	8 (7.8%)
	26-45	13(31.8%)	10(28.6%)	13(54.2%)	8 (57.1%)	2 (25%)	38 (36.9%)
	46-65	11(26.8%)	15(42.9%)	4 (16.6%)	5 (35.8%)	1 (12.5%)	41 (39.8%)
	> 65	11(26.8%)	6(17.1%)	7 (29.2%)	1 (7.1%)	5 (62.5%)	16 (15.5%)
P value		0.213	0.359	0.068	0.271	**0.023**	0.093

Total		**41(100%)**	**35(100%)**	**24 (100%)**	**14 (100%)**	**8 (100%)**	**103 (100%)**
Gender	**Male**	19(46.3%)	18(51.4%)	17(70.8%)	10 (71.4%)	5 (62.5%)	41 (39.8%)
	Female	22(53.7%)	17(48.6%)	7 (29.2%)	4 (28.6%)	3 (37.5%)	62 (60.2%)
P value		0.925	0.690	**0.013**	0.058	0.370	0.072
Total		**41(100%)**	**35(100%)**	**24 (100%)**	**14 (100%)**	**8 (100%)**	**103 (100%)**
Smoking	**Smoker**	14(34.1%)	11(30.6%)	12 (50%)	7 (50%)	2 (25%)	38 (36.9%)
	Non-smoker	27(65.9%)	25(69.4%)	12 (50%)	7 (50%)	6 (75%)	65 (63.1%)
P value		0.671	0.376	0.160	0.296	0.473	0.803
Total		**41(100%)**	**35(100%)**	**24 (100%)**	**14 (100%)**	**8 (100%)**	**103 (100%)**

Table 4 showed the association between sociodemographic characteristics of the study sample and the results of histopathology and revealed significant association (p value 0.005) between age and malignancy as 9 (52.9%) patients aged more than 65 years out of 17 (100%) were diagnosed to have malignancy. No significant association was detected between gender or smoking and the results of histopathology.

Table 4: Association between sociodemographic characteristics and Diagnostic result of histopathology.

		Gastric ulcer	GERD	Duodenal ulcer	Esophagitis	Malignancy	Gastropathy
Age (years)	**18–25**	8(11.8%)	4 (20%)	3 (5.3%)	0 (0%)	0 (0%)	4 (10.5%)
	26-45	22(32.4%)	6 (30%)	28(49.1%)	8 (61.5%)	4 (23.5%)	13 (34.2%)
	46-65	24(35.3%)	8 (40%)	14(24.6%)	5 (38.5%)	4 (23.5%)	14 (36.8%)
	> 65	15(20.6%)	3 (10%)	12(21.1%)	0 (0%)	9 (52.9%)	7 (18.4%)
P value		0.449	0.146	0.195	0.111	**0.005**	0.839
Total		**69(100%)**	**21(100%)**	**57(100%)**	**13 (100%)**	**17 (100%)**	**38 (100%)**
Gender	**Male**	30(43.5%)	11(52.4%)	30(52.6%)	7 (53.8%)	10 (58.8%)	13 (34.2%)
	Female	39(56.5%)	10(47.6%)	27(47.4%)	6 (46.2%)	7 (41.2%)	25 (65.8%)
P value		0.469	0.602	0.314	0.609	0.307	0.079
Total		**69(100%)**	**21(100%)**	**57(100%)**	**13 (100%)**	**17 (100%)**	**38 (100%)**
Smoking	**Smoker**	26(37.7%)	7(33.3%)	24(42.1%)	4 (30.8%)	6 (35.3%)	11 (28.9%)
	Non-smoker	43(62.3%)	14(11.1%)	33(57.9%)	9 (69.2%)	11 (64.7%)	27 (71.1%)
P value		0.885	0.713	0.345	0.630	0.879	0.253
Total		**69(100%)**	**21(100%)**	**57(100%)**	**13 (100%)**	**17 (100%)**	**38 (100%)**

4.5 Diagnostic performance of EGD

The performance of EGD (sensitivity, specificity, positive predictive value PPV, and negative predictive value NPV) (table 4) in the diagnosis of different gastric health problems was assessed and detected that EGD has 100% specificity, 100% PPV, 95.3% NPV and only 47.1% sensitivity in diagnosing malignancy. Meanwhile EGD also has 100% specificity, 100% PPV, 81.3% NPP and only 42.1% sensitivity in diagnosing duodenal ulcer. While the highest sensitivity test reported for endoscopy (100% and 86.8%) was in diagnosing GERD and gastropathy respectively.

Table 5: Diagnostic performance of EGD in relation to the results of histopathology as the cold standard test.

	Sensitivity	Specificity	PPV	NPV
Gastric ulcer	58%	99.2%	97.5%	81.8%
GERD	100%	91.6%	58.3%	100%
Duodenal ulcer	42.1%	100%	100%	81.3%
Esophagitis	76.9%	97.9%	71.4%	98.4%
Malignancy	47.1%	100%	100%	95.3%
Gastropathy	86.8%	55.6%	31.4%	94.7%

5. DISCUSSION

Esophagogastroduodenoscopy is a frequently conducted endoscopic procedure. When done correctly, it offers useful information for individuals with upper gastrointestinal disorders. EGD is a diagnostic procedure that involves visually inspecting the upper gastrointestinal tract using a flexible fiberoptic endoscope or videoscope. It aids in the diagnosis of several upper gastrointestinal disorders such as esophagitis, gastritis, gastric ulcer, and cancer.[52]

The current study included 200 patients referred for EGD. Patients included were mostly equally distributed between males and females. Similar results were reported by Barret et al,.[53] in France as 46.6% of patients admitted for EGD were males. In addition, Duah et al.,[42] in Ghana reported that 42.7% of patients admitted for EGD were males .On the other hand, Bin-

Gadeem et al.,[46] in Yemen reported that 65.4% of patients admitted for EGD were males. The inclusion of larger number of patients and younger age groups < 20 years could affect the overall distribution and explains this difference.

More than one third of the patients included in this study were aged (26 – 45) years, and another one third were aged (46 – 65) years and 20% aged > 65 years. In the same context, Duah et al.,[43] in Ghana reported that two-thirds of the patients were older than 40 years old. Same results were obtained by Barret et al.,[53] in France as two-thirds of the patients were older than 50 years old. However, younger age of included patients was reported by Bin-Gadeem et al.,[46] in Yemen as half of the patients were older than 40 years old. Older age of included patients was reported by Oluwagbenga et al.,[34] in Nigeria as 75.5% of patients were aged > 40 years old. Different sociodemographic characteristics could explain this discrepancy.

In the current study, about one-third of patients were smokers. Leclair et al., (2024).[54] in France reported that 22.5% of patients admitted for EGD were smokers. The relation between smoking and upper GI disorders is well documented, as smokers are more prone to all diseases affecting the esophagus and stomach.

In our study, the most common clinical presentation was epigastric pain, anemia and dyspepsia (77.5%, 43% and 39% respectively). Epigastric pain that can be due to esophagitis or gastritis is commonly associated with dyspepsia. Moreover, one of the most common complications associated with esophagitis or gastritis is mucosal ulceration that will be presented with anemia and melena.[55] Various results were obtained in previous studies regrading EGD however, all came in the same context as our results. Barret et al., (2021)[51] in France reported that the most common clinical presentation was epigastric pain, heart burn (27.8% and 21.3% respectively). Bin-Gadeem et al., (2020)[39] in Yemen reported that the most common clinical presentation was epigastric pain (41.7%). Duah et al., (2022)[43] in Ghana reported that the most common clinical presentation was dyspepsia and upper gastrointestinal bleeding (69.9% and 24.3% respectively). while Ergenç & Uprak, (2022)[56] in Turkey reported that the most common clinical presentation was dyspepsia (25.7%) and Dhungana & Regmi, (2021)[4] in Nepal reported that the most common clinical presentation was abdominal pain (65.2%).

In the current study, the most frequent diagnosis revealed by EGD was gastropathy/gastritis in nearly half of the patients, followed by gastric ulcer (20.5%), GERD (17.5%) which was anticipated due to the significant relation between the three conditions. In the same context, Barret et al., (2021)[57] in France reported that the frequent diagnosis was gastritis and hiatal hernia (20.9% and 18.1% respectively). Bin-Gadeem et al., (2020)[46] in Yemen reported that the frequent diagnosis was gastritis, GERD and esophageal varices (40.9%, 26% and 16% respectively). On the other hand Duah et al., (2022).[43] in Ghana reported that the most frequent diagnosis was gastritis and duodenitis (71.5% and 58% respectively) and Oluwagbenga et al., (2020).[34] in Nigeria reported that the most frequent diagnosis was gastritis and gastric erosion (28.2% and 24.9% respectively). Meanwhile, Dhungana & Regmi, (2021).[39] in Nepal also reported that the most frequent diagnosis was gastritis and gastroduodenal ulcer (50.8% and 19.7% respectively).

In the present study, results of histopathology of the specimens obtained by EGD showed that the most frequent diagnosis was gastric ulcer (34.5%), followed by duodenal ulcer (28.5%), gastropathy/gastritis (19%). In line with our results, Ergenç & Uprak, (2022).[51] in Turkey reported that the most common diagnosis obtained with histopathology was gastritis (74.8%). Parikh et al., (2024).[56] in India reported that the most common diagnosis obtained with histopathology was gastritis and duodenitis (55.3% and 19.3% respectively). Similarly, Jonnalagadda et al., (2019).[4] and Rani et al., (2019).[57] in India reported that the most common diagnosis obtained with histopathology of gastric specimens was gastritis/GERD (38.9% and 19.5% respectively).

In the current study, there was significant association between age and malignancy so as about two third of them were of older age (>65 years). Contradicting to our results, Ergenç & Uprak, (2022).[51] in Turkey reported that there was no significant association between age and malignancy. This could be due to inclusion of elderly patients only in their study.

Concerning the diagnostic performance of endoscopy EGD, the sensitivity ranged from 42.1% in duodenal ulcer to 100% in GERD. Sensitivity is the ability of a test to yield a positive result for a subject that has that disease. The more sensitive a test the less likely the false negative results.[45] The included presentations with high sensitivity as GERD, gastropathy/gastritis and esophagitis reflects the beneficial role of endoscopy EGD in diagnosis such conditions.

As regards specificity of endoscopy EGD, it ranged from 55.6% in gastropathy/gastritis to 100% in malignancy and duodenal ulcer. Specificity is the ability of the test to yield a negative results for a person who does not have a disease so highly specific test will have less false positive results.[4] In the current study, endoscopy EGD reflects excellent potential in exclusion of several presentations as most of the specificity results were above 90% except for gastropathy/gastritis.

Limitations of the study

Since the source of data in this study was the formal health records of the adult patients and only those with completed data were recruited, this may expose the study

to selection bias that may interfere with the generalizability of the results.

As any cross-sectional study inability to determine the temporal relationship between exposure & disease i.e. Which one occurred first the disease or the exposure So that the casual association could not be clearly determined.

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ارجو الموافقة على تزويدي بكتاب تسهيل مهمة معنون الى مديرية صحة اربيل /مركز الجهاز الهضمي/المختبر العام قسم الهستوباثولوجي
وذلك لغرض جمع البيانات من مراجعي المتعلقة بموضوع بحثي الموسوم
Desophagogastro-duodenoscopy results in relation to clinical presentation in adult patients attending gastroenterology center in Erbil City
الاسم:صفا مصطفى صالح
المرحلة الثالثة
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Appendix 1

The formal record of the patient

Age		
Gender	Male	
	Female	
Smoking	Smoker	
	Non-smoker	
Clinical presentation	Pain	Back pain
		Abdominal pain
		Epigastric pain
		Chest pain
	Dyspepsia	
	Dysphagia	
	Anorexia	
	Nausea	
	Vomiting	
	Acid reflux / Heart burn	
	Persistence dry cough	
	Hematuria	
	Malena	
	Anemia	
	Diarrhea	
	Constipation	
	Bloating/ Abdominal distention	
Diagnostic result of endoscopy	Gastric ulcer	
	GERD	
	Duodenal ulcer	
	Esophagitis	
	Malignancy	
	Gastritis/gastropathy	
Result of Histopathology	Gastric ulcer	
	GERD	
	Duodenal ulcer	
	Esophagitis	
	Malignancy	
	Gastritis/gastropathy	

6. Conclusions And Recommendations

6.1 Conclusions

- The most common clinical presentation of adult patients referred for EGD was epigastric pain (more than two thirds of patients), Anemia (aproximatly half of patients), And dyspepsia (more than one thirds of patients).
- The most frequent diagnosis revealed by EGD was gastropathy/gastritis in nearly half of the patients, followed by gastric ulcer and GERD
- Results of histopathology showed that the most frequent diagnosis was gastric ulcer, followed by duodenal ulcer
- Malignancy is diagnosed by EGD among (4%) minority of patients while those approved to have malignancy by histopathology were (8.5%)
- The diagnostic performance of endoscopy EGD revealed it`s sensitivity to be ranged between (42.1% in duodenal ulcer, malignancy 47.1%) to 100% in GERD. while it`s specificity was ranged from 55.6% in gastropathy/gastritis to 100% in malignancy and duodenal ulcer.

6.2 Recommendations

- A larger studies to be conducted in multi-centers across Iraq to explore the diagnostic performance of EGD.
- Inclusion of healthy control subjects as a control group to compare the diagnostic performance of EGD.

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