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BIOPSY SITE AND HISTOPATHOLOGY IN DIAGNOSING BENIGN AND MALIGNANT GASTROINTESTINAL CONDITIONS.

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ABSTRACT

BACKGROUND: Gastrointestinal illnesses exhibit a broad range of histological findings, with malignancies and benign ailments differing throughout age demographics. Precise identification of biopsy kinds, locations, and histological results is essential for diagnosis and treatment. **OBJECTIVE:** This study aims to investigate the distribution of benign and malignant gastrointestinal lesions by age group, biopsy type, and histological results, as well as their correlations. **MATERIALS AND METHODS:** A cross sectional study was conducted on 159 patients undergoing gastrointestinal biopsies in Khyber Teaching Hospital, Peshawar. Variables included patient age groups, biopsy types (colonoscopy, endoscopic), biopsy sites, and histopathological diagnoses. Frequency, percentages, and chi-square tests were used to evaluate associations, with logistic regression applied for malignancy prediction. **RESULTS:** Most samples were endoscopic (88.7%), with the stomach site being the predominant location (54.7%). Benign lesions constituted 87.4% of patients, whereas cancers represented 12%. The greatest frequency of benign lesions occurred in the 20-30 age group (100% positive), but malignancies were more prevalent in older demographics, however without any correlation (p=0.168). Histopathologically, chronic non-granulomatous colitis (CNCG) was the most prevalent benign finding, occurring in 43.3% of cases. Dyspepsia was a prevalent symptom, occurring in 15.7% of cases. Substantial relationships were identified between benign status and age group (p=0.024), however malignant status exhibited no significant link with age. Logistic regression identified age and biopsy type were significant predictors of malignancy. **CONCLUSION:** This study emphasizes the prevalence of benign gastrointestinal lesions in younger individuals and the significance of age and biopsy type in assessing malignancy risk. Histopathological examination is critical for correct diagnosis and clinical decision-making.

KEYWORDS: Gastrointestinal biopsy, Endoscopic biopsy, chronic non-granulomatous colitis

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INTRODUCTION

Gastric ulcer is a prevalent medical disorder, with an annual prevalence exceeding 5 per 1000 persons. The malignancy incidence in endoscopically diagnosed stomach ulcers varies significantly, from 2.4% to 21%[1]. Gastric cancer is the third leading cause of cancer-related death worldwide. Adenocarcinoma histology is present in 95% of cases, with a poor prognosis indicated by a 5-year overall survival rate of under 30% in most countries [2, 3].

Upper gastrointestinal (GI) lesions significantly affect global morbidity, including both benign inflammatory conditions and malignant tumors. This study examines the demographic distribution of upper gastrointestinal lesions based on age, sex, and biopsy site, primarily focusing on the esophagus, stomach, and duodenum[4]. It contrasts the prevalence of neoplastic and non-neoplastic lesions, highlighting the significance of premalignant conditions such as Barrett's esophagus (characterized by the replacement of squamous mucosa by columnar cells following ulceration, resulting from gastric migration or stem cell alterations) and malignancies including esophageal squamous cell carcinoma and gastric adenocarcinoma[5]. Essential disciplines that together help us to understand illness origins and treatment approaches include histopathology, physiology, microbiology, and pharmacology[6]. Each subject individually contributes to the medical sector, offering crucial insights that inform therapeutic choices and enhance patient outcomes. Histopathology, the microscopic analysis of tissue specimens, is essential for detecting several illnesses, including malignancies, inflammatory disorders, and infectious infections[7].

Initial investigations encompass non-invasive techniques such as imaging, along with laboratory analyses that may not yield a definitive diagnosis. Endoscopy is beneficial in certain circumstances[8]. Malignancies in this region are primary contributors to morbidity and among the foremost causes of death. Endoscopy is employed to see the mucosa and get samples from questionable regions[9]. Endoscopic biopsies and histological analysis are regarded as the gold standard diagnostic methods for gastrointestinal disorders[10,11]. This study seeks to systematically examine the relationship between biopsy site selection and histopathological results in diagnosing benign and malignant gastrointestinal disorders, aiming to enhance diagnostic accuracy, refine biopsy protocols, and improve patient outcomes in clinical gastroenterology. Timely identification of premalignant and malignant lesions is crucial for effective intervention and therapy. Endoscopy serves a crucial function as a minimally invasive technique for visualizing and biasing abnormalities in the upper gastrointestinal tract.

MATERIAL AND METHOD

This descriptive cross-sectional investigation was done retrospectively using gastrointestinal tract biopsy data gathered during June 2021 to May 2022. The study comprised individuals of above 18 year ages and genders who had diagnostic biopsy procedures, mostly

endoscopic and colonoscopic biopsies. Biopsies with insufficient clinical information were eliminated from the study. Demographic characteristics of patients, including age and gender, as well as biopsy type, biopsy location, and histopathological diagnosis, were collected from the dataset. The histological results were classified according to standardized pathological categories, encompassing benign and malignant lesions. Particular emphasis was placed on identifying Helicobacter pylori infection, assessing inflammatory state, and recognizing other pertinent morphological abnormalities.

Biopsy locations encompassed stomach, colorectal, anal, and other gastrointestinal tract areas, with the predominant biopsy methods being endoscopic and colonoscopic procedures. The histological examination included a comprehensive categorization of disease entities, including adenocarcinoma differentiation, chronic non-specific inflammation, and other pathological diseases.

Data cleaning entailed the standardization of categorical variables and the appropriate management of missing values using R version 4.4.3. Frequency distributions and percentages were computed for essential variables, encompassing age groups, benign and malignant classifications, and histological categories. Inferential statistical tests, including chi-square tests, were conducted to evaluate the relationships between age groups and diagnostic categories. The study complied with ethical requirements, with institutional approval obtained from ethical board committee. This technique enabled a thorough assessment of biopsy results to discern trends associated with patient demographics and clinical diagnoses within the examined group.

RESULT

Throughout the study period, there were 158 participants, including 32.08% females (n=51) and 67.30% males (n=107). The predominant biopsy type was endoscopic biopsy 88.68% (n=141), followed by colonoscopic biopsy 6.92% (n=11). Other biopsy modalities, including ERCP and stomach endoscopic biopsy, were infrequent, each constituting less than 1% of the sample. Resection biopsies constituted 3.14% (n=5). In terms of biopsy locations, stomach tissue samples were the most prevalent 54.72% (n=87), followed by colorectal sites 6.92% (n=11).

Benign findings were seen in 87.42% (n=139) of cases, while malignant findings were positive in 11.95% (n=19) of cases and negative in 81.76% (n=130). Moderately differentiated adenocarcinoma was diagnosed in 2.52% (n=4) of patients among histological evaluations. Dyspepsia was noted symptomatically in 15.72% (n=25) of participants. The age distribution revealed a predominance of younger to middle-aged persons, with 27.04% (n=43) in the 31–40-year range, 23.90% (n=38) in the 20–30-year range, and 10.06% (n=16) aged above 61 years shown in the table (1).

Table 1. Distribution of Demographic, Clinical, and Histopathological Characteristics with Frequencies and Percentages

Variable	Category	Frequency and Percentage
Gender	Female	32.08% (n=51)
	Male	67.30% (n=107)
Type of biopsy	Colonoscopy	6.92% (n=11)
	Endoscopic	88.68% (n=141)
Site of biopsy	Gastric	54.72% (n=87)
	Colorectal	6.92% (n=11)

Benign	Positive	87.42% (n=139)
	Negative	11.32% (n=18)
Malignant	Positive	11.95% (n=19)
	Negative	81.76% (n=130)
Symptoms	Dyspepsia	15.72% (n=25)
Age Group	20-30 years	23.90% (n=38)
	31-40 years	27.04% (n=43)
	Above 61years	10.06% (n=16)

The research examined several histological, clinical, and inflammatory factors concerning malignancy status. Dyspepsia was the most prevalent presenting symptom, observed in 15.72% (n=25) of patients, however it was not significantly correlated with malignancy ($p = 0.65$). Rectal bleeding was seen in 9.43% (n=15) of patients, with no significant connection ($p = 0.65$). Activity levels classified as Mild and Moderate were noted in 16.98% (n=27) and 4.40% (n=7) of patients, respectively, with the total activity parameter substantially correlated with malignancy status ($p = 0.003$). Mild inflammation was seen in 32.31% (n=42) and moderate inflammation in 15.38% (n=20), both demonstrating significant statistical correlation with malignancy ($p < 0.001$). The antral biopsy results indicated that positive findings were predominant in 51.54% (n=67) of cases, demonstrating a significant correlation ($p < 0.001$), whereas negative results were seldom (0.77%, n=1). Corporal biopsy results indicated Negative in 47.69% (n=62) and Positive in 6.15% (n=8), both significantly associated with malignancy ($p = 0.0003$) shown in the table (2).

Table 2 Frequency, Percentage, Standardized Residuals, and p-values of Clinical Features and Inflammatory Markers

Variable	Category	Frequency & Percentage	Std. Residual	p-value
Symptoms	Dyspepsia	15.72% (n=25)	0.88	0.65
	Bleeding Per Rectum	9.43% (n=15)	-2.29	0.65
Activity	Mild	16.98% (n=27)	1.60	0.003
	Moderate	4.40% (n=7)	1.28	0.003
Inflammation	Mild	32.31% (n=42)	2.77	<0.001
	Moderate	15.38% (n=20)	0.70	<0.001
Antral	Positive	51.54% (n=67)	4.04	<0.001
	Negative	0.77% (n=1)	0.47	<0.001
Corporal	Negative	47.69% (n=62)	3.70	0.0003
	Positive	6.15% (n=8)	1.37	0.0003

Table 3 presents the frequency distribution and percentage of the ten most prevalent histopathological findings in the sample. Chronic non-granulomatous colitis (CNCG) was the predominant diagnosis, including 43.3% of patients, succeeded by H. pylori-induced pangastritis (6.37%) and chronic non-specific duodenitis (5.73%). Additional significant findings encompass

ch ronic non-specific inflammation (5.1%) and juvenile rectal polyps (3.82%).

Table 3 Histopathoogical finding and there frequency and percentage distribution

Histopathological Findings	Frequency (%)
Chronic non-granulomatous colitis (CNCG)	43.3% (n=68)
H.pylori induced pangastritis	6.37% (n=10)
chronic nonspecific duodenitis	5.73% (n=9)
chronic nonspecific inflammation	5.1% (n=8)
juvenile rectal polyp	3.82% (n=6)
Adenocarcinoma well differentiated	3.18% (n=5)
Adenocarcinoma moderately differentiated	2.55% (n=4)
Reflux esophagitis	2.55% (n=4)
Adenocarcinoma poorly differentiated	1.91% (n=3)
Gastrointestinal stromal tumor	1.91% (n=3)

The p-values presented in the table 4 indicate the overall statistical significance of the relationship between the variables Benign and Age Group, as well as Malignant and Age Group, respectively. The p-values are from chi-square tests conducted on the complete contingency tables and are invariant across all category levels of each variable. In patients categorized as benign, the largest prevalence of positive cases (100%, n=38) occurred in the 20-30 years' age group, followed by significant percentages in the 51-60 years 88.89% (n=24) and 41-50 years 85.71% (n=24) groups. Negative benign cases were more prevalent in the above 61 years' cohort 31.25% (n=5). In the malignant category, negative instances were predominant among younger patients, especially in the 20-30 age range 94.74% (n=36), with gradually diminishing percentages in older cohorts. The incidence of positive malignant cases was elevated in the 61+ years cohort 31.25% (n=5). P-values demonstrate a statistically significant correlation between age groups and benign status ($p = 0.024$), however the link with malignant status was not statistically significant ($p = 0.168$).

Table 4 Distribution of Age Groups by Benign and Malignant Status with Corresponding Frequencies, Percentages, and Statistical Significance (p-values).

Variable	Age-Group	Category	Frequency and Percentage	P-value
Benign	20-30 year	Positive	100.00% (n=38)	0.024047
	31-40 year	Positive	86.05% (n=37)	
	31-40 year	Negative	13.95% (n=6)	
	41-50 year	Positive	85.71% (n=24)	
	41-50 year	Negative	14.29% (n=4)	
	51-60 year	Positive	88.89% (n=24)	
	51-60 year	Negative	11.11% (n=3)	
	Above 61 year	Positive	68.75% (n=11)	
	Above 61year	Negative	31.25% (n=5)	
Malignant	20-30 year	Negative	100.00% (n=38)	0.168074
	31-40 year	Positive	13.95% (n=6)	
	31-40 year	Negative	86.05% (n=37)	
	41-50 year	Positive	16.00% (n=4)	

	41-50 year	Negative	84.00% (n=21)	
	51-60 year	Positive	14.29% (n=4)	
	51-60 year	Negative	85.71% (n=24)	
	Above 61 year	Positive	31.25% (n=5)	
	Above 61year	Negative	68.75% (n=11)	

DISCUSSION

In the present study reveal significant demographic and pathological correlations by highlighting prominent trends in the distribution of histopathological diagnoses across various age groups and biopsy sites. For instance, benign lesions constituted the majority of cases positive benign findings varied from 68.75% in the above 61 year age group to 100% in the 20–30 years group, hence indicating a significant frequency of non-malignant conditions among younger patients. Although less prevalent, malignant cases had an increasing trend with age, with a 31.25% positivity rate in the oldest cohort, consistent with the age-related risk escalation observed in other studies.

In previous study, the bulk of samples are derived from the esophagus, accounting for 48.5%, followed by equal proportions from the stomach and duodenum, each representing 25.7%. A research conducted by[12] indicated that most samples were derived from the esophagus, in contrast to prior investigations by[13]. The male-biased gender ratio may indicate that males encounter greater risk factors than females, and gastrointestinal cancers are more prevalent in males[14].

Gastric biopsies comprised the bulk (51%) of the cases. Out of 102 patients, fifteen were diagnosed with stomach malignancies as gastric adenocarcinoma based on histopathological analysis, consistent with prior research[15]. The antrum was the most prevalent location for gastric cancer, followed by the body of the stomach, consistent with earlier research[16]. Chronic nonspecific gastritis was the most prevalent neoplastic gastrointestinal condition, occurring in 16%, which aligns with the findings of the research by[17]. The American College of Gastroenterology advises annual endoscopy for Barrett's mucosa, semiannual examinations for low-grade dysplasia, followed by yearly follow-ups. Patients with high-grade dysplasia need professional validation, a repeat endoscopy within three months, and biopsies to rule out cancer from flat mucosa [18].

In our study, among the most often occurring histopathological findings were *Helicobacter pylori*-induced pangastritis and chronic non-specific inflammation, respectively accounting for around 43.3% and 6.37% correspondingly of all patients. These findings correspond with earlier regional and global research documenting comparable frequencies of chronic gastritis and *H. pylori* infection as main causes of upper gastrointestinal disease. Furthermore in line with the clinical patterns seen in comparable cohorts is the 15.72% incidence of dyspepsia as a presenting symptom.

CONCLUSION

This study highlights the distribution of benign and malignant gastrointestinal lesions across various age groups, focusing on positive benign findings and chronic non-granulomatous colitis (CNCG). The primary method for tissue collection was endoscopic biopsy; dyspnea was the most often reported presenting symptom. The significant relationship between age and benign lesion status underscores the necessity for age-specific diagnostic and therapeutic strategies. Although few, malignant tumors need meticulous monitoring and prompt detection, particularly in older demographics. These data provide significant epidemiological

insights for resource allocation and clinical decision-making in gastroenterology.

RECOMMENDATION

Age-specific gastrointestinal screening programs are advised to be followed, especially for those over 50 years to help to identify malignant tumors early on. Using endoscopic biopsies more widely in patients with dyspnea will help to increase diagnosis accuracy. Improving histology services and training will also guarantee exact detection of certain gastrointestinal disorders. While encouraging cooperation among gastroenterologists, pathologists, and oncologists would maximize patient treatment and results, longitudinal research should be done to better grasp lesion development.

ETHICS APPROVAL: The ERC gave ethical review approval.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.

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