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Original Research

Prevalence of neoplasia in solitary and multiple esophago-gastrointestinal polyps: 5 years retrospective histopathological study

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Abstract: The increasing use of endoscopy has led to more discernable abnormalities in the stomach, including polyps. Gastric polyps encompass a spectrum of pathologic conditions that can vary in histology, neoplastic potential, and management. Despite their high prevalence, there is a paucity of literature to support management and treatment decisions for endoscopists. The goal of this review is to summarize clinical, endoscopic, and histopathologic features of various polyps, review syndromes associated with such polyps and provide management recommendations. The present study was carried out for analyzing and comparing the prevalence of neoplasia in polyps (Solitary and multiple) removed endoscopically from the esophagus, stomach, and bowel undergoing screening. Five years retrospective study was done on patients who underwent endoscopy procedures including Oesophagogastroduodenoscopy (OGD) and colonoscopy between June 2015 and March 2019 in Faruk Medical City Hospital, Sulaimani City. Age and sex of patients, site of occurrence, number of polyps (solitary or multiple), and polyps' histologic type of 369 cases were analyzed in this study. Regarding solitary polyps, out of 279 polyps, 155 were neoplastic (55%) and 124 were non-neoplastic polyps, while multiple polyps, out of a total of 90 cases, 68 were neoplastic (75%) and 22 were non-neoplastic. More than 78% of patients were above the age of 40 years. Tubular adenoma was the most commonly diagnosed polyp. Large bowel was the most commonly involved site and left-sided polyps outnumbered right-sided ones with the sigmoid colon being the most commonly involved site. Screening programs including endoscopy, especially the colon for detecting polyps and particularly the colorectal region can be helpful to reduce morbidity and mortality of patients.

Key words: Gastric polyps; Neoplasia; Endoscopy; Management.

Introduction

Polyps are simply defined as any lesion or mass protruding into the lumen of hollow viscus at any site in gastrointestinal, respiratory, and genitourinary tracts and these usually arise from mucosal layers (1). Colorectal polyps can be broadly classified according to their histology as neoplastic and non-neoplastic polyps with the most common neoplastic types are colonic adenomas which make the precursor lesions for the majority of colorectal adenocarcinoma, on the other hand, non-neoplastic polyps can be hamartomatous, hyperplastic, or inflammatory (2) producing a large diagnostic variability for different colorectal polyps among different community pathologists (3).

Gastrointestinal polyps are regarded as common specimens in the field of surgical pathology. These polyps have a variable histologic spectrum but the major importance and significance among them are the premalignant adenomatous polyps due to their crucial association with adenocarcinoma (4) and among these, the colorectal polyps (CP) take the most importance and significance. They can be classified depending on their colonoscopic appearance as pedunculated (with stalks) or sessile (without a stalk), their morphological appearance (hyperplastic, adenoma, etc.), and their behavior (5).

Incidence of developing changes of invasive carcinoma in a given polyp depends on the size and histologic type of the polyp, also the risk of malignant changes rises with increasing severity of dysplasia in adenomatous polyps (6).

Colorectal carcinoma is considered to be the third most common cancer in the world (7), and the carcinogenesis of this type of cancer is characterized by the progressive accumulation of genetic defects and abnormalities (8).

Recently colorectal cancer (CRC) is considered to be the second most fatal cancer and over 140200 new cases of colorectal cancers were diagnosed in the United States in 2018 (9).

Among the common types of polyps, we have hyperplastic polyps which may be found in the gastric region and small bowel but this type of polyps is considered to be the most common type detected in the colon especially the left colon and mostly in the rectum (10). These polyps feature two main histologic patterns: microvesicular hyperplastic polyps (MVHPs) and goblet cell hyperplastic polyps (GCHPs); otherwise, they have no clinical significance (11). Hyperplastic polyps reveal a characteristic feature named "saw-toothed" or serrated microscopic appearance bit with no dysplasia (12), and they had the long-accepted belief that they are mostly benign lesions. The next sequential studies have proposed that hyperplastic polyps (with their histologically

related polyps, called serrated adenomas and mixed polyps) may either lie in the classical adenoma-carcinoma pathway or have a specific mutator-phenotype pathway independently from the well-known adenomatous polyps (13). At the molecular level, hyperplastic polyps reveal properties of neoplastic changes which are intermediate between normal mucosa and adenomas or carcinomas, among these: proliferative activity, *p53* overexpression, and hypomethylation of the c-*myc* gene (14) and (15), also hyperplastic polyps possess a high rate of frequency of *ras* mutations (16). Later following studies suggest that hyperplastic polyps, adenomas, and the presence of both are usually associated with the same lifestyle-related risk factors and are broadly compatible with those found in colorectal carcinoma (10). Regarding adenomatous polyps (Adenomas), they are common in the human body and are considered to be the main precursor lesions for colorectal cancer (17) and their removal in colonoscopic screening will largely lower the risk of colorectal carcinoma (18).

It is accepted that the major and the most significant concern is colorectal adenomas' ability to progress into carcinoma through adenoma-carcinoma sequence (19), and so the prevalence of colorectal adenomas nearly match the risk of colorectal malignancy in western countries where up to 25% of asymptomatic individuals will have adenomas (5).

Generally, adenomas can be divided microscopically into tubular, tubulovillous or villous types depending on the World Health Organization (WHO) 25% classification rule by which at least 25% of the adenoma's volume must show villous architecture to be named as tubulovillous adenoma while if at least 75% of the adenoma's volume showed villous histology it will be classified as a villous adenoma (20).

All the adenomas by definition are dysplastic and generally, dysplasia can be defined as these epithelial changes which are unequivocally neoplastic (20). Cytological grading of dysplastic changes present in adenomatous polyps must follow the revised Vienna classification of gastrointestinal epithelial neoplasia, using the two-tiered system of low- and high-grade dysplasia (21).

Generally, it is accepted that the malignant potential of adenomas associates with a histologic type of the polyp, the size, and the degree of dysplastic changes, and accordingly, higher grades of dysplasia, a higher percentage of the villous component within the polyp, and polyps larger than 1 cm in diameter will be associated with an elevated risk of malignant changes (22).

Also, a specific group of polyps named "mixed" polyps reveal some features of dysplasia with a serrated appearance like hyperplastic polyps and are defined as mixed polyps, serrated adenomas, or hyperplastic polyps with adenomatous changes (12). This type of polyps has features between a hyperplastic polyp and an adenoma, and these readings and findings did not represent a major separation from the ordinary classification of colorectal polyps but retained the separation of adenomas from non-neoplastic hyperplastic polyps (23). Initially, their natural history, risk of malignancy, and their genetic features are not fully defined with no clear-cut guidelines to be performed on patients with mixed polyps during screening colonoscopy (24), but recent studies stated that mixed polyps also have the ability to become malignant (25). A mixture of hyperplastic and adenomatous changes presenting within the same polyp is unusual, and even adenocarcinoma chance arising from such mixed hyperplastic/adenomatous polyp is even more rarely (26). Another type of polyps called hamartomatous polyps (HPs) found in the gastrointestinal (GI) tract are rare when compared to other types of GI polyps, still, they are considered to be the most common type of polyps in children (27) comprising over 90% of polyp cases (28). This type of polyp is non-neoplastic tumor-like lesions made of normal tissue with normal cells otherwise found in abnormal distribution and numbers and can be subdivided into different histologic subtypes depending on their histologic appearance: juvenile polyps (JP) and Peutz-Jeghers polyp (PJP) (29). Juvenile polyps are characterized microscopically by being lobulated and pedunculated with size variation and histologically characterized by glandular cystic dilatation and infiltrated by inflammatory cells (30). On the other hand, the Peutz-Jeghers polyps are even rarer and may be identified throughout the GI tract (31).

There is a group of polyps that include three major types: Hyperplastic polyps HPs, sessile serrated adenomas/polyps SSA/Ps, and traditional serrated adenomas TSAs (32). Recently sessile serrated adenomas/polyps termed as sessile serrated lesions (SSLs) account for approximately 25% of serrated polyps while TSAs are the least common type of serrated polyps, and both are considered precursor lesions for colorectal cancer (33). TSAs feature nuclear dysplasia and have been known as potential precursors for colorectal cancer (34), while, HPs and most SSA/Ps lack nuclear dysplasia, so many recommendations regarding their clinical management have changed over time, however; in the last few years, many studies have assessed the relation between SSA/Ps and following colorectal neoplasia risk (35).

Fundic gland polyps are the most common polyps affecting the gastric area, making about 50% of all gastric polyps; they show variation in size ranging from 2 to 5 mm and are found either as single or multiple polyps (36). The sporadic type is regarded to be benign and requires no further follow-up, however, its multiple type-considered as part of what is known as familial polyposis syndrome, in those patients endoscopic follow-up is required because of elevated risk of gastric neoplasia development (37).

Materials and Methods

A 5-year retrospective study was conducted on patients who underwent endoscopy procedures including Oesophagogastroduodenoscopy (OGD) and colonoscopy covering the period between June 2015 and March 2019 in Faruk Medical City Hospital, Sulaimani City. Age and sex of the patient, nature of polyps (neoplastic or nonneoplastic), number of polyps (solitary or multiple), site and polyp's histologic type of 369 cases were analyzed. Two hundred and seventy-nine (279) cases were solitary polyps and ninety (90) cases were multiple; regarding the multiple polyps, only those in which the polyps were clustered at one site and showed unifying histologic features were enrolled in this study while those cases in which the multiplicity of polyps

was distributed at more than one site with more than one pathology was discarded.

Endoscopic biopsies were taken from the polyps and received as polypectomy specimens, fixed in 10% buffered neutral formalin, formalin-fixed tissue blocks were processed by rapid multifunctional microwave tissue processor-histostation then paraffin-embedded tissue blocks were made, and 4-micron thick tissue sections were cut followed by staining with hematoxylin-eosin, finally histopathological findings of the submitted polyps were reported by two consultant pathologists.

Statistical method

The data were analyzed using SPSS version 25 (Armonk, NY: IBM Corp, USA). Descriptive statistics were done for the data through frequency, proportion, mean and standard deviation. The difference between categorical data was measured through Chi-square and the significant statistical level was set at level < 0.05.

Results

The total number of patients enrolled in our study was 369, their age ranged from 4 to 87 years old with a mean of 52 years (± SD=14), 225 were males (61%) and 144 were females (39%), Figure 1. Of the total 369 cases, 279 had solitary polyps (75.6%) and 90 had multiple polyps (24.4%).

Regarding solitary polyps, the most common age group affected was the 6th decade (n=64, 22.9%), Figure 2, and the most commonly affected site was the large bowel (n=246, 88.2%) with left-sided polyps outnumbered right-sided ones and sigmoid colon being the most commonly involved site (n=110, 39.4%) followed by the rectum (n=95, 34.05%), Table 1. One hundred twenty-four (124) were nonneoplastic (44.4%) and one hundred fifty-five (155) were neoplastic polyps (55.6%). Among the nonneoplastic category, hyperplastic polyps (n=103, 83.1%) were the most common,

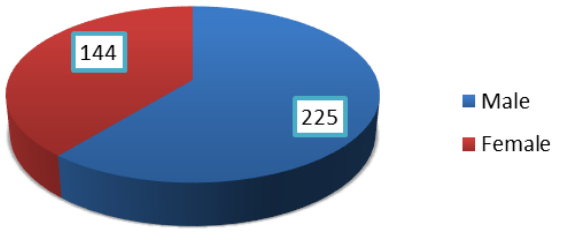

Figure 1. Gender of patients in total cases.

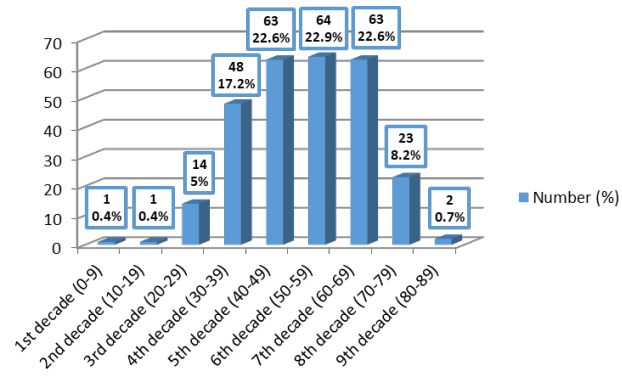

Figure 2. Age groups-solitary polyps.

Table 1. Location (Site)-solitary polyps.

Site	Number	%
Jejunum	2	0.72
Duodenum	2	0.72
Terminal ileum	1	0.36
Cecum	1	0.36
Ascending colon	7	2.5
Transverse colon	13	4.65
Descending colon	20	7.2
Sigmoid colon	110	39.4
Rectum	95	34.05
Stomach	25	8.9
Esophagus	3	1.07
Total	279	100

Table 2. Histologic types-solitary polyps.

Histologic type	Number	%
Hyperplastic	103	36.92
Retention polyp	7	2.5
Mixed	27	9.7
Fundic gland polyp	11	3.9
TA with LGD	101	36.2
TVA with LGD	21	7.5
TVA with HGD	4	1.4
Hamartomatous	3	1.07
Traditional serrated adenoma SSA	2	0.72
Total	279	100

Figure 3 while among the neoplastic category, tubular adenoma (n=101, 65.2%) was the most common, with other histologic types of polyps listed in Table 2, like fundic gland polyps (Figure 4) and mixed polyps (Fi-

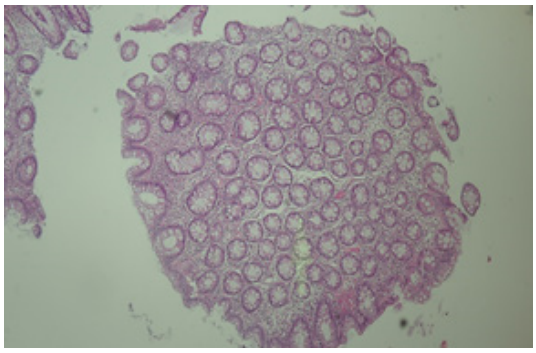

Figure 3. Hyperplastic polyp (H&E-40 HPF).

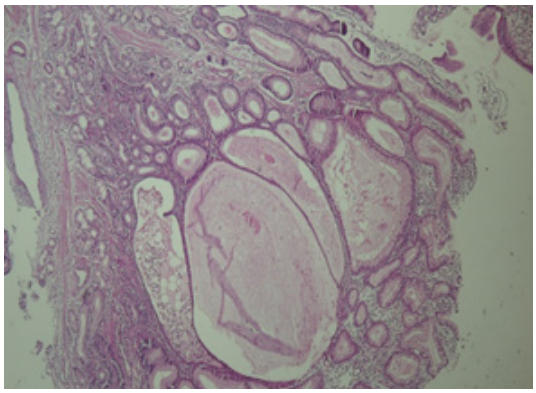

Figure 4. Fundic gland polyp (H&E-40 HPF).

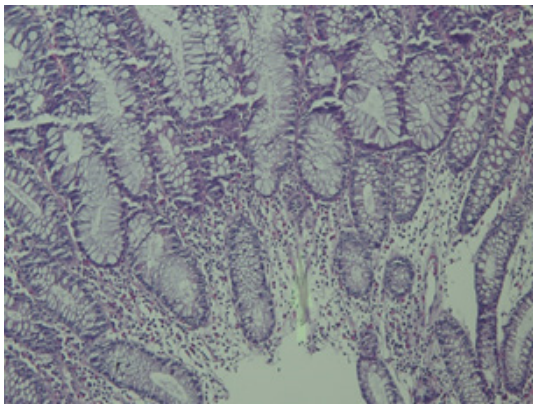

Figure 5. Mixed polyp (H&E-100 HPF).

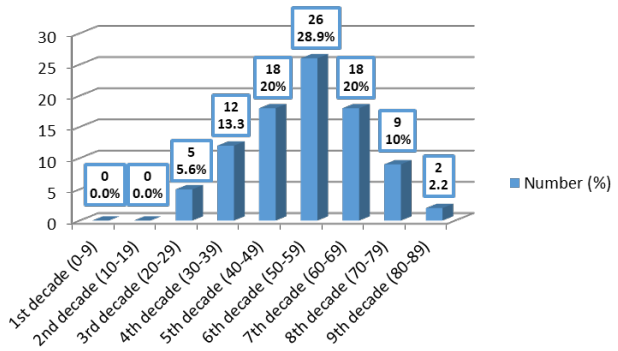

Figure 6. Age groups-multiple polyps.

gure 5).

Regarding multiple polyps, the most common age group affected was the 6th decade (n=26, 28.9%), Figure 6. The large bowel was the most common site (n=85, 94.44%) with left-sided polyps outnumbered right-sided ones and sigmoid colon being the most commonly involved site (n=29, 32.22%), Table 3. Sixty-eight (68) were neoplastic polyps (75.6%) and twenty-two (22) were nonneoplastic (24.4%). Among the nonneoplastic category, hyperplastic polyps (n=18, 81.8%) were the most common while among the neoplastic variety,

Table 3. Location (Site)-multiple polyps.

Site of multiple polyps	Number	%
Duodenum	1	1.11
Sigmoid colon	29	32.22
Descending colon	14	15.6
Transverse colon	14	15.6
Ascending colon	10	11.11
Rectum	13	14.44
Cecum	5	5.6
Stomach	4	4.44
Total	90	100

Table 4. Histologic types-multiple polyps.

Histologic type	Number	%
Hyperplastic	18	20
Mixed	6	6.7
TA with LGD	54	60
Fundic gland polyp	4	4.4
TVA with LGD	8	8.9
Total	90	100

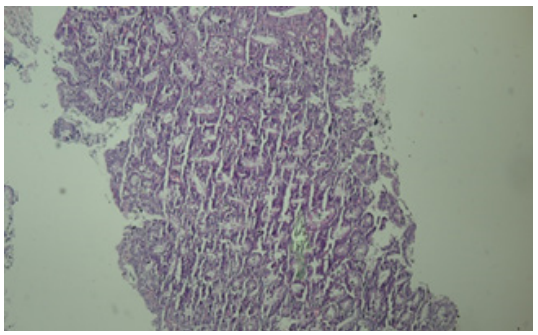

Figure 7. Tubular adenoma with low-grade dysplasia (H&E-40 HPF).

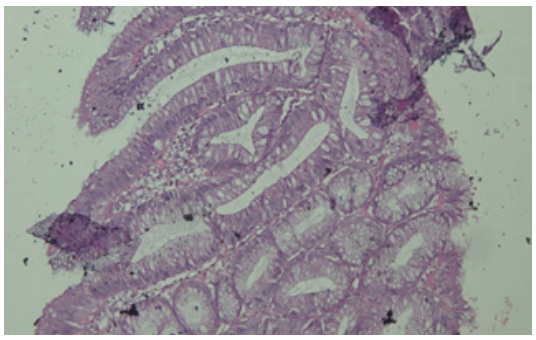

Figure 8. Tubulovillous adenoma with low-grade dysplasia (H&E-100 HPF).

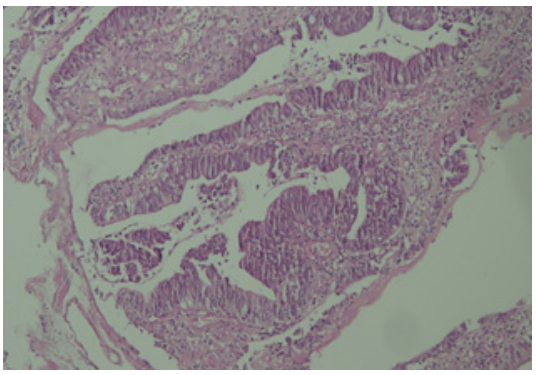

Figure 9. Tubulovillous adenoma with high-grade dysplasia (H&E-100 HPF).

tubular adenoma (n=54, 79.4%) was the most common, with other histologic types of polyps listed in Table 4. Among the total (solitary and multiple) adenomatous polyps (190), tubular adenoma with low-grade dysplasia was the commonest histologic finding (n=155, 81.6%), Figure 7 followed by tubulovillous adenomas with low-grade dysplasia (n=29, 15.2%), Figure 8 then tubulovillous adenomas with high-grade dysplasia (n=4, 2.1%), Figure 9 and two cases of traditional serrated adenomas (1.05%).

Regarding the number of polyps (solitary vs. multiple), there was no statistically significant difference in age groups (P=0.82) Table 5, gender (P=0.20) Table 6, and site (P=0.35) Table 7.

There was no statistically significant difference regarding the nature of polyps (Nonneoplastic and neoplastic) between age groups P=0.049 Table 8, and gender (P=0.38) Table 9, but there was a statistically significant difference in the site of polyps (P< 0.0001) Table 10.

There was a statistically significant difference between gender and the site of polyps (P=0.02) in Table

Table 5. Statistical relation between polyps' number and age groups.

Age group	Solitary polyps n(%)	Multiple polyps n(%)	P value
1st decade (0-9)	1(0.4)	0(0.0)	0.82
2nd decade (10-19)	1(0.4)	0(0.0)	
3rd decade (20-29)	14(5.0)	5(5.6)	
4th decade (30-39)	48(17.2)	12(13.3)	
5th decade (40-49)	63(22.6)	18(20.0)	
6th decade (50-59)	64(22.9)	26(28.9)	
7th decade (60-69)	63(22.6)	18(20.0)	
8th decade (70-79)	23(8.2)	9(10.0)	
9th decade (80-89)	2(0.7)	2(2.2)	

Table 6. Statistical relation between polyps' number and gender.

Gender	Solitary polyps n(%)	Multiple polyps n(%)	P-value
Male	165(59.1)	60(66.7)	0.20
Female	114(40.9)	30(33.3)	

Table 7. Statistical relation between polyps' number and site.

Site	Large bowel n(%)	Small bowel n(%)	Stomach n(%)	Esophagus n(%)	P value
Solitary polyps	246(74.3)	5(83.3)	25(86.2)	3(100.0)	0.35
Multiple polyps	85(25.7)	1(16.7)	4(13.8)	0(0.0)	

Table 8. Statistical relation between polyps' nature and age groups.

Age group	Neoplastic polyps n(%)	Nonneoplastic polyps n(%)	P value
1st decade (0-9)	0(0.0)	1(0.7)	0.049
2nd decade (10-19)	0(0.0)	1(0.7)	
3rd decade (20-29)	9(4.0)	10(6.8)	
4th decade (30-39)	31(13.9)	29(19.9)	
5th decade (40-49)	43(19.3)	38(26.0)	
6th decade (50-59)	60(26.9)	30(20.5)	
7th decade (60-69)	52(23.3)	29(19.9)	
8th decade (70-79)	24(10.8)	8(5.5)	
9th decade (80-89)	4(1.8)	0(0.0)	

Table 9. Statistical relation between polyps' nature and gender.

Gender	Neoplastic polyps n(%)	Non- neoplastic polyps n(%)	P value
Male	132(59.2)	93(63.7)	0.38
Female	91(40.8)	53(36.3)	

Table 10. Statistical relation between polyps' nature and site.

Nature of polyps	Large bowel n(%)	Small bowel n(%)	Stomach n(%)	Esophagus n(%)	P value
Neoplastic	218(65.9)	3(50.0)	2(6.9)	0(0.0)	0.000
Nonneoplastic	113(34.1)	3(50.0)	27(93.1)	3(100.0)	

Table 11. Statistical relation between polyps' site and gender.

Gender	Large bowel n (%)	Small bowel n (%)	Stomach n (%)	Esophagus n (%)	P value
Male	210(63.4)	2(33.3)	11(37.9)	2(66.7)	0.02
Female	121(36.6)	4(66.7)	18(62.1)	1(33.3)	

11.

Discussion

Although this study demonstrates various histologic types of polyps affecting different parts of the gastrointestinal tract like the small bowel, gastric and esophageal region, the main concern was focused on the nature of polyps located in the colorectal region due to their clinical significance and malignant potential.

One of the most effective programs of screening is colonoscopy due to its ability for early detection and removal of different polyps throughout the colon by the hand of expert gastroenterologists and by which it can lower the colorectal carcinoma incidence to a level reaching up to 90% (38) and (39).

In this study, it has been noticed an elevated prevalence of GI polyps in patients above 40 years, the total number was 288 in both groups (solitary and multiple) which is similar to the study of Amarapathy Sivasankar and Vajravelu Jayanthi (6) and Dakshitha et al. (5) indicating that the prevalence of polyps increases with age and is well established all over the world (40). From the total 369 cases, males were more commonly affected [225] than females [144] which is similar to Dakshitha et al. (5) and Wisedopas et al. (41), and no significant statistical differences were seen between gender, the number of polyps (P=0.20) and the nature of polyps (P=0.38), however, a statistically significant difference was found related to the site of polyps (P=0.02). The number of polyps in both groups (solitary and multiple) was more common in the left side of the colon (281) than the right side (50) although all transverse colon polyps were roughly considered as right-sided colon polyps, and this was similar to studies of Amarapathy Sivasankar and Vajravelu Jayanthi (6), Dakshitha et al. (5) and Tony et al. (42), with no statistically significant differences between the number of polyps in relation to site and age groups. Regarding the site in both groups (solitary and multiple), the sigmoid colon was the most commonly involved site in this study (139) similar to Amarapathy Sivasankar and Vajravelu Jayanthi (6), whereas rectum was the most commonly affected site in other studies conducted by Delavari et al. (43) and Shilpa et al. (44), with statistically significant difference related to nature of polyps. From the total (369 cases), the majority had solitary polyps (279) similar to Dakshitha et al. (5) and Tamannna et al. (45) Neoplastic polyps (Totally 223) were more common than nonneoplastic variety (Totally 146) similar to Tony et al. (42), Albasri et al. (46) but not similar to other studies in which nonneoplastic polyps were more common (41) and (6), with no statistically significant difference between age groups.

The commonest histologic type among the neoplastic category was tubular adenoma (155) similar to studies conducted by Amarapathy Sivasankar and Vajravelu Jayanthi (6), Shilpa et al. (44), Tony et al. (42), Masoudreza et al. (47) and Al-Enezi et al. (17), while hyperplastic polyps (121) were the commonest among the nonneoplastic category similar to studies conducted by Amarapathy Sivasankar and Vajravelu Jayanthi (6) and Albasri et al. (46). Among the total adenomatous polyps (190), tubular adenoma with low-grade dysplasia was the commonest histologic finding followed by tubulovillous adenomas with low-grade dysplasia then tubulovillous adenoma with high-grade dysplasia similar to other studies was done by Tony et al. (42), Amarapathy Sivasankar and Vajravelu Jayanthi (6), Masoudreza et al. (47) and Tamannna et al. (45) while in other studies, tubulovillous adenomas were the commonest (46). All the encountered four polyps which showed histology of tubulovillous adenomas with high-grade dysplasia were more than 1 cm in size which was similar to Amarapathy Sivasankar and Vajravelu Jayanthi (6) and Tony et al. (42), also three of them were pedunculated and one was sessile. The distribution of polyps, namely colorectal polyps which were more common in the left side of the colon than the right side, follows and parallels the distribution of colorectal cancer (48). Further study is needed to examine genome-wide association studies to identify candidate genes (49) and polymorphism (50-52) in different populations.

Screening procedures among which and most commonly performed is endoscopy, especially the colon which is targeted for exploring and finding incidental polyps in the gastrointestinal tract and particularly colorectal region with attempting to break the adenoma-carcinoma sequence through endoscopic polypectomy. This will lower the morbidity and mortality of malignant changes affecting this important and large surface area of the gastrointestinal tract. In conclusion, no significant differences were found regarding the number of polyps in age groups, gender, and site, also no significant differences were found regarding the nature of polyps between age groups and gender, but there was a statistically significant difference in the site of polyps with a statistically significant difference between gender and the site of polyps. Although a prospective, long-term study enrolling a larger number of patients is required for confirmation, the present findings and results suggest the more effort must be targeted for detection and more active management of colorectal polyps.

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None

Interest conflict

The authors declare no conflict of interest.

Author's contribution
Ahmed Hamdi Mehdi: The author did all the works lonely.

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