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Original Research Article

Spectrum of colonic lesions with cytohistological correlation

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Abstract

Background: Colon is the site of broad array of diseases and is frequently affected by infectious, inflammatory and neoplastic disorders. It is the most common site of gastrointestinal neoplasia in western population. Many benign lesions if not detected in time can progress to malignancy over time. Cancer diagnosis very often results in an enormous change in patient's psychological well being but at the same time, early diagnosis and prompt treatment plays a very important role in survival of the patient. Flexible colonoscope is well established in procuring histologic and cytologic material for microscopic evaluation. Colonoscopic direct vision brush cytology has several advantages that are not equally possessed by tissue biopsies. Objectives were to study cytomorphological features of colonic lesions, to correlate them with histopathology and evaluate sensitivity and specificity of cytological evaluation.
Methods: In present study, 200 cases of colonic lesions were evaluated cytologically and cytohistopathological correlation was done where possible.
Result: In present study sensitivity of 96.6 % and specificity of 100 % was observed for cytological evaluation.
Conclusion: Brush cytology is a reliable, safe, inexpensive and rapid method of diagnosing gastrointestinal lesions.
Keywords: Adenocarcinoma, brush cytology, colon.

1. Introduction

Colon is the site of broad array of diseases and is frequently affected by infectious, inflammatory and neoplastic disorders. Colon is the most common site of gastrointestinal neoplasia in western population [1]. Various nonneoplastic lesions like microscopic colitis, collagenous colitis, lymphocytic colitis, amoebic colitis, and ulcerative colitis are detected on biopsy. [2,3] Ulcerative colitis if not treated in time can lead to dysplasia and carcinoma[4]. Benign polyp if not removed in time can undergo malignant transformation [5].

Studies in India (1989) indicate that malignancy of colon, rectum, and anal canal has high frequency in north and some part of middle east.[6] Colon cancer is treatable in early stage before the tumor has spread out of bowel. Unfortunately many patients in our state present at a late stage with polypoid or ulcerated lesion on colonoscopy and spread of tumor out of bowel. Appropriate management of patients presenting with various benign and malignant colonic lesions depends almost entirely on obtaining a pathological diagnosis as this usually dictates the most appropriate form of treatment.

In India over 70% of patients report in advanced stages of disease resulting in poor survival and high mortality rates.[7] So it becomes very important to diagnose colonic cancers at an early stage to improve the survival rates.

Although, barium radiologic x-ray may show lesions, but colonoscopy is required for cytological and histopathological diagnosis. Biopsies are taken to establish a specific diagnosis or to follow a particular lesion or disease. They are also taken to determine disease extent, as in inflammatory bowel disease or to judge its severity. Biopsies are also taken to determine response to therapy and to detect cancer or premalignant stages. Most of the inflammatory and neoplastic lesions of the colon have been

well characterized histologically. On the other hand, cytomorphology of many of these entities is less widely recognized despite of the fact that all clinically significant disorders originate in and are concentrated on the mucosal surface. Various techniques for the collection of cytological samples from gastrointestinal tract have been described. Endoscopic direct vision brush cytology is one of them. Even when a large number of biopsies are obtained, sampling by brush is more thorough. It is especially important in dysplastic mucosa and early carcinoma which may not appear endoscopically distinct from benign mucosa; as in ulcerative colitis.[8] It is also non invasive, cost effective, and selectively samples dyscohesive malignant cells even from relatively inaccessible stenotic lesions. Procurement of both biopsies and brush cytology samples during the same colonoscopic session improves the overall diagnostic yield.

2. Material and Methods

Prospective study for duration of one year was conducted in the Department of Pathology, Indira Gandhi Medical College, Shimla to study the spectrum and to find the relative incidence of colonic lesions in patients undergoing colonoscopic brushing and biopsy examination. Cytohistopathological findings were correlated; anatomical distribution and age at diagnosis of colonic cancer were also described

The samples were obtained by flexible colonoscopy by gastroenterologist. Brushing material and imprint smears were taken directly on at least 2 clean slides and were stained by Giemsa stain. Colonoscopic biopsies - were grossly examined and fixed in 10% formalin and H&E staining of tissue sections was done. Validation of cytological diagnosis was done on the basis of histopathological diagnosis. Special stains were used whenever required. Sensitivity, specificity and diagnostic accuracy were calculated for colonoscopic brush cytology and imprint smears cytology by considering biopsy as confirmatory test.

3. Observation

A total of 200 patients who presented with gastrointestinal tract symptoms were subjected to colonoscopy and biopsy during the study. Out of these, 165 cases were subjected to brush sampling and imprint smears for cytology with subsequent biopsy.

The age of patients varied from 1 year to 95 years, with the mean age being 49.13 years. Maximum numbers (24%) of the patients were in the age group of 50-59 years of age. Out of 200 patients, 128 were males 72 female with M: F of 1.78:1.

Rectum was the most common site of involvement by lesions seen in 29.5% cases. About 17% cases each showed lesions in the right side of colon or whole of the colon.

Table 1: Showing site of lesion on colonoscopy

S. No	Site of Lesion	No. of Patients	Percentage
1.	Rectum	59	29.5 %
2.	Colon	34	17 %
3.	Right side colon	34	17 %
4.	Left side colon	22	11 %
5.	Caecum	23	11.5 %
6.	Rectum and colon	13	6.5 %
7.	Transverse colon	8	4 5
8.	Anorectum	7	3.5 %
	Total	200	100 %

Bleeding per rectum was the commonest symptom seen in 47.5% patients followed by pain abdomen while 6 % patients presented with weight loss, weakness and subacute-intestinal obstruction with constipation. Two patients were known cases of Familial adenomatous polyposis.

Table 2: Showing presenting symptom of patients

S. No.	Symptoms	No. of Patients	Percentage
1.	Bleeding Per Rectum	95	47.50 5
2.	Pain Abdomen	52	26 %
3.	Diarrhea	28	14 %
4.	Constipation	11	5.50 %
5.	Known C/O FAP	2	1 %
6.	Others	12	6 %
	Total	200	100 %

Commonest appearance of lesion on colonoscopy was proliferative growth in 33% patients. Ulcerated lesions, erythematous, hyperemic, granular, and unhealthy with loss of mucosal folds and colitis like appearance was also seen. Eight patients had normal colonoscopic findings.

On cytological evaluation out of 165 patients it was found that 87 (53 %) patients had benign lesions and 57 (34%) patients had malignancy. In 5% cases each lesions were suspicious for malignancy and inconclusive respectively.

Table 3: Spectrum on cytology

S. No.	Cytological Results	No. of Patients (n=165)	Percentage
1.	Benign	87	53 %
2.	Carcinoma	57	34 %
3.	Suspicious for malignancy	8	5 %
4.	Inconclusive	8	5 %
5.	Granulomatous Colitis	3	2 %
6.	IBD	2	1 %
	Total	165	100 %

On histopathology of 200 cases there were 104 (52%) cases of non-neoplastic lesions and 96 (48%) cases of neoplastic lesions.

Table 4: Showing Histopathological results of Non-neoplastic lesions

S. No.	Histopathological Results	No. of Patients (n=104)	Percentage
	Non- Neoplastics		
1.	Non Specific Colitis	29	28 %
2.	Inflammatory Bowel Diseases	27	26 %
3.	Benign Ployp	16	15 5
4.	Granulomatous Colitis	7	7 %
5.	Granulomatous Colitis possibility of Tuberculosis	6	6 %
6.	Microscopic Colitis	1	1 %
7.	Inconclusive	18	17 %
	Total	104	100 %

Nonspecific colitis was the commonest non neoplastic lesion followed by twenty-seven (26 %) cases of inflammatory bowel disease.

Among the neoplastic lesions, carcinomas were most common with 68 (71 %) cases. Spectrum of neoplastic lesion has been depicted in the table 5.

Table 5: Showing histopathological results of neoplastic lesions

S. No.	Neoplastic	No. of Patients (n=96)	Percentage
	Benign		
1.	Adenomatous Polyp	9	9 %
2.	Adenoma	6	6 %
3.	Carcinoid	1	1 %
4.	Others	10	11 %
	Malignant		
1.	Carcinoma	68	71 %
2.	Malignant Melanoma	2	2 %
	Total	96	100 %

Table 6 depicts the kind of malignancy encountered on histopathological evaluation.

Table 6: Showing types of malignancy on histopathology

S. No.	Types of malignancies	No. of Patients (n=70)	Percentage
1.	Adenocarcinoma	60	86 %
2.	Signet ring cell carcinoma	6	9 %
3.	Malignant Melanoma	2	3%
4.	Squmous cell carcinoma	1	1%
5.	Transitional cell Carcinoma	1	1 %
	Total	70	100 %

Adenocarcinoma was the commonest malignancy with 86 % cases. Cases of signet ring carcinoma (9%) malignant melanoma (3%), squamous cell carcinoma (1%) and transitional cell carcinoma (1%) were also seen on histopathology.

Cytology and histopathological findings on biopsy were compared and accuracy of cytology was evaluated taking histopathology as reference standard test.

Out of 165 cases, cytology revealed 87 benign and 57 malignant cases. Further, on biopsy of 87 benign lesions, 22 were diagnosed as IBD, 19 were polyps, 14 were normal, 12 were chronic non-specific colitis, 5 each were cases of adenoma and granulomatous colitis, 1 each was benign lymphoid hyperplasia, carcinoid, chronic active colitis, SRUS and poorly processed.

All 57 cases reported as malignant on cytology all proved to be malignant on biopsy. Out of 8 cases which were diagnosed as suspicious of malignancy on cytology proved as adenocarcinoma in 5 cases, 1 each as hemartomatous polyp, suspicious for malignancy and chronic nonspecific colitis on biopsy.

In 5 cases where no opinion was possible on cytology, 2 were diagnosed as polyps, 2 as colitis and 1as signet ring cell carcinoma on biopsy. Our study has sensitivity of 96.6 % and specificity of 100 %.

Table 7: Showing Cytohistological correlation of 165 patients

Clinical Suspicions	Cytology results	No. of Patients	Histopathology results	No. of Patients
Carcinoma (88)	Carcinoma	57	Carcinoma	63
	Suspicious for malignancy	7	Malignant Melanoma	2
	Granulomatous colitis	2	Polyps	13
	Benign	17	Non specific Colitis	5
	Inconclusive	5	Gralomatous Colitis	2
			Granulomatous Colitis poss of TB	1
			No opinion is possible	2
IBD (25)	Benign Smears	23	IBD	15
	IBD	2	Non specific colitis	6
			Normal	4
Polyp (19)	Benign smears	17	Adenomatous Polyp	10
	Descriptive	1	Benign Polyp	8
	Poorly Spread	1	Ulcerative colitis	1
Tuberculosis / Infective (21)	Benign Smears	18	Ulcerative colitis	7
	Granulomatous	2	Chronic nonspecific colitis	5
	No opinion is possible	1	Granulomatous colitis	4
			Granulomatous colitis possibility of TB	2
			Normal	3
FUC/O Peutz–Jeghers syndrome, DU, Malignancy (3)	Benign Smear	3	Peutz–Jeghers syndrome	1
			Normal	2
KC/O hemorrhoid and adenomatous polupossis (2)	Benign Smear	2	Ulcerative colitis	1
			Benign polyp	1
Carcinoid tumor (1)	Benign Smear	1	Carcinoid	1
SRUS (1)	Benign Smear	1	SRUS	1
Miscellaneous (5)	Benign Smear	3	Benign polyp	2
	Suspious for malignancy	1	Chronic non-specific colitis	1
	No Opinion id possible	1	Benign lymphoid hyperplasia	1
			Normal	1

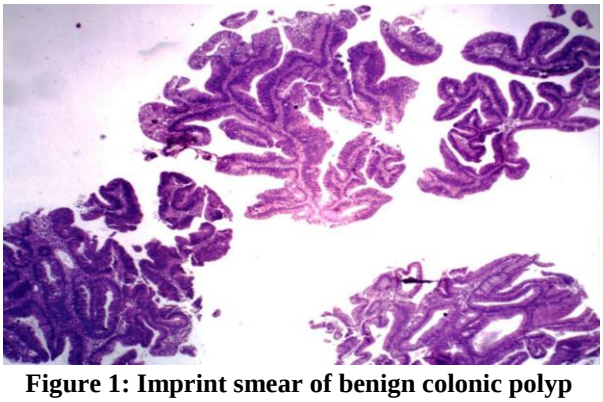

Figure 1: Imprint smear of benign colonic polyp (G X 400)

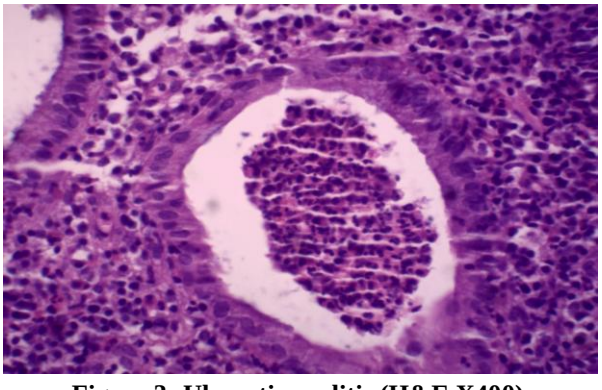

Figure 3: Ulcerative colitis (H&E X400)

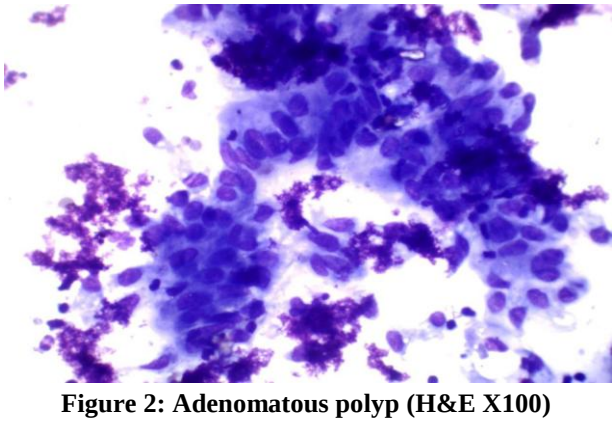

Figure 2: Adenomatous polyp (H&E X100)

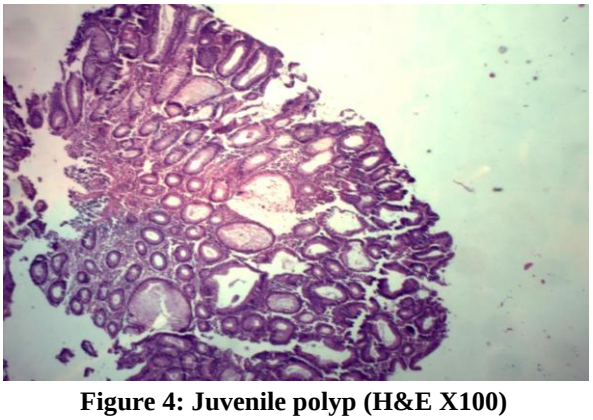

Figure 4: Juvenile polyp (H&E X100)

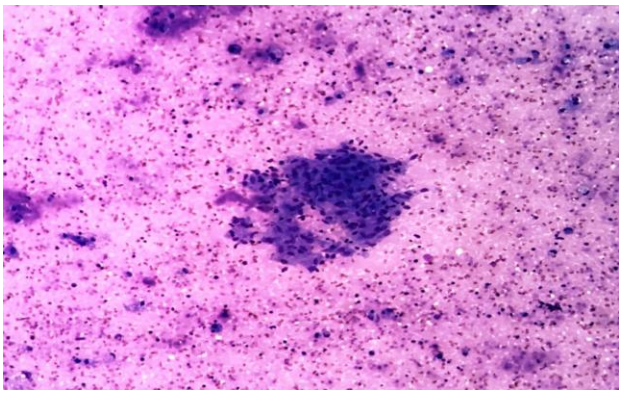

Figure 5: Brush smears of caecum showing granuloma (G X 100)

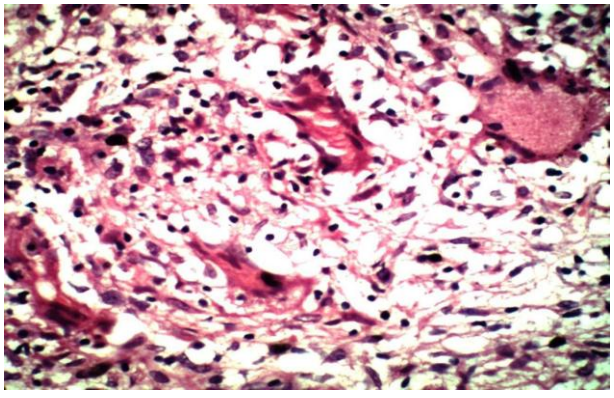

Figure 6: PA Granuloma (H&E X 400)

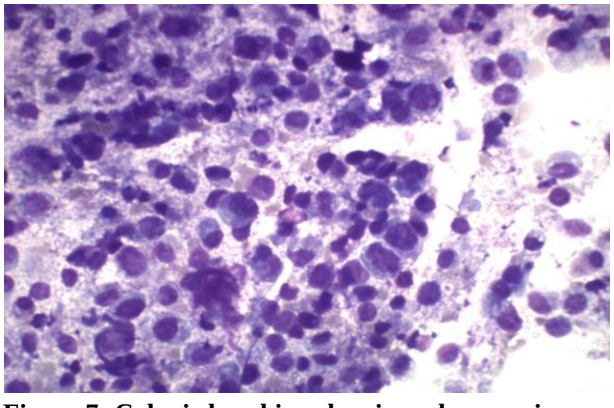

Figure 7: Colonic brushing showing adenocarcinoma

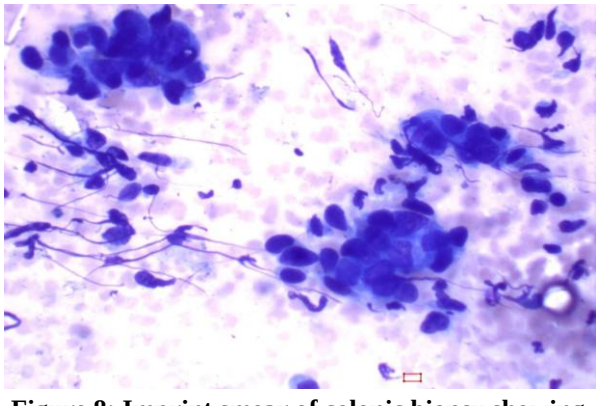

Figure 8: Imprint smear of colonic biopsy showing Adenocarcinoma (G X 400)

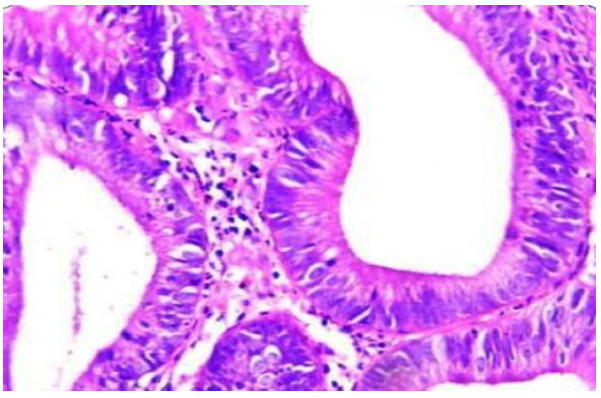

Figure 9: Well differentiated adenocarcinoma

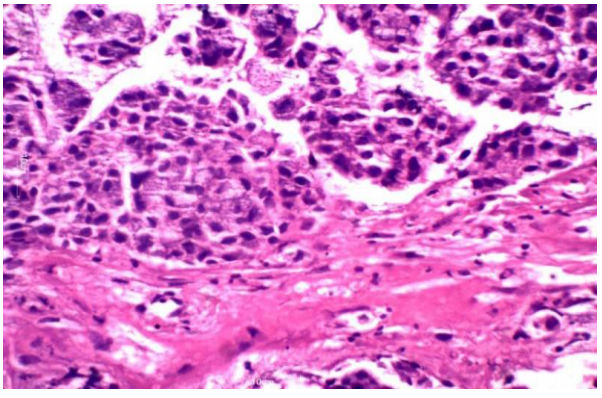

Figure 10: Signet ring cell carcinoma colon (H&E X 400)

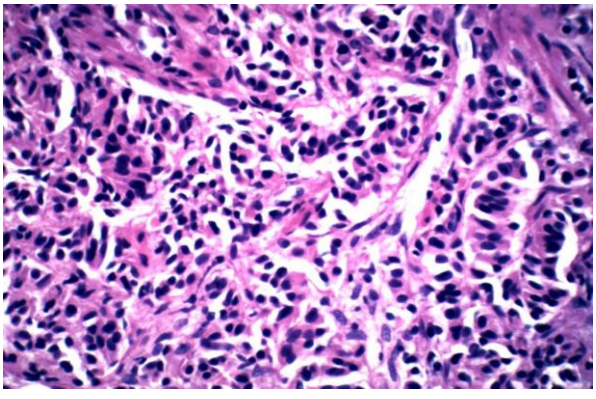

Figure 11: Carcinoid Rectum (H&E X 400)

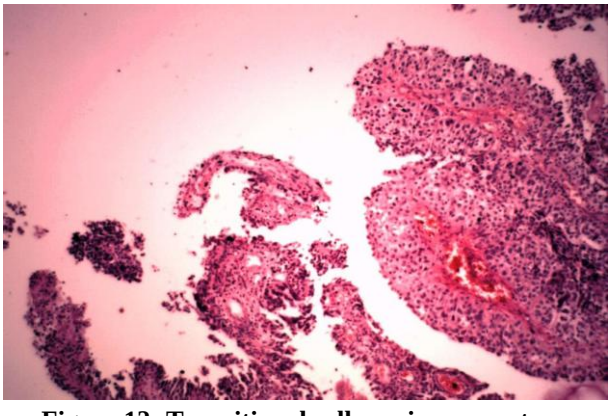

Figure 12: Transitional cell carcinoma rectum (H&E 400X)

4. Discussion

The present study was undertaken in IGMC, Shimla to study the spectrum of lesions and cytohistological correlation in the diagnosis of colorectal lesions. During the one year study period, 200 colonoscopic biopsies were examined, while material for correlation of cytology with histopathology was obtained in 165 cases.

In present study age range was 1-95 years and mean age was 49 years. Rangaswamy *et al* [9] showed age range was 16-83 years and mean age of patients as 47 years which is comparable with our study. Whereas in the studies of Tatomiravic *et al*[10] and Pandey *et al*[11] average age was 21-88 years and 5 days -78 years and mean age was 69 years and 63 years respectively. The difference in mean age may be due to selection of cases and difference in age range as compared to present study.

In present study 128 (64%) cases were males and 72 (36%) cases were females M: F ratio was 1.7:1. The studies conducted by Pandey *et al* [11] and Rangaswamy *et al*[9] Sayeed *et al*[12] M: F ratio was comparable with present study.

In the study conducted by Sayeed *et al*[12] the most common site of lesion was rectum and anal canal 121 (63%) cases followed colon 63 (33%) and caecum 7 (4%). Whereas in present study the most common site of lesion was colon 98 (49%) followed by rectum and anal canal 66 (33 %), caecum 23 (11.5 %) and rectum and colon 13 (6.5%).

In our study bleeding per rectum was the most common presenting symptom in 95 (47.5%), followed by pain abdomen in 52 (26%) and diarrhoea in 28 (14%) patients subjected to colonoscopic examination. In the studies conducted by Pandey *et al* [11], Rangaswamy *et al*[9] diarrhoea was the most common presenting symptoms. Sayeed *et al* [12] and Ritesh *et al* [13] in their study showed bleeding per rectum as the most common presenting symptom.

In the present study non-neoplastic lesions were seen in 104 (52%) cases and neoplastic lesions were seen in 96 (43%) of cases. In the study conducted by Rangaswamy *et al*[9] there were 82 (76.63%) cases of non-neoplastic lesion and 25 (23.37%) cases of neoplastic lesion and is comparable with present study.

In the studies conducted by Pandey *et al*[11] and Rangaswamy *et al*[9] adenocarcinoma was the most common type of lesion which is comparable with our study.

In the studies conducted by Brouwer *et al*[14] Geramizadeh *et al*[15], and Sharma *et al*[16] sensitivity of cytology was 88.2%, 88 % and 98.5% respectively and specificity was 98.1 %, 98 % and 97 % respectively.

In the present study there was no false positive case. Two cases were diagnosed as false negative; these may be due to scant cellularity of collected samples.

Use of only biopsy for the validation of cytology and absence of other confirmatory tests like barium roentegenography, surgery, follow-up or autopsy were limitations of our study.

5. Conclusions

Though colonoscopic biopsy is used as a routine procedure in diagnosis of colonic lesions, brush cytology can be used as an adjunct to tissue biopsy during the investigation of patients with suspicious mucosal lesions of gastrointestinal tract to distinguish benign from malignant lesions of colon. Brush cytology is a reliable, safe, inexpensive and rapid method of diagnosing gastrointestinal lesions. Since brushing is a relatively noninvasive procedure, routine use of brushings of colonoscopically visible lesions is advocated to augment the diagnostic yield.

References

[1]. Turner Jerrold R. The Gastrointestinal tract. In: Kumar V, Abbas AK, Aster JC. *Robbins and Cotran Pathologic Basis of Disease*. South Asia Edition. New Delhi: Elsevier, 2015; Volume 2: 796-817.

[2]. Mishra V, Mishra SP *et al*. Microscopic colitis in patients presenting with diarrhea. *Indian Journal of Pathology and Microbiology* 2010; 53: 15-18.

[3]. McAllister TA. Diagnosis of Amoebic colitis on routine biopsy from Rectum and Sigmoid colon. *British Medical Journal* 1962; 362-364.

[4]. Milville DM, Pirichman *et al*. Brush cytology of colon and rectum in ulcerative colitis: an aid to cancer diagnosis. *J Clin Pathol* 1988; 41: 1180-1186.

[5]. Muto T, Konishi F, Swada T, Adachi M, Morioka Y. Colonoscopic polypectomy as a tool for management of colonic polyps and detection of new lesions. *Ann Acad Med Singapore*, 1987; 16 (3): 427 31.

[6]. Bazaz Malik G, Lal N. Malignant Tumors of the Digestive Tract. A twenty five years study. *Indian Journal of Pathology and Microbiology* 1989; 32: 179-185.

[7]. Dinshaw KA, Shastri SS, Patil SS. Cancer control program in India: Changes for the New Millenium. *Health Administrator* 2005; 17(1): 10-13.

[8]. Geisinger KR. Alimentary Tract. In Bibbo M, editor. Comprehensive Cytopathology. 2nd edition. Philadelphia; W.B. Saunders Company1997; 413-444.

[9]. Rangaswamy R, Sahadedev R, Suguna B, Preethan K, Ranjeeta S. Clinico-colonoscopic and histomorphological spectrum of colonic diseases in an a academic tertiary care centre. 2014; 31: 1-9.

[10]. Tatomirovic Z, Skuletic V, Tufegdzic I, Tomic L, Dzambas J, Tarabar D. The value of brush cytology and biopsy for the diagnosis of colorectal cancer. Original article VSP. UDC: 616-348/351-076.

[11]. Pandey MS, Pandey A, Dombale VD. Histomorphological Profile of Colonscopic Biopsies- A Two Year study in a Tertiary care Hospital in South India. *IJSR* 2016; 5(2): 5.

[12]. Sayeed MA, Islam R, Siraji D, Hoque MG, Mohsen AQM. Colonoscopy: A Study of Findings in 332 patients. *JCMCTA* 2007; 18(2): 28-31.

[13]. Sulegaon R, Shete S and Kulkarni D. Histological Spectrum of Large Intestinal Lesions with clinicopathological correlation. *J Clin Diagn Res*. 2015; 9(11): EC30-EC34

[14]. Brouwer R, MacDonal A, Mathews R, Gunn J, Monson JR, Hartley JE. Brush cytology for diagnosis of colorectal cancer. *Dis Colon Rectum*, 2009; 52(4): 598-601.

[15]. Geramizadeh Bita, Hooshmand Farhang, Kumar Petricala V. Brush cytology of colorectal malignancies. *Acta Cytol* 2003; 47: 431-434.

[16]. Sharma P, Mishra V, Singh PA, Misra SP, Gupta SC. Acorrelative study of histology and imprint cytology in the diagnosis of gastrointestinal malignancies. *IJPM*. 1997; 40(2): 139-46.

[17]. Rangaswamy R, Sahadedev R, Suguna B, Preethan K, Ranjeeta S. Clinico-colonoscopic and histomorphological spectrum of colonic diseases in an a academic tertiary care centre. 2014; 31: 1-9.

[18]. Tatomirovic Z, Skuletic V, Tufegdzic I, Tomic L, Dzambas J, Tarabar D. The value of brush cytology and biopsy for the diagnosis of colorectal cancer. Original article VSP. UDC: 616-348/351-076.

[19]. Pandey MS, Pandey A, Dombale VD. Histomorphological Profile of Colonscopic Biopsies- A Two Year study in a Tertiary care Hospital in South India. *IJSR* 2016; 5(2): 611.

[20]. Sayeed MA, Islam R, Siraji D, Hoque MG, Mohsen AQM. Colonoscopy: A Study of Findings in 332 patients. *JCMCTA* 2007; 18(2): 28-31.

[21]. Sulegaon R, Shete S and Kulkarni D. Histological Spectrum of Large Intestinal Lesions with clinicopathological correlation. *J Clin Diagn Res.* 2015; 9(11): EC30-EC34.

[22]. Erasian E, Turkay C, Isik A, Uz B, Kaya A, Bavbek N. Prevalence of proximal neoplasms among asymptomatic patients according to distal colorectal findings. *Dig Dis Scl*, 2009; 54(6): 1312-6.

[23]. Geramizadeh Bita, Hooshmand Farhang, Kumar Petricala V. Brush cytology of colorectal malignancies. *Acta Cytol* 2003; 47: 431-434.

[24]. Sharma P, Mishra V, Singh PA, Misra SP, Gupta SC. A correlative study of histology and imprint cytology in the diagnosis of gastrointestinal malignancies. *IJPM*. 1997; 40(2): 139-46.

[25]. Turner Jerrold R. The Gastrointestinal tract. In: Kumar V, Abbas AK, Aster JC. Robbins and Cotran Pathologic Basis of Disease. Volume 2. South Asia Edition. New Delhi: Elsevier, 2015; 796-817.