Indian Journal of Pathology and Oncology 2023;10(4):382–386

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Indian Journal of Pathology and Oncology

Journal homepage: www.ijpo.co.in

Original Research Article

Scrape cytology – Diagnostic tool in large intestinal tumors

Shashirekha Patil[1]*, Nagarekha Kulkarni[1], Shanthi Manickyam[1], Shridevi S Hulikeri[1]

[1]*Dept. of Pathology, Vijayanagar Institute of Medical Sciences, Ballari, Karnataka, India*

ARTICLE INFO

Article history:
Received 29-09-2023
Accepted 18-11-2023
Available online 11-12-2023

Keywords:
Large intestinal tumors
Scrape cytology
Histopathology

ABSTRACT

Background: Gastrointestinal tumors, mainly esophagogastric and colorectal carcinomas constitute one of the major causes of morbidity and mortality worldwide. The early detection and treatment of gastrointestinal tumors has been shown to improve patient's survival significantly. The current study is carried out to know the efficiency of scrape cytology in diagnosis of large intestinal tumors by comparing with histopathological diagnosis

Materials and Methods: Thirty surgically removed large intestinal tumor specimens were studied. Scrapings were taken from representative areas of each specimen, spread on slides, stained with H/E and reported. The specimens were fixed in 10% formalin, grossed and routine histopathological processing was carried out, followed by staining with H/E, examined and reported. The diagnosis obtained by scrape cytology and histopathology was correlated and analyzed

Results: Total 30 specimens were received and majority of them were of rectal tumors(20%) and sigmund colon tumors(20%), followed by rectosigmoid region tumors (17%). Over all the scrape cytology diagnosis showed concordance for 28 cases with histopathology diagnosis having diagnostic accuracy of 93.3%.

Conclusion: Scrape cytology is simple, rapid and economically feasible technique and can be useful as an adjunct for frozen section in intraoperative consultation.

1. Introduction

Colorectal cancer is the fourth-most common cancer worldwide, accounting for approximately 9% of all cancers.[1] Colon cancer is the most common gastrointestinal (GI) tract malignancy in the world.[2] However, in India, colorectal malignancy is the second-most common GI malignancy after gastric cancer.[3] The significant decline in colorectal cancer-related mortality in regions of high prevalence can be attributed to an effective surveillance system, with early diagnosis of cancer and precursor lesions.[4]

Histology is the universally accepted means of establishing definitive pathological diagnosis. It can provide information on the tumor invasion depth, metastatic potential and recurrence which is important for staging and treatment planning. It is the final arbiter of diagnosis, but the delay involved may at times affect the course of treatment.[5]

Cytology on the other hand has the advantage of being rapid, easy to adopt, reliable and does not require instruments.[6] Cytological evaluation is widely accepted as a cheap, accessible method in resource limited settings, such is the case in many locations of India that allows rapid interpretation and triaging of material.[7] Scrape preparations yield good cellular smears[6] and morphological features are well-preserved.[7] Scrape cytology was shown to be

* *Corresponding author*.
E-mail address: sr90reddy@gmail.com (S. Patil).

https://doi.org/10.18231/j.ijpo.2023.085

fairly accurate (93%) in differentiating between benign and malignant lesions, equivalent to frozen sections and hence aid in early diagnosis leading to quick management.[6–8]

2. Objectives

Main objective is to study utility of scrape cytology in diagnosis of large intestinal tumors by comparing it with Histopathological diagnosis.

3. Materials and Methods

A prospective study conducted in department of pathology, Vijayanagar Institute of Medical Sciences, Bellary. For a duration of one year. Total 30 surgically resected specimens of large intestinal tumor cases were received, before transferring them into formalin Gross examination of tumor done, scrapings were taken from representative areas of tumor with one end of glass slide and material was spread on glass slide in the same manner as FNAC, stained with H/E stain and reported. Afterwards the specimen was fixed in 10% formalin. After fixation, grossing and routine histopathological processing was done and stained with H/E. Slides were examined and reported. The diagnosis obtained by scrape cytology and histopathology was then correlated and analyzed.

4. Results

In this study out of total 30 large intestinal cases, 20 were of male patients and 10 were of females.

Among males, 7 cases were in age group of 25-30 yrs, 4 cases each in the age group of 40- 49yrs and 60-69 yrs, 2 cases each in age group of 30-39 yrs and > 70yrs and 1 case in the age group of 50-59 yrs.

Among females, 5 cases were in age group of 40-49 yrs, 4 cases in the age group of 30-39 yrs and 1 case in age group of 50-59 yrs.

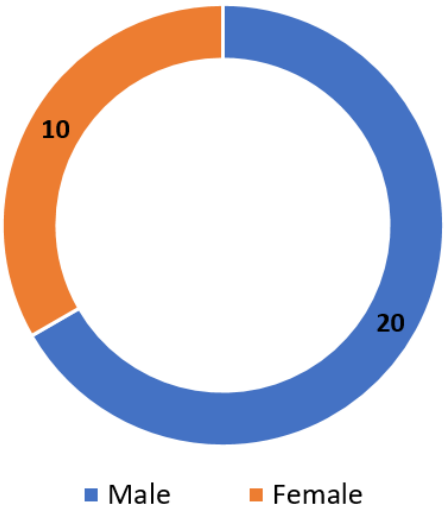
Among 30 large intestinal cases 3 cases each were seen in caecum, ascending colon, transverse colon, 5 cases were of rectosigmoid region, 4 cases were seen in descending colon and 6 cases each were seen in sigmoid colon and rectum.

Among 30 cases of large intestine, 28 cases were diagnosed as Adenocarcinoma on both scrape cytology and histopathology and 2 cases one from caecum and one from rectosigmoid were diagnosed as Benign small round cell tumor on scrape cytology whereas on histopathology were diagnosed as non hodgkins lymphoma and Neuroendocrine tumor respectively.

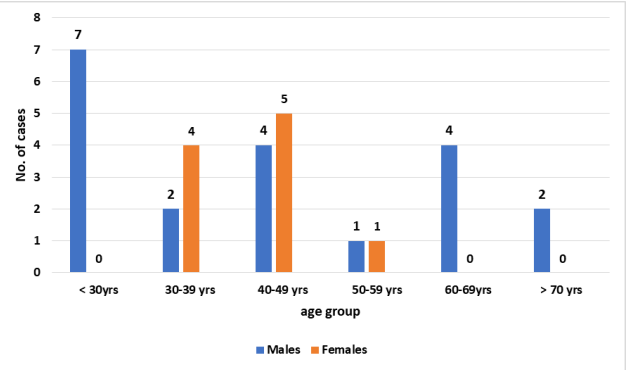
Hence, out of 30 cases scrape cytology could correctly diagnose 28 cases with accuracy of 93.3%.

5. Discussion

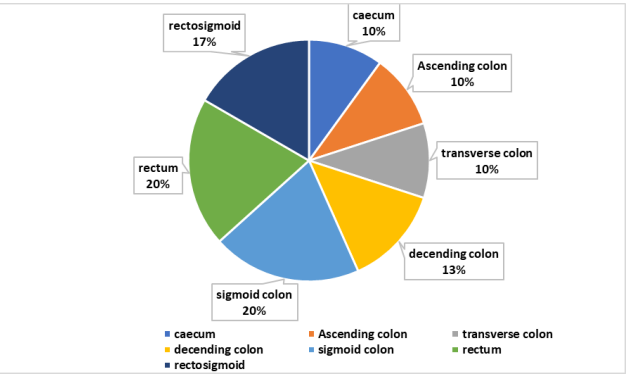
Scrape cytology dates back to 1927, when Leonard S. Dudgeon and Vincent Patrick at the University of



Graph 1: Sex wise distribution of study cases



Graph 2: Age and sex wise distribution of cases



Graph 3: Organ wise distribution of study cases

Figure 1: Gross image showing ulceroproliferative growth of colon

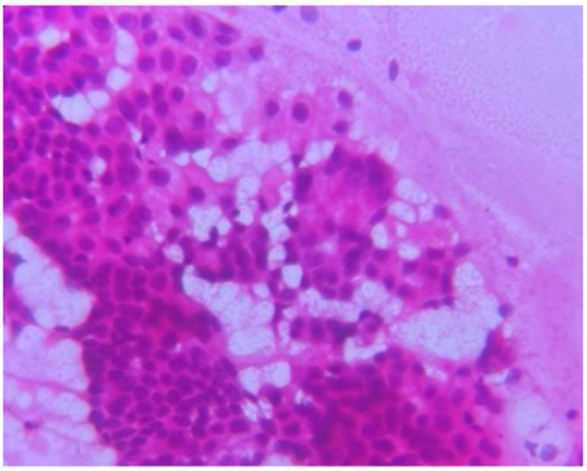


Figure 2: Scrape smear showing pleomorphic cells with hyperchromatic nuclei arranged in glandular pattern- Adenocarcinoma of colon, H/E- 400x

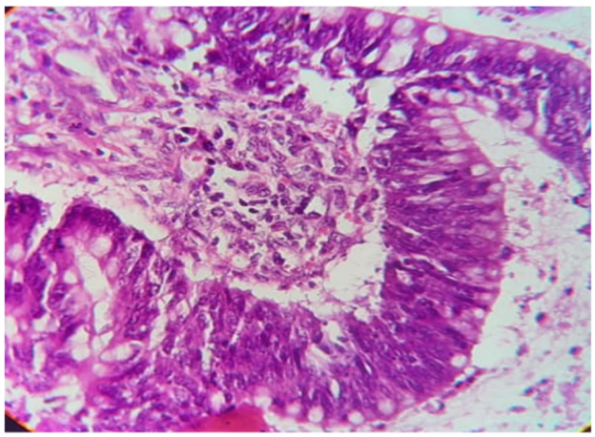


Figure 3: Histopathology section shows tumor cells arranged in glandular pattern lined by tall columnar mucinous malignant epithelial cells, H/E-400X

Figure 4: Gross image showing nodular mass in rectum

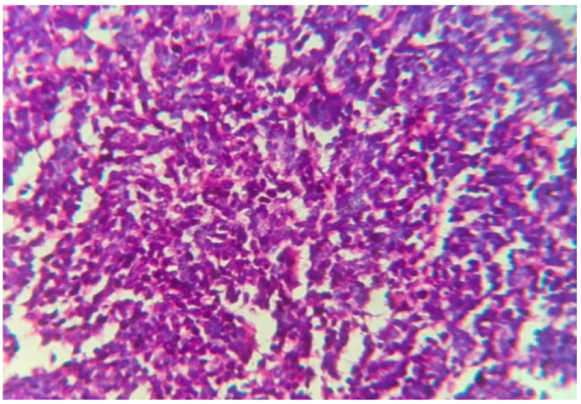


Figure 5: Histopathology section showing sheets of monotonous round to oval cells, with salt and pepper chromatin, moderate amount of eosinophilic cytoplasm- Neuroendocrine tumor-Rectum, H/E -400x

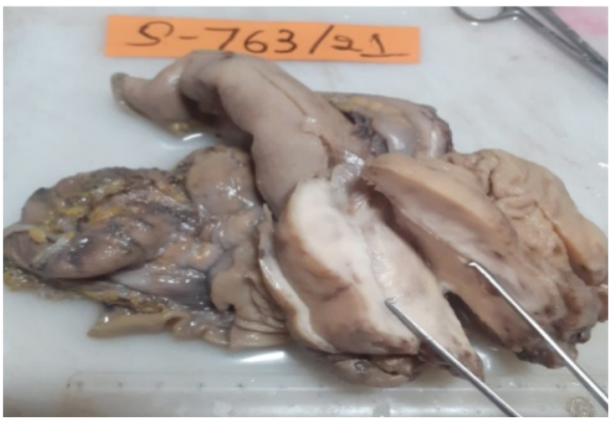


Figure 6: Gross image showing fish flesh appearance of cut section of caecum

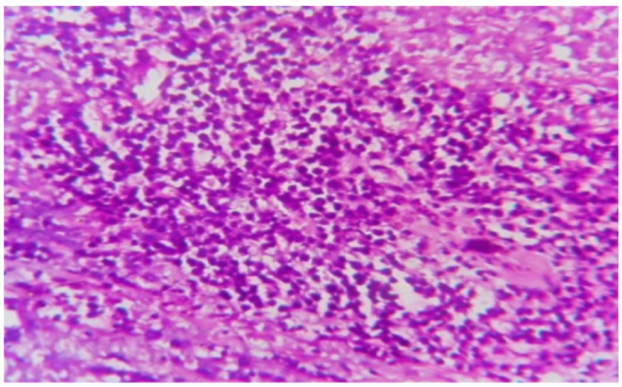


Figure 7: Histopathology section showing monotonous small round to oval cells having cleaved nuclei – Lymphoma of Caecum, H/E – 400X

London expanded the possibilities for quick, accurate cytological diagnosis intraoperatively. The use of imprint and scrape preparation has since been covered in a number of publications, particularly as a tool for intraoperative diagnosis.[9]

Following these first studies, the traditional evaluation of frozen sections has often replaced by the use of cytology samples during intraoperative consultation. This appears to be because intraoperative cytology's diagnostic accuracy is equivocal with that of frozen section. So, the purpose of this study was to determine the value of scrape cytology in the intraoperative diagnosis of large intestinal tumors by correlating scrape cytological diagnois with histopathological diagnosis. Using scrape cytology, we had excellent findings with 93.3% diagnostic accuracy.

In the present investigation, 30 patients in all had cytological and histological examinations, with comparisons of the cytological data conducted subsequently. Male patients were double than females by a ratio of 2:1. Vidyavathi studied scrape cytology of gastrointestinal neoplasms and reported a clear preference for men, with a male: female ratio of 1.7:1.[10] Aggarwal et al. 2020 achieved a comparable outcome.[11] (Table 1)

Table 1: Comparison of sex ratio of tumor cases with other studies

S. No.	Author	M/F ratio
1.	Aggarwal et al., 2020	1.98:1
2.	Vidyavathi et al	1.7: 1
3.	Present Study	1.7:1

Our study included patients from age group 14 years to 75 years with mean age of 45 years. In research conducted by Shidham et al., patients' ages ranged from 24 to 80, with a mean of 51.[12] (Table 2)

Sayeed et al. and Kontzoglou et al.[13] conducted studies and found adenocarcinoma was the most prevalent kind of tumor in the lower GIT (97.3%). Present study also showed similar results with adenocarcinoma colon being more prevalent (93.3%) in lower GIT.

Table 2: Comparison of ranges of age of tumor cases with other study

S. No.	Authors	Age range (years)	Mean age (Years)
1	Shidham et al., 2000	24- 80	51
2	Present study	20- 75	45

In the current work, scrape cytology intraoperatively yielded 93.3% accuracy. Others have claimed accuracy rates as high as 97.5% and 94%. Whereas low accuracy rates of 87.7% and 86.6%, respectively, were concluded by Saleh et al.[14] (2008) and Gupta et al. (2012).

According to Shidham et al. and Khunamornpong et al., scraping a tumor is the procedure of choice for obtaining a lot of cells that can be evenly distributed on slides.[12,15] Also, we discovered that smears made after scraping a tumor produced uniformly cellular smears.

Before performing any cytology, a gross inspection is quite helpful. We studied scrape cytology of 30 large intestinal tumor samples and out 30 cases 2 cases showed discordance with histopathology as they were diagnosed as benign tumors on scrape and as malignant tumors on histopathology. Similar results were also seen by Keihanian T et al.,[16] having discordance.

Negative cytology report in the presence of malignancy in histopathology can be attributable to poor cellularity which can be due to vigorous scraping, excess of crushing during smear preparation leading to crushing artifacts leading to obscured nuclear features, inappropriate site, excess inflammation, necrosis or fibrosis also causes obscured cytological features.

Table 3: Sensitivity and specificity of scrape cytology in several studies compared with present study

S. No.	Authors	Scrape cytology	
		Sensitivity	Specificity
1.	Aggarwal et al. 2020 (Lower GIT)	100	86.79
2.	Vidyavathi et al 2008	98.03	-
3.	Sharma et al 2021	90.9	97.4
4.	Mosarrat et al 2018	98.11	100
5.	Kshirsagar et al 2020	88.33	100
6.	Present study	93.3%	-

Kontozoglou et al. and Suen et al. accomplished accuracy rates of 100% and 85.9%, respectively. We obtained an accuracy rate of 93.3% in our study.[13,18]

The sensitivity of scrape cytology in present study were calculated as 93.3%. Several studies showed 90- 100% sensitivity of scrape cytology results and confirms its effectiveness,[16,19,20] whereas in some cases it was less than

Table 4: Accuracy rates achieved by other authors and present study

Author	Accuracy
Mavec et al [17]	93%
Suen et al [18]	96.3%
Shidham et al [12]	98.4%
Kontozoglou et al [13]	99.1%
Present study	93.3%

90%. [21] The specificity as shown in studies by Kshirsagar et al and Mosarrat et al. [19,22] and Sharma et al. 2021 was found to be 97-98.5% specific [21] as shown in Table 3.

Table 4 shows the accuracy of scrape cytology of different studies which ranges from 93 – 99.1%. Comparatively, present study shows accuracy of 93.3% which correlates with that obtained by Mavec et al. in their study.

6. Conclusion

To conclude the study, Scrape cytology is simple, rapid and economically feasible technique with diagnostic accuracy of 93.3% and can be used as an alternate for frozen section in intraoperative diagnosis. Histopathology being gold standard method, cytological methods like scrape/brush cytology during colonoscopic screening can be an adjunct in diagnosis of tumors by shortening the time required for diagnosing tumor and has high sensitivity. However limitation of scrape cytology is that depth of invasion and margin extension cannot be made out.

7. Source of Funding

None.

8. Conflict of Interest

None.

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Author biography

Shashirekha Patil, PG Student https://orcid.org/0009-0003-8319-2553

Nagarekha Kulkarni, Professor https://orcid.org/0009-0005-9118-1525

Shanthi Manickyam, Professor and HOD

Shridevi S Hulikeri, Associate Professor https://orcid.org/0009-0006-2884-6237

Cite this article: Patil S, Kulkarni N, Manickyam S, Hulikeri SS. Scrape cytology – Diagnostic tool in large intestinal tumors. *Indian J Pathol Oncol* 2023;10(4):382-386.