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Squash cytology of endoscopic biopsy specimens in gastrointestinal lesions

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ABSTRACT

Cytologic examination during endoscopic biopsy is a rapid, useful and reliable adjunct to mucosal biopsy for the diagnosis of lesions of GI tract. The study was conducted to assess the diagnostic value of squash cytology of biopsy samples and establish it as a primary diagnostic technique. It was a prospective study carried out in the Department of Pathology and Apex Diagnostic centre, Cuttack over a period of 2 years from August 2010 to July 2012. The first endoscopic biopsy specimen collected from GI lesions was crushed between two glass slides and fixed with 95% isopropyl alcohol. Smears were stained with H and E and papanicolaous' stain. 288 patients with GI lesions were subjected to endoscopic biopsy and squash cytology. Females were more commonly affected than males (M:F = 1:1.2) . 216 (75%) lesions were seen in stomach, out of which 45 (20%) were benign lesions. 50% of rectal lesions were malignant .Colonic lesions accounted for 6.25% and esophageal lesions were 6.25% of all GI lesions. All the cytologic evaluations were correlated with biopsy findings. A positive correlation was seen in 91% cases.Squash cytology is a quick, simple and inexpensive adjunct to endoscopic biopsy and does not require any additional equipment. It can be used as a necessary information to clinician for fast management of patients with GI lesions.

INTRODUCTION

Neoplasms of gastrointestinal tract (GIT) especially malignancy is one of the leading causes of death. Worldwide gastric adenocarcinoma is the second most common cancer and carcinoma esophagus is the sixth leading cause of death. [1, 2] In India, according to National Cancer Registry esophageal and gastric cancers are the most common cancers found in men, while in women it comes after the carcinoma of breast and cervix. [3] Most of the malignant lesions of upper gastrointestinal tract are advanced at the time of diagnosis. [4] The reason being the lack of a definitive etiology of such lesions which therefore cannot be prevented .Though the causes are not established, pathogenesis of gastric carcinoma is closely related to environmental and genetic factors. [5]

It is important to diagnose the lesions of GIT at an early stage. Fibroptic endoscopy has greatly enhanced the ability to directly visualize several parts of the gastrointestinal tract and obtain specimens for cyto-histologic evaluation. The ultimate diagnosis of malignancy is based in histologic or cytologic criteria. [6] However, during the last few years use of gastrointestinal cytology has declined due to the preference for tissue biopsy. [7] As is already established, cytology is a valuable adjunct to biopsy; the combined yield of the two is superior to that of either technique.[8]The purpose of this prospective study was to use squash cytology in the evaluation of GI lesions, as it is one of the cytological techniques and to establish squash cytology as a primary diagnostic technique.

Cytological examination during endoscopic biopsy is a rapid , useful and reliable adjunct to mucosal biopsy for the diagnosis of lesions of GI tract . Endoscopy of the GI tract allows a gross description of lesions and permits sampling of tissue for a definitive diagnosis. [9]

In the present era, the advent of endoscopy has greatly facilitated the detection of GI lesions.

MATERIALS AND METHODS

The present study was conducted in the Department of Pathology, SCB medical College, Cuttack and Apex Diagnostic Centre of Cuttack, Odisha, over a period of 2 years from August 2010 to July 2012. The patients presenting with GI symptoms were subjected to endoscopy of both upper and lower GI tract. Clinical history, investigation details, endoscopic findings were

collected and analyzed. On endoscopy, patients with visible mucosal lesions such as ulcers, polypoid or ulcerative growths in the GI tract, suspected of having malignant lesions of esophagus, stomach, colon and rectum (at routine endoscopy) were included in the study during the period of two years.

With the help of endoscopic forceps, biopsy specimens were obtained from 288 patients with GI lesions at routine endoscopic examinations. The samples were obtained using forward viewing fibre-optic endoscopes. Biopsy specimens were taken using forceps with a central spike and fenestrated cups with a diameter of 2 mm. Small quantity of biopsy specimen were crushed between two glass slides and immediately fixed with 95% isopropyl alcohol. The large amount of specimens were fixed in 10% formalin for histopathological examination. The glass slides with squash smear were studied with H & E stain and papanicolaou's stain.

RESULTS

A total of 288 patients presented with GI symptoms and lesions suspicious of malignancy on endoscopy were included in the study group.The age range of the patients varied from 21-80 yrs (Table 1) out of which majority belonged to age group 51-60 years with slight female preponderance (M : F ratio 1:1.2).The endoscopic findings revealed (Pi chart) 18 cases (6.25 %) of esophageal lesions , 18 cases (6.25 %) of GEJ lesions, 216 cases (75 %) of gastric lesions, 3 cases (1 %) of intestinal lesions, 15 cases (5%) of colonic and 18 cases (6.25 %) of Rectum (Fig 1)

The carcinoma of stomach presented as polypoid growths and ulcerative lesions where as the inflammatory lesions of stomach presented as ulcerative and erythematous patches. And all cases of carcinoma of rectum presented as polypoid growths (Table 2). Out of total 288 lesions sampled, cytodiagnosis revealed that 207 cases (71.87 %) were positive for malignancy, 27 cases (9.37%) suspicious lesions,9 cases (3.12%) benign lesions and 45 cases (15.62) were non-neoplastic (Table 3). In squash cytology, it is comparatively easy to diagnose signet ring type carcinoma due to presence of eccentric nuclei and mucin filled cytoplasm in tumor cells (Fig 2). Out of the malignant lesions of the stomach, histopathological study revealed 21(12.28 %) signet ring cell carcinoma (Fig-3), 84 (49.12 %) of tubular adenocarcinoma, 42 (24.56 %) of mucinous adenocarcinoma and 24 (14.03%) of papillary type (Table 4). Polyps of GIT tract are identified by detection of benign uniform looking cells present in fragments with smooth peripheral outline, low cellularity and absence of tumor diathesis. (Fig 4) 91% correlation of squash cytology was

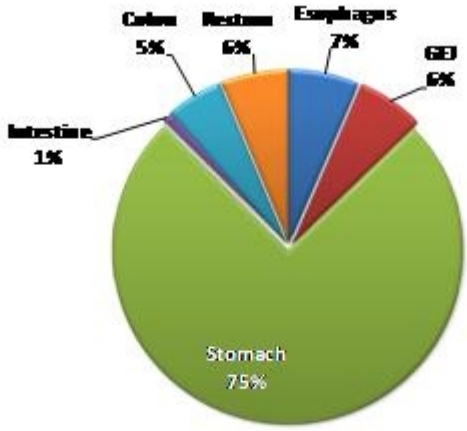

Fig. 1: Distribution of gastrointestinal lesions

Table 1: Endoscopic finding in GI lesions

Type of lesion	No of cases	Ulceration	Growth	Erythematous patch
Ca Esophagus	18	9	9	0
GEJ	18	6	9	3
Adeno Ca. Stomach	171	96	75	0
Inflammatory lesions of stomach	45	18	0	27
TB intestine	3	3	0	0
Ca. Colon	12	3	9	0
Colitis	3	3	0	0
Rectal polyp	9	0	9	0
Ca. rectum	9	0	9	0

Table 2: Type of Lesion with age and sex

Type of lesion	No of cases	Age in years											
		21-30		31-40		41-50		51-60		61-70		71-80	
		M	F	M	F	M	F	M	F	M	F	M	F
Ca Eso	18	0	0	0	0	0	0	6	0	3	6	3	0
GEJ	18	0	0	0	0	0	0	6	3	3	3	3	0
Adeno Ca stomach	171	0	0	12	12	12	21	21	39	9	21	15	9
Inflammatory lesions of stomach	45	12	18	3	6	3	3	0	0	0	0	0	0
TB intestine	3	3	0	0	0	0	0	0	0	0	0	0	0
Ca. colon	12	0	0	0	0	0	0	6	0	3	3	0	0
Colitis	3	0	0	0	0	0	3	0	0	0	0	0	0
Rectal Polyp	9	0	3	0	3	0	0	0	0	3	0	0	0
Ca. rectum	9	0	0	0	0	0	0	3	3	3	0	0	0

Table 3: Endoscopic squash cytology finding

Type of lesion	No. of cases	Inflammatory	Benign	Suspicious	Malignant
Growth esophagus	9	0	0	3	6
Ulcer Esophagus	9	0	0	0	9
GEJ	18	0	0	0	18
Growth stomach	75	0	0	0	75
Ulcer Stomach	141	42	0	21	78
Ulcer Intestine	3	3	0	0	0
Ulcer Colon	6	0	0	3	3
Growth colon	9	0	0	0	9
Rectal Polyp	9	0	6	0	0
Growth rectum	9	0	0	0	9

Table 4: Malignant lesions of stomach

Sl. No	Type of Gastric Carcinoma	No. of cases	Percentage
1	Signet ring cell carcinoma	21	13.28%
2	Tubular adenocarcinoma	84	49.12%
3	Mucinous adenocarcinoma	42	24.56%
4	Papillary adenocarcinoma	24	14.03%

Table 5: Comparison of Cytology Vs Histopathology

Site of Lesions	Cytology			Histopathology		
	Negative	Suspicious	Positive	Benign	Inflammatory	Malignant
Esophagus (18)	0	3	15	0	0	18
GEJ(18)	0	0	18	0	0	18
Stomach (216)	42	21	153	0	43	173
Intestine (3)	3	0	0	0	2	1
Colon (15)	0	3	12	0	1	14
Rectum (18)	9	0	9	9	0	9
TOTAL	**54**	**27**	**207**	**9**	**46**	**233**

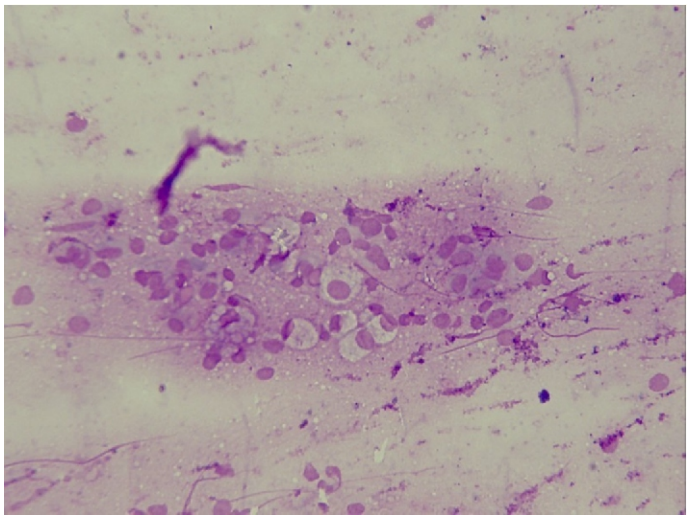

Fig. 2: Smear showing Signet ring cell adenocarcinoma of stomach (H & E X 400)

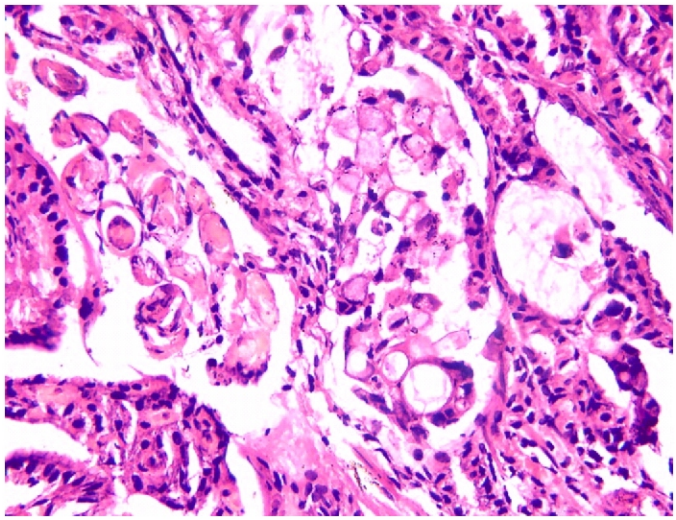

Fig. 3: Histopathology showing signet ring cell adenocarcinoma of stomach (H & E X 400)

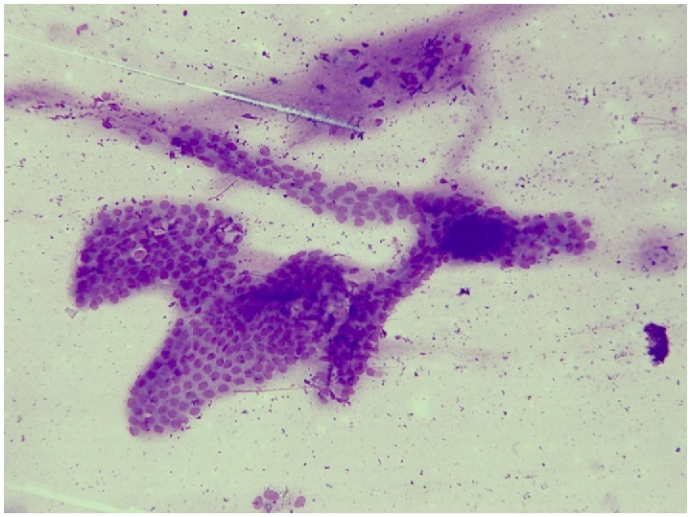

Fig. 4: Smear showing cytology of rectal polyp. (Leishman Stain x 400)

seen with histopathological diagnosis (Table 5)

DISCUSSION

The primary role of GI tract cytology is cancer detection. Endoscopy allows the visualization of mucosal lesions, so that samples can be easily taken from appropriate sites. [9] During the period of 2 years, 288 cases were included in study group. Both cytology and biopsy were performed in all the cases. Majority of cases were in the age group 51 60years, which correlates with the study of K. Vidyavathi et al. Male : Female ratio was 1:1.2 , with slight female preponderance. Out of 288 Gastro-intestinal lesions crush cytology (Squash cytology) were positive for malignancy in 207cases (71.87%), suspicious for malignancy were 27cases (9.37%). Inflammatory lesions were seen in 47 (16.31%) cases. Biopsy study reveals 183 cases of malignancy (63.54%). Out of 27 cases of suspicious for malignancy category, 3 cases were of ulcer esophagus, 21 cases of ulcer stomach, 3 cases of ulcer colon. 26 cases of suspicious for malignancy in cytology proved as malignant in histology.

Single case of ulcer stomach(inflammatory lesion in biopsy) reported as suspicious lesion in squash cytology due to regenerative epithelium showing marked atypia and hyperchromatia in cytology. In a study of 160 patients done by Wok et al , there were 5 false positive cases (3.1%). N. Rout et al compared squash cytology findings with histopathology and obtained 4.8% of false positive cases.[10] Trakeda et al in their study found 1.3% false positive cases.[11] where as Cook found 3.1% false positive cases. But in our study we found only 0.34% of false positive cases. Less false positivity is due to the fact that large amount of tissue was crushed between the slides because of which the morphology almost duplicates the histology appearance. In present study maximum number of cases were adenocarcinoma of stomach i.e. 123 cases (42.27%).We subdivided them into 4 categories as according to all type of arrangement of cells in the smear, In biopsy they were all found to be adenocarcinoma.

In case of endoscopic finding of ulcer intestine in 3 cases, cytodiagnosis was negative for malignancy but histopathology study showed 2 as inflammatory and 1 case was malignant lesion. This false negative case was due to initial necrotic surface of the tumor which was included in cytology and deeper tissue might have been processed during biopsy.

The sensitivity of crush cytology by Batra et al is 81.25% and touch smear is 87.5% and combined brush and biopsy is 100%. [12]The sensitivity of the present study is 97.18 % which is comparable to above sited study findings. Hence, this indicates the usefulness of squash cytology as a screening procedure. The suspicious lesion for malignancy category alerts the clinician about possibility of malignancy, So that repeat endoscopy and biopsy was mandatory.

The limitation of cytology is its inability to distinguish displasia / carcinoma in situ and invasive carcinoma. A tumor diathesis and high cellularity, specific cells such as signet ring cells with malignant cells, pool of mucin with malignant cells are clue to a diagnosis of malignancy and indicate invasion.

CONCLUSION

In conclusion, squash cytology is the single most reliable and accepted technique. When it is combined with histopathology, the accuracy reaches 100% in diagnosing malignant lesions of GI tract. It is an effective, quick, simple, inexpensive and reliable adjunct to endoscopic biopsy and does not require any additional equipment. Advantage of squash cytology is it helps in work up for management of the patients. It gives a positive yield in cases where specimen is inadequate for biopsy. For making definitive diagnosis, squash cytology combined with biopsy gives a very good result. It can be used as a necessary information to clinician for fast management of patients with GI lesions.

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