

Cytodiagnosis in Upper Gastrointestinal Malignancy

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ABSTRACT

Introduction: The role of exfoliative cytology as an adjunct to endoscopic biopsy in the detection of upper gastrointestinal malignancy is controversial insofar as some claim that its use is of little clinical benefit. To evaluate the diagnostic accuracy of upper gastrointestinal with brush cytology as compared to conventional endoscopic biopsies.

Material and Methods: A prospective observational study was conducted prospectively at Dhanalakshmi Srinivasan medical college and hospital in perambalur. Total 45 Patients with clinical signs and symptoms of benign and malignant lesions of the upper gastrointestinal tract was included in the study. The data was collected between April 2018 to March 2019.

Results: The brush cytology had a sensitivity of 72.73% in predicting gastric malignancy of biopsy and Specificity was 75.00%, false positive rate was 25.00%, false-negative rate was 27.27, positive predicting value was 88.89%, negative predictive value was 50.00%, diagnostic accuracy was 73.33%, positive likelihood ratio was 2.91 and negative likelihood ratio was 0.36. In predicting esophageal malignancy in biopsy Specificity was 83.33%, the false positive rate was 16.67%, false-negative rate was 11.11%, the positive predicting value was 88.89%, negative predictive value was 83.33%, diagnostic accuracy was 86.67%, positive likelihood ratio was 5.33 and negative likelihood ratio was 0.13 of brush cytology.

Conclusion: The study concluded that Prompt early endoscopic examination with cytological and biopsy studies in patients with early symptoms may help very much in the early diagnosis and improves the survival rate.

Keywords: Gastrointestinal, Malignancy, Cancer, Gastric

indicates the fact that dysplastic and cancerous cells tend to have fewer and weaker connections to each other and their neighbouring normal cells in the surrounding tissue.⁴ The technique of brush cytology through endoscope retrieves epithelial cells from a large surface area of the mucosa. As malignant cells possess a lower level of intercellular cohesion than normal cells, brushing can selectively sample these dispersive cells. This procedure is non-invasive, cost-effective and has a rapid turn-over time.²

In the recent era, cytopathologic are kept at the lead for evaluation of endoscopically obtained brush cytology samples of the patient management team for deciding about the treatment of GIT lesions. The diagnostic value of upper GIT biopsy is ingrained; however, the value of brush cytology continues as a dispute. Brush cytology frequently complements and expands the sensitivity and specificity of detection of GIT lesions in wider ways such as endoscopic - guided balloon abrasive technique, lavage, or FNA performed under either endoscopic guidance or computed tomographic guidance. Nevertheless brush cytology is the most repeatedly used means of obtaining a sample for the diagnosis of GIT lesions.⁵ The current study was undertaken to evaluate the diagnostic accuracy of upper gastrointestinal with brush cytology as compared to conventional endoscopic biopsies.

MATERIAL AND METHODS

The present study was a prospective observational study, conducted prospectively Dhanalakshmi Srinivasan medical college and hospital in perambalur. Patients with clinical signs and symptoms of benign and malignant lesions of the upper gastrointestinal tract were included in the study. The data was collected between April 2018 to March 2019.

The inclusion criteria of the study were patients aged above

INTRODUCTION

The worldwide scenario states that gastrointestinal cancers, comprising of esophageal, gastric and colorectal cancers, are some of the most common and life-threatening cancers worldwide.¹ In India, male population esophageal and gastric cancers are commonly found, while esophageal cancer ranks third among women after the carcinoma of breast and cervix. When found in advance, esophageal malignancies are asymptomatic and highly curable. Diagnosis of most of the malignancies is woefully seen when the disease reached the advanced stage.²

The emergence of endoscopy and endoscopic biopsy has immensely eased the detection with the diagnosis of gastrointestinal lesions but, the diagnostic value of cytology has received less appreciation in the evaluation of malignant lesions.³

The procedure of cytology, without consideration of its application to cervical, bladder or oral mucosal lining,

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18 years, both genders, presenting with symptoms suggestive of upper GI involvement like upper abdominal discomfort, dysphagia, upper GI bleeding and associated loss of weight and loss of appetite. Patients with a past history of gastric malignancy and upper GI surgery were excluded from the study.

A total of 45 subjects were included in the study. All the eligible subjects were sampled into the study by convenient sampling. The study was approved by the institutional ethical committee and informed written consent was obtained from all the participants.

All the subjects were evaluated by thorough clinical history and examination. Brush cytology with endoscopic biopsy was performed on them. Biopsy sections were stained with haematoxylin and eosin, cytology specimens with H & E and in a few special cases with PAS and Pap's stain. The cytological and histopathological examinations were done separately, and finally, both were compared and correlated.

The data were presented as mean and standard deviation for quantitative variables, frequency and proportion for categorical variables. Brush cytology findings were considered as a screening test, and biopsy findings were considered as a gold standard. Sensitivity, specificity, positive, negative predictive value and diagnostic accuracy of the screening test calculated. The biopsy was considered a gold standard. Brush cytology was considered as screening tests. The sensitivity, specificity, predictive values and diagnostic accuracy of the screening test along with their 95% CI were presented. Reliability of the screening test was assessed by kappa statistic along with its 95% CI and p Value. P value < 0.05 was considered statistically significant. IBM SPSS version 22 was used for statistical analysis.

RESULTS

A total of 45 subjects included in the final study.

Among the study population, the majority of participants 17 (37.8%) were aged ≥ 60 years, including 37(82.2%) male and remaining 8(17.8%) female population. (Table 1) Among the people who were positive gastric malignancy in the biopsy, 16 (72.73%) showed a positive result in brush cytology. Participants who were negative in the biopsy, 2 (25%) showed positive in brush cytology. The difference in the proportion of brush cytology and biopsy results was statistically significant. (P value 0.018) (Figure 1)

The brush cytology had a sensitivity of 72.73% in predicting

Parameter	Summary
Age group	
<30	5 (11.1%)
30-39	5 (11.1%)
40-49	7 (15.6%)
50-59	11 (24.4%)
≥ 60	17 (37.8%)
Gender	
Male	37(82.2%)
Female	8(17.8%)

Table-1: Baseline characteristics of the study population (N=45)

Parameter	Value	95% CI	
		Lower	Upper
Sensitivity	72.73%	49.78%	89.27%
Specificity	75.00%	34.91%	96.81%
False positive rate	25.00%	3.19%	65.09%
False negative rate	27.27%	10.73%	50.22%
Positive predictive value	88.89%	65.29%	98.62%
Negative predictive value	50.00%	21.09%	78.91%
Diagnostic accuracy	73.33%	54.11%	87.72%
Positive likelihood ratio	2.91	1.18	6.416
Negative likelihood ratio	0.36	0.04	0.802

Table-2: Predictive validity of brush cytology as compared to biopsy in the diagnosis of gastric malignancy (N=30)

Parameter	Value	95% CI	
		Lower	Upper
Sensitivity	88.89%	51.75%	99.72%
Specificity	83.33%	35.88%	99.58%
False positive rate	16.67%	0.42%	64.12%
False negative rate	11.11%	0.28%	48.25%
Positive predictive value	88.89%	51.75%	99.72%
Negative predictive value	83.33%	35.88%	99.58%
Diagnostic accuracy	86.67%	59.54%	98.34%
Positive likelihood ratio	5.33	1.11	35.029
Negative likelihood ratio	0.13	0.01	0.876

Table-3: Predictive validity of brush cytology as compared to biopsy in the diagnosis of esophageal malignancy (N=15)

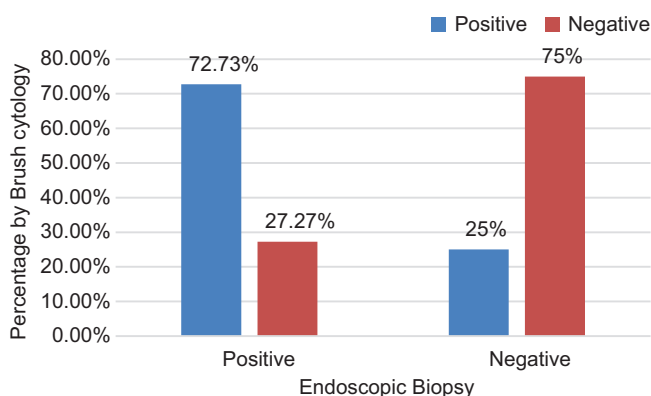


Figure-1: Comparative bar chart of association between brush cytology as compared to biopsy in the diagnosis of gastric malignancy (N=30)

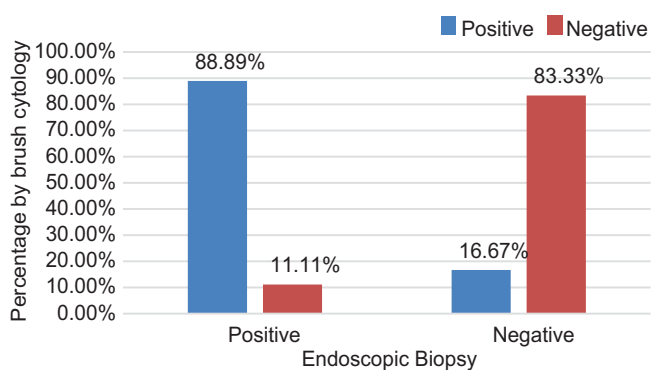


Figure-2: Comparative bar chart of association between brush cytology as compared to biopsy in the diagnosis of esophageal malignancy (N=15)

gastric malignancy of biopsy. Specificity was 75.00%, the false positive rate was 25.00%, false-negative rate was 27.27, the positive predicting value was 88.89%, negative predictive value was 50.00%, diagnostic accuracy was 73.33%, positive likelihood ratio was 2.91, and negative likelihood ratio was 0.36. (Table 2)

Among the people who were positive esophageal malignancy in the biopsy, 8 (88.89%) had positive in brush cytology. Subjects who got negative esophageal malignancy in the biopsy, 1 (16.67%) had positive in brush cytology. The difference in the proportion of brush cytology and biopsy about esophageal malignancy was statistically significant. (P value 0.005) (Figure 2)

The brush cytology had a sensitivity of 88.89% in predicting esophageal malignancy in the biopsy. Specificity was 83.33%, the false positive rate was 16.67%, false-negative rate was 11.11%, the positive predicting value was 88.89%, negative predictive value was 83.33%, diagnostic accuracy was 86.67%, positive likelihood ratio was 5.33, and negative likelihood ratio was 0.13. (Table 3)

DISCUSSION

The gastrointestinal tract can be affected by malignancy in any of its portions. Endoscopic biopsy and cytology are considered as traditional methods in diagnosis of upper gastrointestinal tract malignancies.⁶ GI cytology plays a role to diagnose infectious processes and malignancy in immunocompromised patients, as well as in the surveillance of patients with Barrett's esophagus or with inflammatory bowel diseases.⁷ The present study had a population of age group starting from less than 30 years to more than or equal to 60 years. The male population showed the majority in numbers as compared to the female population.

A study was included 45 patients with the age of the patients ranged from 24 to 70 years, with a mean age to be 54.32 years. The results obtained concluded that the brush cytology is a very efficient procedure for the diagnosis of GI malignancies at it is inexpensive, provides rapid diagnosis, and minimal discomfort to patients. Cytology can be used as an adjunct to biopsy in the diagnosis of upper GIT neoplasms.⁸

In prospective study on 123 brush cytology showed high sensitivity and specificity (98.57 and 96.23%, respectively) in detecting the disease, and high accuracy (97.5%) comparable to that provided by histopathology which is the accepted gold standard which concluded that brush cytology specimens preserved in liquid medium may be a good alternative for ESCC diagnosis.⁹ In our study, the difference in the proportion of brush cytology and biopsy results were statistically significant. Another research suggested that endoscopic biopsy and cytology be done together, especially in highly suspected cases to malignancy.¹⁰

A case review of 406 patients stated that brush cytology, in conjunction with other clinical and radiological investigations, is a useful technique in the assessment of patients with suspected pancreatic–biliary neoplasia.¹¹ In our study, Predictive validity of brush cytology as compared to biopsy in the diagnosis of gastric malignancy had a

sensitivity of 72.73% and Specificity was 75.00%.

A study showed overall sensitivity of upper gastrointestinal brush cytology as 83.45% and specificity 80.95%. The accuracy of brush cytology came out to be 82.37% in the upper gastrointestinal tract.¹² Our study also revealed that brush cytology had a sensitivity of 88.89% in predicting esophageal malignancy in a biopsy with Specificity of 83.33%. Another research on cytohistological discordance showed that Inadequacy of cytological sample and overlap of nuclear atypia caused by regenerative changes and malignancy were significant factors for cytohistological discordance which concluded that there could be an improvement in the diagnostic accuracy of brush cytology taking appropriate measures to eliminate factors responsible for fallacies in cytological diagnosis.¹³

CONCLUSION:

Brush cytology may be considered as an effective diagnostic screening method in poor resource settings, due to its high sensitivity and specificity. The study concluded that Prompt early endoscopic examination with cytological and biopsy studies in patients with early symptoms may help very much in the early diagnosis and improves the survival rate.

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Declarations

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