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Original article

Endoscopic sampling techniques in gastro-esophageal malignancies -A combined approach for a better diagnosis

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ABSTRACT

Aim: To evaluate the diagnostic accuracy of various endoscopic sampling techniques in diagnosis of gastroesophageal malignancies. Methods: Fifty two suspected gastro-esophageal malignancies were studied from 2005-2007. The gross appearances of the suspected lesions were noted following endoscopy, and three cytological sampling techniques were applied in all the cases along with biopsy , like brushing before and after biopsy and fine needle aspiration cytology. Cytology smears were fixed and routinely stained .Tissue obtained on biopsy was routinely processed and stained with hematoxylin and eosin. Results and Conclusion : Brush cytology revealed- sensitivity(92.3%), specificity(82%) and diagnostic accuracy(84.2%), proving better in diagnosing tumours with ulcerated surface. Endoscopic FNAC was found to have sensitivity(96%), specificity(90%) and diagnostic accuracy(98%), the efficiency of this technique was better in necrotic, stenotic and infiltrative gastro-esophageal malignancies. Biopsy showed-sensitivity(92.4%), specificity(95%) and diagnostic accuracy(96%). As various combination of the techniques increased the overall diagnostic accuracy drastically, the final diagnosis after performing such sampling methods and considering the nature of the tumour, would contribute to higher efficiency in diagnosis of gastroesophageal neoplasms.

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1.Introduction:

Endoscopy of the gastrointestinal tract allows a gross description of lesions and permits sampling of tissue for a definitive diagnosis. The ultimate diagnosis of malignancy is based on histologic or cytologic criteria[1].

Various endoscopic techniques like brushing-before(BB) or after (BA) biopsy, forcep biopsy, fine needle aspiration cytology, touch smear, crush smear, suction cytology and salvage cytology are being increasingly utilized for obtaining good diagnostic yield. The technique of washings from upper gastrointestinal malignancies was used much before the advent of endoscopes[2].

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Brushings give good yield and has diagnostic accuracy in tumors with eroded or ulcerated surface, while endoscopic FNAC proves to be a simple, safe and reliable technique in obtaining higher yield and diagnostic accuracy in necrotic, deeply infiltrative, stenotic tumours and those located submucosally or in cardia / antrum. It is also found to be effective in diagnosis of those tumours with ulcerated or eroded surface, where brushing cytology would be inconclusive[3].

Cytology is a valuable adjunct to biopsy; the combined yield of the two is superior to that of either technique[1].

2.Materials and Methods

The patients with complaints like dysphagia, vomiting , retrosternal pain, dyspepsia or weight loss attended to out patient clinic of Goa Medical College, Bambolim and were subjected to upper gastrointestinal endoscopy using flexible upper gastrointestinal endoscope- Pentax. The study period was of 3

years(2005-2007) duration. The suspected malignancies were observed endoscopically as proliferative, ulcerative, ulcero-necrotic or infiltrative. Various cytological techniques were undertaken along with biopsy and are as follows: endoscopic brushing before and after biopsy and fine needle aspiration cytology. The material obtained after introducing the Cytobrush through separate channel in endoscope upto the lesion followed by moving the brush over the lesion yielded exfoliated cells in it which was later spread on the glass slide and smears were made. Likewise FNAC was performed by passing needle with syringe through endoscope. Once the needle was within the target area, repeated to and fro movements were performed under negative pressure by applying gentle suction with syringe in order to obtain diagnostic material which was subsequently smeared on the slide. Biopsy was later performed with forceps and lastly brushing was done after biopsy. The material obtained by cytological techniques was fixed in alcohol and stained by routine hematoxylin and eosin. The tissue achieved by biopsy was processed and stained routinely. Slides were interpreted according to WHO criteria for reporting of upper gastrointestinal mucosal biopsies.

Smears were categorized into positive, negative and suspicious in each of the sampling techniques applied. False positive cases were those malignant smears which were negative on biopsy. False negative cases which were negative for malignancy by cytology and positive on biopsy.

3.Results and Discussion

In this study, 52 cases of gastro-esophageal malignancies were obtained. The gastro esophageal malignancies had its peak in the age group 50-60 years, youngest patient was 28 years and oldest was 75 years old. Most common clinical complaints were abdominal pain(68%) followed by dysphagia(15%) , weight loss(10%), anorexia(5%) and abdominal mass(2%).

Table 1 Cytological techniques
Table 2 Various techniques and comparison of their diagnostic yield
Table 3 Cytological diagnosis

Table 1 Categorisation of diagnosis on various sampling techniques

	Esophagus				Stomach				
	Total	Positive	Negative	Suspicious	Total	Positive	Negative	Suspicious	Total % positive cases
1.Brushing before biopsy	29	22	2	5	23	18	2	3	76.9%
2.Brushing after biopsy	29	25	2	3	23	18	2	4	80.7%
3. FNAC	29	26	0	3	23	21	0	2	90.3%
4. Biopsy	29	26	1	2	23	23	0	0	94.2%

Table 2 Various techniques and comparison of their diagnostic yield

Biops	Brushing	FNAC	Ingoldby et al [4]	Present study
+	+	+	50%	90%
+	–	–	10%	2%
–	+	–	10%	8%
–	–	+	20%	15%
–	–	–	10%	5%

Table 3 Cytological diagnosis

Site	No. of cases(%)
1)Esophagus	26(53 %)
a)Squamous cell carcinoma	19
b)Poorly differentiated carcinoma	7
2)Stomach	23(47 %)
a)Adenocarcinoma	18
b)Poorly differentiated carcinoma	5

Table 4 Comparison of diagnostic accuracy of various individual techniques

	Biopsy	FNAC	Brushing	Brushing+Biopsy	FNAC+Brushing+Biopsy
Kochar et al[8]	88.8%	89.1%	80.4%	93.5%	100%
Zargar et al [5]	87.2%	94%	84.9%	90.9%	98.5%
Present study	89%	95%	78.4%	99%	100%

Table 5 Diagnostic accuracy of combinations of various endoscopic techniques

	BB+BA	BB+FNAC	BB+Biopsy	BA+FNAC	BA+Biopsy	FNAC+Biopsy	All techniques
Malhotra et al [9]	90%	96%	100%	100%	100%	100%	100%
Present study	88%	92%	99%	100%	99%	100%	100%

Table 6 Nature of the tumour and its diagnostic accuracy by various techniques

	Zargar et al [5]			Present study		
Appearance	**FNAC**	**Brushing**	**Biopsy**	**FNAC**	**Brushing**	**Biopsy**
1.Proliferative	95%	93%	100%	98%	96.6%	100%
2.Ulcerative	90%	90%	98%	92%	95%	98%
3.Ulceronecrotic	90%	36%	45%	97%	90%	92%
4.Infiltrative	96%	90%	79%	98%	88%	90%

Figure 1 Endoscopic Brush cytology-adeno carcinoma of stomach(H & E,40 x)

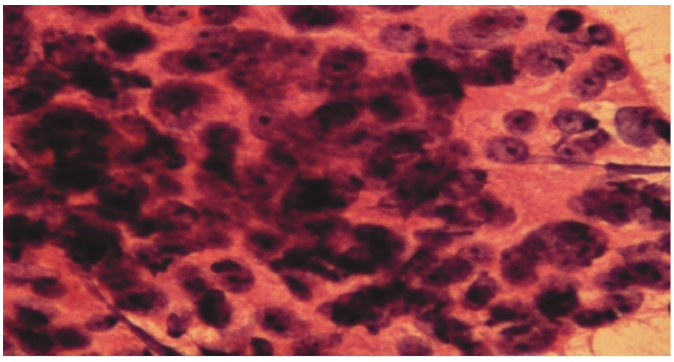


Figure 2 Endoscopic FNAC- adeno carcinoma of stomach (H & E,10 x)

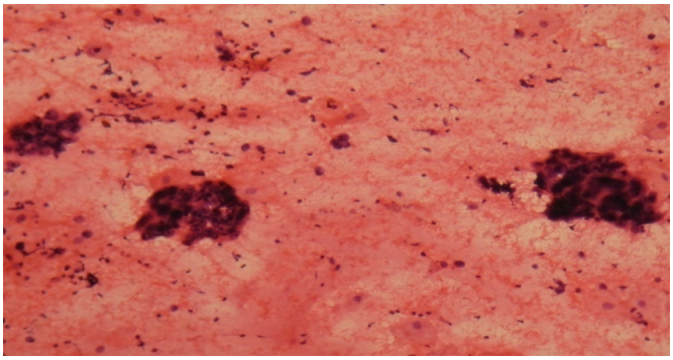
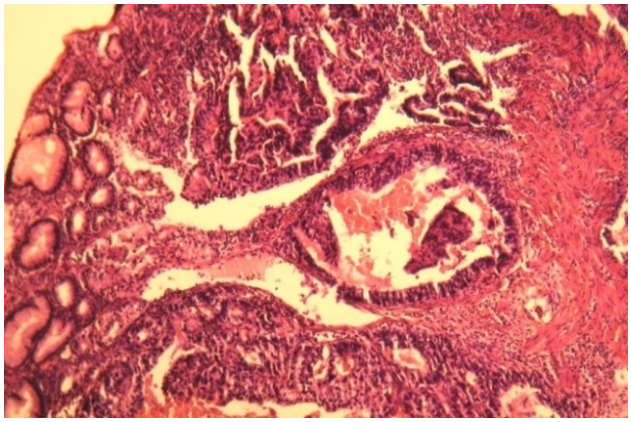


Figure 3 Biopsy-adenocarcinoma of stomach (H & E,10 x)



3.1.Esophagus

Among cytological techniques, brushing cytology proved better diagnostic tool for ulcerative neoplasms than proliferative category. Among esophageal brushings, 2 cases were false positive(both were ulcerative and showed reparative and inflammatory atypia).False negative category included 3 cases(2 necrotic and 1 proliferative). Endoscopic FNAC gave excellent diagnostic yield. However in 1 case, it was false negative due to scanty yield and there were no false positive cases. Candidial hyphae were observed in 2 cases of squamous cell carcinoma. Among biopsy, 2 cases were false negative and were necrotic(1) and stenotic(1) in nature.

3.2.Stomach:

Gastric malignancies in this study revealed 3 false positive and 1 false negative cases on brush cytology, as ulcerative nature of the tumour exhibits regenerative and inflammatory atypia. Tumours which had smooth surface revealed no malignant cells by this technique. Endoscopic FNAC revealed 1 false positive and 1 false negative cases.

On biopsy, 5 cases were false positive and all were ulcerative malignancies with reactive atypia. False negative category included 2 cases –one was necrotic and other was infiltrative type of malignancy.

Comparative study of overall endoscopic sampling techniques in diagnosing gastro-esophageal malignancies.

Brush cytology- Sensitivity-92.3%, Specificity-82%, Diagnostic accuracy-84.2%

Endoscopic FNAC-Sensitivity-96%, Specificity-90%, Diagnostic accuracy-98%

Biopsy-Sensitivity-92.4%, Specificity-95%, Diagnostic accuracy-96%

The usefulness of cytological examination of the gastrointestinal tract is dependent upon a number of factors such as sampling, specimen preparation, the expertise and knowledge of the cytologist and the recognition of the limitations of cytology.

Wiiliam D Johnson et al in their study analysed and documented that cytology forms useful adjunct to biopsy especially wherever the latter fails to diagnose. Rolf Jorde et al observed diagnostic accuracy of 86% for carcinoma detection through specimens obtained endoscopically[6].

With better and more advanced endoscopes, biopsy has been advocated the best choice over cytology with the exception of stenosed lesions.It have become more accurate as histologic and endoscopic techniques have improved accuracy to 98.5% [7]. However, endoscopic intra-lesional FNAC is preferred cytological technique as it gave better cellular yield compared to brushings and washings. Its validity was confirmed by first applying it on surgically resected gastric carcinoma. C J Ingolgby et al[4] derived from his study that it is useful particularly when tumour is deep to mucosa or necrotic slough. Combination of cytology and biopsy can detect 95% of gastrointestinal malignancies. K Vidyavathi et al[1]undertook a study and found that 86.6% of upper gastrointestinal malignancies were positive by cytology and 77.3% by biopsy.

Kocchar et al[8] introduced the novel technique of endoscopic fine needle aspiration cytology and compared its efficacy with brushings and biopsy, thus confirming that combination of these techniques improves the diagnostic accuracy to 100% especially in infiltrative tumours.

Table 4 Comparison of diagnostic accuracy of various individual techniques

Table 5 Diagnostic accuracy of combinations of various endoscopic techniques

Table 6 Nature of the tumour and its diagnostic accuracy by various techniques

Our study is relatively consistent with those by other authors .When sampling techniques were used in isolation, the diagnostic sensitivity was less. But combination was found to have higher sensitivity, specificity and diagnostic accuracy.

4.Conclusion

Gastroesophageal malignancies are one of the leading causes of death worldwide. The advent of endoscopy along with various sampling techniques like brush cytology and endoscopic fine needle aspiration cytology etc, has greatly facilitated their detection and diagnosis. However, combination of endoscopic cytological and biopsy techniques helps in accurate diagnosis of upper gastrointestinal malignancies and reduces the rate of false negativity and enable the pathologist to give appropriate diagnosis, but with the expertise of the cytology and recognising the limitations of the same.

This would in turn enhance the survival rate tremendously as the malignancy would be diagnosed early and management can be favourably modified. Thus the techniques are complimentary and when used in combination will help to achieve better diagnostic accuracy.

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