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Original Article

Endoultrasound versus Conventional Image Guided (CT/US) Fine Needle Aspiration in Diagnosis of Pancreatic Malignancy

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Abstract

Background: The emergence of endoultrasound (EUS) has shown this modality to be an excellent method of detecting and staging lesions in the pancreas with a low rate of complications. Controversy has arisen about whether the approach with the conventional image (CT/US) guided FNA or endoultrasound (EUS) guided FNA is the preferred method to obtain cells from suspicious mass.

Objectives: To assess the diagnostic efficacy of endoultrasound guided fine needle aspiration (EUS FNA) versus conventional imageguided fine needle aspiration (CT/US FNA) in pancreatic malignancy.

Methodology: Twentyeight cases of clinically suspected patients of pancreatic malignancy were included in the study. Each enrolled patient underwent to either a conventional image guided fine needle aspiration or endoultrasound guided fine needle aspiration of the pancreatic mass for diagnosis of pancreatic malignancy. Data were analyzed with the help of SPSS version 23. Statistical analysis was done by student t-test and Chi square ($\div^2$) test. Statistical significance was set at $p<0.05$.

Result: Diagnostic accuracy in terms of distinguishing the cytopathology was 57.1% in conventional image(CT/US) guided FNA group and 85.7% in EUS guided FNA group. These values were numerically convincing for preferring EUS guided FNA method but was statistically insignificant. Again, if we consider the diagnosis of malignancy alone the values were 35.7% and 64.3% for CT/US guided FNA and EUS guided FNA respectively. This was also not significant statistically.

Conclusion: Numerically EUS guided FNA showed better precision in detecting pancreatic malignancy and thereby its accuracy in yielding adequate tissue sample for cytological evaluation and inference.

Key words: Endoultrasound, Fine Needle Aspiration, Pancreatic Malignancy, Cytology.

Introduction:

Endoultrasound has excellent accuracy to diagnose pancreatic malignancy. Recent meta analyses reported a pooled sensitivity for the diagnosis of pancreatic malignancy based on cytology of 85.0% and 89%, and a pooled specificity of 98% and 99% respectively[1]. The emergence of endoultrasound (EUS) has shown this modality to be an excellent method of detecting and staging lesions in the pancreas with a low rate of complications (<2%)[2,3] and risks are no more than upper-GI endoscopy. As retrospective studies have shown, endoultrasound guided fine needle aspiration of the pancreas is comparable with conventional image (CT/US) guided FNA and even surgery for tissue yield[4,5]. EUS offers real-time images[6] while performing FNA for sampling pancreatic lesions under direct visualization[7]. The feasibility varies from 90% to 98% and the efficiency in terms of collecting analyzable cytological specimens varies from 80% to 95%. For the diagnosis of pancreatic adenocarcinomas, the sensitivity of EUS guided FNA varies from 75% to

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90%, the specificity being 82% to 100%, with a mean accuracy of 85%[3,8].

Initial results of cytology by conventional image(CT/US) guided FNA and EUS guided FNA were compared with final histology from surgical pathology had shown the sensitivity of CT/US guided FNA was 62% and EUS guided FNA was 84% respectively and diagnostic accuracy were 72% and 89% respectively[9].

The concern over needle tract seedling with conventional image guided FNA raised the favourability of EUS guided FNA as the preferred sampling technique in pancreatic masses if it is available. The establishment of EUS with aspiration needle helps in accurate identification of the lesion, it's aspiration for cytological diagnosis and staging in pancreatic malignancy.

This study observed the two modalities for preoperative cytological diagnosis of clinically suspected pancreatic malignancy and attempted to compare the two options based on their adequacy of tissue acquisition,diagnostic accuracy and procedure related complication rate which might help clinicians to choose the more suitable, feasible and accurate method.

Methods:

This is a cross sectional comparative studycarried out in the Department of General Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Shahbag, Dhaka over a period of 1 year; from April 2019 to March 2020.

Twenty eight suspected cases of pancreatic malignancy on the basis of prior clinical evaluation, abdominal Ultrasound or Computed tomography who required a pancreatic tissue diagnosis were included in the study. Each enrolled patient underwent to either a conventional image guided (CT/US) fine needle aspiration or endoultrasound guided fine needle aspiration of the pancreatic mass.

Results

Table I. *Distribution of the patients according to socio-demographic variable (n=28)*

Socio-demographic variables	Procedure CT/US(n=14)	Procedure EUS(n=14)	p value
Age (mean±SD)	51.0±6.9	46.9±15.5	0.374[c]
Sex (%)Male	9 (64.3)	8 (57.1)	0.699[a]
Female	5 (35.7)	6 (42.9)	

Table I shows the mean age of conventional image(CT/US) guided FNA group (n=14) is 51.00 ± 6.94. Whereas, the mean value of EUS guided FNA group (n=14) is 46.86 ± 15.52.

The male and female ratio in conventional image (CT/US) guided FNA group (n=14) was 9:5. But it was 8:6 in EUS guided FNA group (n=14). There were no significant difference of age and sex in between two procedures (p>0.05).

Table-II. *Distribution of the patients according to Pre-procedure radiology and imaging: CT/US and EUS by sample collection procedure (n=28)*

Pre-procedure radiology and imaging:CT/US and EUS	Procedure CT/US (n=14)	Procedure EUS (n=14)	P value
Size of mass [max diameter only]			
2-2.5	11 (78.6)	8 (57.1)	
2.5-3	1 (7.1)	1 (7.1)	
3-3.5	2 (14.3)	5 (35.7)	
Mean ± SD	2.40±0.39	2.69±0.59	0.135[b]
Location			
Head	14 (100.0)	12 (85.7)	0.481[a]
Body	0 (.0)	2 (14.3)	

[a]Fisher's Exact test, [b]Unpaired t test was done
Figure within parenthesis indicates in percentage.

Table-II shows mean mass size and their location within pancreas. The mean size of the mass (in cm) in conventional image(CT/US) guided FNA group (n=14) was 2.40 ± 0.39. Whereas, the mean value of the same in EUS guided FNA group (n=14) was 2.69 ± 0.59. (p value is 0.135).

Table 3. *Distribution of the patients according to FNA outcome by sample collection procedure (n=28)*

FNA outcome	Procedure CT/US (n=14)	Procedure EUS (n=14)	p value[a]
Adequate cells for diagnosis	8(57.1)	12(85.7)	0.209
Inadequate cells	5(35.7)	0(0.0)	0.041
Nopancreatic cell at all	1(7.1)	2(14.3)	0.999

[a]Fisher's Exact test was done
Figure within parenthesis indicates in percentage.

Table-III shows the FNA outcome of the comparative groups. 8 out of 14 patients (57.1%) in conventional image(CT/US) guided FNA group (n=14) had Adequate cells for diagnosis. This value was 12 (85.7) in EUS guided FNA group (n=14). p value is 0.209.5 out of 14 patients (35.7%) in conventional image (CT/ US) guided FNA group (n=14) had Inadequate cells for diagnosis. This value was 0 (0.0) in EUS guided FNA group (n=14). p value is 0.041.1 out of 14 patients (7.1%) in conventional image(CT/US) guided FNA group (n=14) had No Pancreatic cells at all for diagnosis. This value was 2 (14.3) in EUS guided FNA group (n=14), (p value is 0.999).

Table-IV. *Distribution of the patients according to FNAC inference by sample collection procedure (n=28)*

FNAC Inference	Procedure		p value
	CT/US (n=14)	EUS (n=14)	
Positive for malignancy	5 (35.7)	9 (64.3)	0.131[a]
No malignancy	3 (21.4)	2 (14.3)	0.999[b]
Inconclusive	6 (42.9)	2 (14.3)	0.209[b]
Other diagnosis (Benign/lymph node)	0 (0.0)	1 (7.1)	0.999[b]

[a]Chi-square test and [b]Fisher's Exact test was done
Figure within parenthesis indicates in percentage.

Table-IV shows the FNAC inference of the comparative groups. 5 out of 14 patients (35.7%) in conventional image(CT/US) guided FNA group (n=14) was diagnosed positive for malignancy. This value was 9 (64.3%) in EUS guided FNA group (n=14). p value is 0.131.3 out of 14 patients (21.4%) in conventional image(CT/US) guided FNA group (n=14) was diagnosed as No malignancy. This value was 2 (14.3%) in EUS guided FNA group (n=14). p value is 0.999.6 out of 14 patients (42.9%) in conventional image(CT/US) guided FNA group (n=14) was diagnosed as Inconclusive. This value was 2 (14.3) in EUS guided FNA group (n=14). p value is 0.209. Finally, 0 out of 14 patients (0.0%) in conventional image(CT/US) guided FNA group (n=14) was diagnosed as benign/ lymph node disease. This value was 1 (7.1%) in EUS guided FNA group (n=14), (p value is 0.999).

Discussion

In the 28 patients there was no significant difference in the socio-demographic variables of the two groups. However, this insignificance is important in comparing other variables.

The clinical features we had taken into consideration were comparable in both groups since there was no statistically significant difference found in any of the parameters.

A recently published retrospective study of 1000 cases of pancreatic FNA also found that EUS guided FNA was more accurate than conventional image guided techniques for masses <3 cm[10,11].In our study we found that the mean size of the lesion in conventional image (CT/US) guided FNA group was 2.40 ± 0.39 cm and the mean size of the lesion in EUS guided FNA group was 2.69 ± 0.5, numerically this finding supports the previous studies. However, this difference was not statistically significant.

The number of needle pass is of value in obtaining adequate tissues from the suspected lesions. One of the reasons why EUS guided FNA challenges conventional image (CT/US) guided FNA is its relatively lesser chance of injuring intra-abdominal tissues due to shorter needle course and more precise outlining of the pathological mass. Due to the smaller size of the lesions precise targeting is a must. Also, EUS and EUS FNA avoid the risk of cutaneous or peritoneal contamination that may occur with conventional image (CT/US) guided investigations and is less invasive than surgical interventions. As a result, EUS guided FNA of pancreatic masses is becoming the standard for obtaining cytological diagnosis[12].

Considering the tissue yield accuracy, we found that 8/14 (57.1%) of CT/US guided FNA had adequate cells for diagnosis and the number was 12/14(85.7%) in the EUS guided FNA group. Five patients were found to have inadequate cells for making an inference of the tissue report in the CT/US guided FNA group.Inadequate cells were found significantly higher in CT/US compared to EUS. Recently, Horwhat et al.[10] present the unique randomized, prospective cross-trial of EUS guided FNA versus conventional image (CT/ US) guided FNA for diagnosing cancer in pancreatic mass lesions.

In our study, we have categorized the FNA cytology inferences in four groups- positive for malignancy,

no malignancy, other specific diagnosis (Pancreatitis, Lymph nodes etc.) and inconclusive. These values were numerically convincing for preferring EUS guided FNA method but was statistically insignificant. Again, if we consider the diagnosis of malignancy alone the values were 35.7% and 64.3% for CT/US guided FNA group and EUS guided FNA group respectively. This was also not significant statistically.

A few patients had some minor complaints of pain, fever and nausea in both the groups. But none of those were statistically significant. We found no case of procedure induced bleeding manifestations or other organ injuries. Micames et al.[13] with their retrospective, non-randomized series comparing CT guided FNA with EUS guided FNA of pancreatic masses showed that there were significantly more peritoneal failures after neoadjuvant chemoradiation in patients having had CT guided procedure (16.3%) versus EUS guided FNA (2.2%) procedure.

Conclusion

Numerically EUS guided FNA shows better precision in detecting pancreatic malignancy and thereby its accuracy in yielding adequate tissue sample for cytological evaluation and inference. But claiming it as a superior modality or advocate it as preferred method to conventional image (CT/US) guided FNA was not justified from statistical point of view.

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