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Original Article

Safety and Effectiveness of Endoscopic Ultrasound-Guided Fine Needle Biopsy for Retroperitoneal and Gastrointestinal Tumors in Elderly Patients

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SUMMARY

Background: Endoscopic ultrasound with fine needle biopsy (EUS-FNB) is the most useful procedure to obtain tissue samples for confirmation of pancreaticobiliary disease. It was a relative mini-invasive procedure had low complication rate in overall patients. However, there was no study to observe the safety and effectiveness of EUS-FNB in elderly patients.
Methods: We compared the clinical which including the Charlson comorbidity index (CCI) and antithrombotic agents using in elderly patients, tumor factors and EUS characteristics between elderly and younger patients who underwent EUS-FNB in our hospital.
Results: Total we enrolled 41 elderly patients ≥ 70 years old who underwent EUS-FNB between April 2019 to January 2021. Most of the elderly patients had high Charlson comorbidity index, and there were 29.3% patients using antithrombotic agents. There were no significant differences in adverse events or cytopathological diagnostic rate between younger and elderly patients.
Conclusion: EUS-FNB is a safe and effective diagnostic procedure for elderly patients, even for those with comorbidities or who use antithrombotic agents.

1. Introduction

Endoscopic ultrasound (EUS) is one of the most important tools used to assess pancreaticobiliary disease. Compared to surgical biopsy, EUS-guided fine needle aspiration/biopsy (EUS-FNA/FNB) is a relatively less invasive procedure to obtain tissue samples.[1] According to previous literature, Attila and Faigel had proven that EUS-FNB is safe in the management of GI, pancreatobiliary, and mediastinal diseases of patients more than 80 years old,[2] on the other way, Lin et al. said that although EUS-FNA is safe and well tolerated in the elderly patients (> 70 years old), but a lower EUS-FNA diagnosis accuracy (50%) was found.[3] Furthermore, there was no study to compare the clinical factors between the younger and elderly groups of patients who underwent FNB. In this study, we aim to evaluate the safety and effectiveness of EUS-FNB in elderly patients, particularly those with comorbidities or who use antithrombotic agents.

2. Materials and methods

2.1. Patient characteristics and data collection

The Institutional Review Board of Mackay Memorial Hospital in Taipei, Taiwan approved the protocol for this retrospective study. We reviewed the cases of patients who underwent EUS-FNB for retroperitoneal and gastrointestinal tumors at Mackay Memorial Hospital from April 2019 to January 2021. All patients are adult ≥ 20 years old. We excluded patients who had a post-procedure follow-up less than one week.

The following data were recorded from the patients: personal and clinical demographics, including age, sex, Charlson comorbidity index (CCI), and use of antithrombotic agents; target tumor characteristics, including location, size, solid or cystic features, and final diagnosis; the number of puncture passes; cytopathological results; and adverse events, including bacteremia, cholangitis, acute pancreatitis, hemorrhage, abdominal pain, and esophageal perforation. A malignant diagnosis was made either by FNB, surgical or transabdominal echo-guided liver biopsy. Patients with a benign diagnosis needed to be followed up after six months to avoid missing a diagnosis.

The enrolled patients were divided into two groups according to their age, the younger group consisting of patients < 70 years old and the elderly group consisting of patients ≥ 70 years old. We compared the target tumor characteristics and EUS-FNB findings between the two groups. We adjusted the intake of antithrombotic agents before EUS-FNB based on the guidelines,[4] such as hold Plavix 5 days before procedure.

2.2. Procedure

All EUS-FNB procedures were performed by endoscopists, who were experts on EUS and FNA.[5] Patients were in the left lateral decubitus position under moderate sedation using midazolam and fentanyl. A curvilinear echoendoscope (GF-UCT260, Olympus, Japan) and a 22-gauge needle (Acquire™, Boston Scientific, Natick,

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MA, USA) were used for this procedure. A standard fanning method was used for FNB. Biopsy tissues were collected and prepared by the endoscopists themselves. A macroscopic on-site evaluation was done, but no rapid on-site cytological evaluation. The technical success was defined as ability to obtain tissue from the target lesion.

2.3. Cytopathological results

The diagnostic criteria used for cytological diagnoses was determined by the cytopathologist. Negative means the ductal epithelium with a well-organized honey-combed pattern, uniform size nuclei, with fine granular chromatin and in-conspicuous nucleoli; and malignant ductal epithelium which cells have lost the honey-combed arrangement, have varying nuclear size, irregularity in nuclear contour, vesicular nuclei, and a prominent nucleolus. Positive cytopathological results, defined as cytological or histological reports, were suggestive of malignancy. In contrast, negative and atypia reports were classified as false negative in malignancy patients. The diagnostic accuracy rate was defined as the number of patients that were correctly classified as benign or malignant.

2.4. Statistical analyses

Statistical analysis was performed using the SPSS software (Chicago, IL, USA). Differences were considered statistically significant at a two-sided p value of 0.05. The distributional properties of continuous variables were expressed as mean ± standard deviation, whereas categorical variables were expressed as frequency and percentage. Independent sample t-test, chi-square test, and crosstabs statistics were used, according to the data type, to compare the demographic and clinical characteristics between the younger and elderly groups.

3. Results

A total of 131 patients were enrolled in this study, including 90 younger patients and 41 elderly patients (Figure 1). All patients had a post-procedure follow-up more than one week to observe if they had EUS-FNB complications. There were no significant differences in tumor location and size between the younger and elderly patients (Table 1). The overall technical success rate of FNB was 100%. The number of FNB puncture passes and positive cytopathological findings also showed no difference between the two groups.

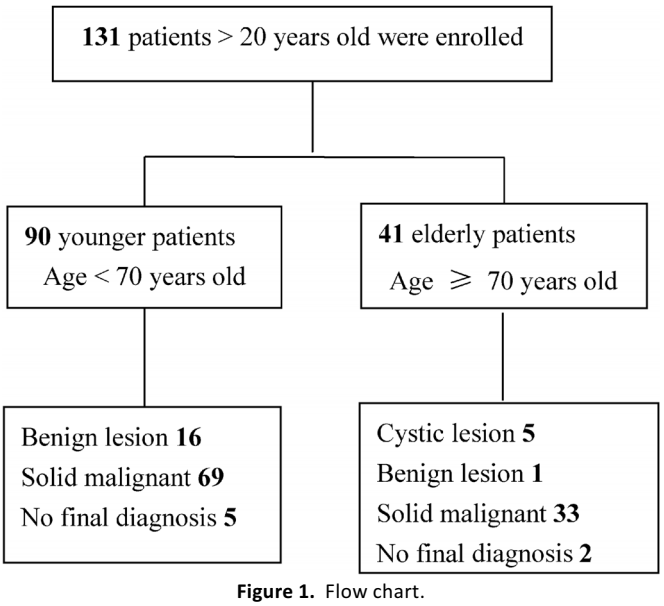

Figure 1. Flow chart.

There were five younger and two elderly patients who had no final diagnosis. Based on the cytopathological, clinical, and imaging findings, these seven patients did not have a definite diagnosis and refused to do further examination. In the younger group, 69 patients had solid malignant lesions, while 16 patients had solid benign lesions or cystic lesions. Thirty-three elderly patients had solid malignant lesions, one had benign solid lesions, and five had cystic lesions. In patients with solid malignant tumors, the positive cytopathological result rates were 92.8% and 85.4% in the younger and elderly patients, respectively. The overall diagnostic accuracy rate was 92.4%. The overall incidence of FNB-related adverse events was 0.8%. Only one younger patient had post-FNB pancreatitis, which improved within three days after conservative treatment. There was no difference in the FNB cytopathological diagnostic rate and adverse events between the two groups.

Among elderly patients, the age range was 70 to 88 years (Table 2). There were 17 males and 24 females. Twenty-five patients had pancreatic ductal adenocarcinomas, six patients had pancreatic neuroendocrine tumors, one patient had cholangiocarcinoma, and another had a gastrointestinal stromal tumor. The median CCI was 6, and the range was 5–9. Sixteen patients (39%) had cardiac disease or stroke. Twelve patients (29.3%) used antithrombotic agents, seven used clopidogrel, three used aspirin, one used warfarin plus clopidogrel, and one used dabigatran. Eight patients (19.5%) had other underlying malignancies, aside from FNB target lesion, including five with lung adenocarcinoma, one with breast cancer, and one with hepatocellular carcinoma.

4. Discussion

EUS-FNA is an excellent method for tissue sampling in pan-

Table 1
Comparison of clinical and tumor factors of patients who underwent FNB between the younger and elderly groups.

Variable	Younger (n = 90)	Elderly (n = 41)	*p* value
Tumor location, n[F1]	45/36/9	24/13/4	0.90
Tumor size, cm*	3.30 ± 1.75	2.99 ± 1.17	0.29
Pass number, n*	3.27 ± 1.34	3.10 ± 1.34	0.50
False negative cytopathology, n (%)[F2]	5 (7.2 %)	4 (12.1%)	0.38
Adverse events, n	1	0	0.50

[F1] Pancreas uncinate process and head/body and tail/others.
[F2] There were 69 and 33 patients had solid malignant final diagnosis in younger and elderly groups, respectively.
* Mean ± standard deviation.

Table 2
Clinical and EUS characteristics of elderly patients who underwent endoscopic-guided fine needle biopsy (*n* = 41).

Age, years*	77.4 ± 5.8 (70–88)
Sex, male/female, n	17/24
Serum creatinine level, mg/dL*	1.01 ± 0.65
Solid tumor/cystic lesion, n	36/5
Solid tumor final diagnosis, n[F1]	25/6/1/2/2
Charlson comorbidity index**	6 ± 1.17 (5–9)
Other malignancy, n[F2]	5/2/1
Antithrombotic agents using, n (%)	12 (29.3%)

* Mean ± standard deviation (range).
** Median ± standard deviation (range).
[F1] Pancreas adenocarcinoma/neuroendocrine tumor/benign lesion/others/unknown.
[F2] Lung adenocarcinoma/breast cancer/hepatocellular carcinoma.

creaticobiliary and gastrointestinal lesions because of its high diagnostic accuracy and low adverse event rate.[6] Most clinicians would utilize this as the first choice for patient management. As with other age groups, EUS and EUS-FNA are also safe for elderly patients.[2]

With the advancements in technology, FNB has outperformed FNA in terms of specimen adequacy and diagnostic accuracy.[7,8] Specimens from FNB can provide additional information, such as tissue architecture, and allow further immunohistochemical staining. Furthermore, FNB requires less puncture number than FNA, so theoretically, it can shorten the procedure time and is suitable for elderly patients, especially those with cardiovascular or pulmonary disease. Due to the high technical success rate and low adverse event rate of FNB, just as with FNA,[9] more endoscopists have been using this procedure in recent years. However, some studies have shown that despite the low risk for FNB-related complications, patients should still be monitored for pancreatitis, bleeding, fever, and perforation.[10] Evaluation of procedure safety for elderly patients should be given utmost importance.[11] However, to date, there has been no study on the safety of FNB use in elderly patients.

Our overall diagnostic accuracy rate for FNB was 92.4%, which was like to a previous finding of 90.8%. The adverse event rate was 0.8%, which was also comparable with a previous meta-analysis study result of 0.59%. There was no significant difference in the diagnostic accuracy and adverse event rates between the younger and elderly patients. Therefore, EUS-FNB is a safe and effective procedure for tissue biopsy in elderly patients.

The Charlson comorbidity index (CCI) has been widely used to measure the burden of complex comorbidities. A study showed that for elderly patients who underwent invasive endoscopic procedures, those with higher CCI scores (> 3) had higher complication rates than those with lower scores.[12] In our study, most patients had relatively high CCI scores (range: 5–9), and there was no increase in the rate of adverse events. This shows that FNB is a safe procedure for elderly patients with comorbidities.

Antithrombotic agents are common in elderly patients. The guideline recommends withholding clopidogrel five days before doing an EUS-FNA as it is considered as a high-risk procedure for bleeding.[4] Aspirin can continue to be used. No patient in this study had post-FNB bleeding. Therefore, this procedure is safe for elderly patients who use antithrombotic agents.

The limitations of this study were including 1) it was a retrospective study; 2) the elderly patient number was too small; 3) we did not record the clinical and EUS characteristics of younger group, because this study was focus on elderly patients specially. In conclusion, EUS-FNB is a safe and effective diagnostic procedure for elderly patients, even for those with comorbidities or who use antithrombotic agents.

Conflict of interest

There is no conflict of interest for this work.

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