Pain Score within Twenty-Four Hours Post-Endoscopic Ultrasonography: A Comparison Between with or without Fine Needle Aspiration Procedure

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ABSTRACT

AIMS: To compare the pain score within twenty-four hours post-endoscopic ultrasonography (EUS) with or without fine needle aspiration (FNA) procedure in adult patients.

METHODS: We prospectively analyzed the patients who underwent EUS procedures from January, 2009 to December, 2009. Pain score was compared by using verbal rating scale (VRS, 0-100) and pain rescued medications at 2, 6, 12, 18, 24 hours post-procedure.

RESULTS: One hundred and twenty-four patients, 84 patients only with EUS procedure (group D) and 40 patients with EUS and FNA procedures (group F), were enrolled. All procedures were completed successfully. Sedative and analgesic agents in both groups were propofol, midazolam and fentanyl and were comparable the dose among the two groups. The mean procedural time in D and F was 39.8±19.1 and 60.6±26.0 minutes, respectively. Mean pain score at baseline and at 2, 6, 12, 18 and 24 hours post-EUS was not significantly different between the two groups. Additionally, total dose of pethidine used for pain control after EUS procedure in both groups was not significantly different.

CONCLUSION: EUS-induced abdominal pain is mild and mainly occurs within six hours after the procedure. Pain score within twenty-four hours after EUS with or without fine needle aspiration procedure is comparable.

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Key words: Pain score; Endoscopic ultrasonography; Fine needle aspiration

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INTRODUCTION

Pain is a complex, private experience and attempts to make valid assessments of it have been fraught with difficulties. It is also influenced by numerous intrinsic and extrinsic factors, and the multiple aspects of pain have been assessed in many different ways. The assessment of perceived pain is necessary in the clinical setting for diagnosis and choice of treatment but also for the evaluation of treatment efficacy in a research context. However, pain intensity could be attributed to several patient and technique-related risk factors as well as the operator’s skill.

The pain intensity, also assessed by using the pain score [1-4], is relatively the most commonly assessed severity of pain. The reliable and valid measurements of pain are essential for conducting clinical trials of pain treatments[5]. Fortunately, in most situations, that most
Endoscopic ultrasound examination involves the use of an ultrasound probe introduced through the upper or lower gastrointestinal tract. The ultrasound probe is connected to a computer that generates images of the organs being examined. Patients are usually sedated during the procedure to ensure comfort and safety.

**Measurement of pain**

The verbal rating scale (VRS) was used for pain measurement. All patients were instructed to make a single number on an oriented, unmarked 0-10 scale labeled “0 = no pain” and “10 = most pain possible”. As a measure of reliability, the patients were asked to score their pain before the procedure and this was then repeated at the end (2, 6, 12, 18 and 24 hours later). A VRS score was assessed by the ward nurses. According to this pain assessment, if the patients were asleep, the pain score should not be assessed. After EUS procedure, intramuscular pethidine was used for pain rescued medication and was given to the patients when their VRS scores were ≥ 30. The total amount of pethidine used during 24 hours post-procedure was noted.

**Statistical analysis**

Results were expressed as mean±SD or percentage (%), when appropriate. Comparisons between EUS with and without FNA procedure were compared by using with Chi-square tests (for categorical variables), Chi-square tests for trend (for ordinal variables), and two-sample independent t-test (for continuous variables). The statistical software package SPSS for Window Version 11 (SPSS Inc., Chicago, IL) was used to analyze the data. All statistical comparisons were made at the two-sided 5% level of significance.

**RESULTS**

One hundred and twenty-four EUS procedures were performed between January 2009 and December 2009. Of these, 84 patients were performed only with EUS procedure (group D) and 40 patients were performed with EUS and FNA procedures (group F). Table 1 showed the characteristics of patients, duration and indication of procedure. There were no statistically significant differences in age, gender, weight and ASA physical status between the two groups. However, the duration of procedure in the EUS with FNA group was significantly longer than the EUS without FNA group (60.6 and 39.8 minutes, p=0.002). Pancreatic mass and gastric pathology were the most two common indications of the procedure in both groups.

**Measurement of pain**

There were not statistically significantly different in mean baseline pain score measured before EUS procedure and mean VRS score at 2, 6, 12, 18, and 24 hours post-EUS procedure between the D and F groups. However, mean VRS score at 2 and 6 hours after EUS procedure in group F was relatively greater than in group D. In addition, there was the highest pain score at 2 hours post-EUS procedure in both groups (Table 2).

Table 3 demonstrated the mean VRS score ≥ 30 at all periods of time was not significantly different between the two groups. Sedative and analgesic drugs used during the procedure were propofol, midazolam and fentanyl. Mean dose of propofol, midazolam and fentanyl was not significantly different between the two groups. After the EUS procedure, 30 patients (20.3%) in the EUS with FNA procedure and five patients (17.2%) in the EUS without FNA procedure received pethidine for pain rescued medication (p=0.436). The total number of pain rescued medication in group F was relatively greater than group D. The mean total dose of pethidine was 0.9±0.2 mg/kg in group F and 0.8±0.2 mg/kg in group D (Table 4).

**DISCUSSION**

EUS is a technique increasingly used and essential for the diagnosis and treatment of the gastrointestinal tract and the structure adjacent to the gastrointestinal tract. However, it is an invasive GIE procedure and produces moderate to severe pain. As a consequence, the application of pain medications during and after the procedure would be necessary. In Siriraj GI Endoscopy Center, deep sedation and general anesthesia techniques are commonly used for EUS procedure. The combination of propofol, opioid and midazolam is usually utilized in this procedure. Up to date, limited information regarding pain assessment after EUS procedure is available. Our report is the first study that assesses the pain score after early post-EUS procedure in the adult patients.

Pain rating scales have an essential tool in clinical practice. Several

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data recommend that patients are capable to use these scales to communicate their pain experience and their response to management. However, pain is probable to vary over time and with different activities\(^2\). The VRS score is usually used in the measurement of pain since it is easy to use. The alterations of pain score measured in two different patients or at two different times are referenced to categorical responses contrasting the two health conditions in order to verify clinically meaningful differences. A previous study has been recommended that the minimum clinically significant change in patient pain severity measured with a 100-mm visual analog scale was 13 mm\(^2\)\(^3\).

Generally, it is essential to detect a minimal clinically significant difference in pain that can be used to evaluate the differences between these two endoscopic groups. In our study, we used mean VRS score \(\geq 30\) mm to compare pain intensity between the two groups because this score signified moderate to severe pain severity for each patient. This difference was considered to be clinically significant. However, the range of the score was very wide, for example no pain (0 mm), mild pain (0-30 mm), moderate pain (30-65 mm), severe pain (65-100 mm)\(^4\). Our present study reveals clinically non-significant changes in pain intensity between the EUS with and without FNA procedure by using VRS score in 24 hours after the procedure. The total number of pain rescued medication in the EUS with FNA group is relatively greater than in the EUS without FNA group but not statistically significantly different. In addition, mean VRS score \(\geq 30\) mm in both groups were mainly occurred at 2 and 6 hours after procedure. This study also explained that mild and moderate pain frequently occurred earlier on the first 6 hours after EUS with or without FNA procedures.

Both conventional and interventional EUS procedures were established to be acceptably safe techniques\(^1\). The overall complication rate of these procedures was relatively low with mild degree and no severe or fatal events. Acute pancreatitis related with EUS-FNA procedure ranges from 0% to 2%. Importantly, this pancreatitis as a result of EUS-FNA procedure arises in patients undergoing FNA of pancreatic cysts, masses, or pancreatic duct\(^5\). In the present study, the patient-related factors, baseline clinical presentation and severity of disease were similar in both groups. Moreover, there were no signs and symptoms of post-EUS pancreatitis in these two groups.

From our previous experiences, we assumed that the therapeutic GIE procedures produced higher pain intensity than the diagnostic GIE procedures\(^6\). We hypothesized that the therapeutic procedure initiated more tissue injuries, was the causing factor. In our present report, pain intensity in the EUS with FNA group did not support this hypothesis. This might be due to three factors. First, all EUS procedures were performed by experienced endoscopists. Second, an exact deep sedation target may offer a better pain control. Third, the FNA procedure may create less tissue injuries than other therapeutic procedures. An indirect evidence to support the latter explanation is that pain rescued medication is not significantly different between EUS with and without FNA groups.

There are several limitations of this study that should be noted. First, we only use VRS score for pain assessment. The large variability around the mean and the discordance of this scale may reflect a problem with the reproducibility or reliability. We are unable to find any published studies of the reproducibility in measurement of acute pain in the EUS patients. In addition, small changes in pain can be challenging, when using the VRS to compare the effectiveness of differences in mean VRS score. Second, pain score assessed in this study is limited to pain intensity and pain rescued medication. There seems to be a considerable individual variability in post-EUS pain perception even following standardized procedure\(^1\). Third, in our practice, we do not routinely measure serum amylase and lipase levels after the procedure. Abdominal pain from post-EUS pancreatitis can influence the pain score. However, the patients who develop abdominal pain and fever during post-procedural period will investigate for acute pancreatitis. Additionally, no patients have been suspected. Fourth, we do not evaluate the pain score in the sleep

| Table 1 | Characteristics of patients, duration and indication of procedure (mean, SD and percentage). |
|---------|------------------------------------------------------------------------------------------------------------------|
| Age (yr; mean, SD) | Without FNA (n=40) | With FNA (n=40) | P value |
| Gender (n, %): | | | | |
| Female | 35 (41.7) | 20 (50.0) | 0.383 |
| Male | 59.6 (12.5) | 20 (50.0) | 0.539 |
| ASA physical status (n, %) | | | | |
| I | 49 (58.3) | 32 (80.0) | 0.522 |
| II | 20.0 (6.0) | 2 (5.0) | 0.220 |
| III | | 0.002 |
| Indications (n, %) | | | | |
| Pancreatic mass | 15 (18.7) | 8 (20.0) | 0.539 |
| Gastric pathology | 12 (14.3) | 0 | 0.220 |
| Cholelithiasis | 12 (14.3) | 1 (2.5) | 0.050 |
| Chronic pancreatitis | 9 (10.7) | 0 | 0.220 |
| Chronic dyspepsia | 8 (9.5) | 1 (2.5) | 0.220 |
| Pancreatic cyst | 6 (7.1) | 0 | 0.220 |
| Chronic abdominal pain | 4 (4.8) | 9 (22.5) | 0.220 |
| Others | 18 (21.4) | | |

| Table 2 | Pain score at baseline and during 24 hours post-EUS. |
|---------|-----------------------------------------------------|
| VRS (mean, SD) | Without FNA | With FNA | P value |
| 0-20 | 0.141 | | |
| 0-40 | 0.539 | | |
| 0-60 | 0.522 | | |
| 0-80 | 0.220 | | |
| 0-100 | 0.000 | | |

| Table 3 | VRS score \(\geq 30\) after EUS procedure. |
|---------|-----------------------------------------------------|
| Post-EUS | Without FNA | With FNA |
| VRS (mean, SD) | n (%) | n (%) | P value |
| 0-20 | 3.3 (5.7) | 4.3 (8.4) | 0.752 |
| 0-40 | 6.8 (10.0) | 4.3 (8.4) | 0.752 |
| 0-60 | 3.3 (5.7) | 4.3 (8.4) | 0.752 |
| 0-80 | 6.8 (10.0) | 4.3 (8.4) | 0.752 |
| 0-100 | 3.3 (5.7) | 4.3 (8.4) | 0.752 |

| Table 4 | Sedative and analgesic drugs used during procedure (mean, SD), mg/kg and pain rescued medication during 24 hours post-EUS (n, % and mean, SD, mg/kg). |
|---------|-----------------------------------------------------|
| Without FNA | With FNA |
| Anesthetic agents | n (%) | n (%) | P value |
| Propofol | 4.2 (2.2) | 6.3 (3.4) | 0.279 |
| Midazolam | 0.02 (0.01) | 0.02 (0.01) | 0.478 |
| Fentanyl | 0.001 (0.000) | 0.001 (0.000) | 0.154 |
| Pain rescued medication | | | |
| Pethidine | 4 (4.8), 0.8 (0.2) | 6 (15.0), 0.9 (0.2) | 0.050 |
There are no conflicts of interest with regard to the present study.

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