# Anesthesia Provider Sedation (APS) is Superior to Conscious Sedation (CS) for Successful Diagnostic Tissue Acquisition in Endoscopic Ultrasound Fine Needle Aspiration And/Or Biopsy (EUS FNA/B)

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## Background

- EUS-FNA/B is frequently used for diagnosis of suspicious intestinal, subepithelial, and extraintestinal lesions.

- Our study aimed to evaluate the role of sedation on specimen adequacy and diagnostic yield of malignancy in EUS-FNA/B of solid pancreatic and extra pancreatic lesions.

- Given frequent use and experience of CS with diagnostic EUS at our institution, we hypothesized that the diagnostic yield of EUS-FNA/B would be equivalent for both sedation groups.

## Materials and Methods

- Retrospective, single-center, cohort study was conducted including patients aged >18 years old who received EUS-FNA/B at our institution from 9/2018 – 5/2021 for further evaluation of suspicious lesions.

- Primary endpoint: Diagnostic yield of neoplastic lesions.

- Secondary endpoint: Adverse events (AEs)

- Technical success was defined percentage of lesions sampled in which the obtained material is representative of the target site and adequate for cytologic evaluation

- Diagnostic yield successful cytologic diagnosis was defined by positive or suspicious results. Unsuccessful cytological results were defined by unsatisfactory, indeterminate, or false negative results.

- AEs categorized into 4 groups - mild, moderate, severe and fatal.
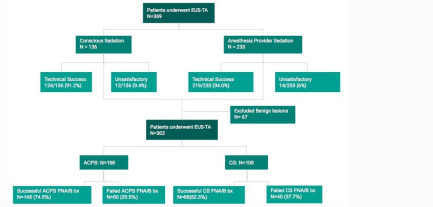
## Results and Data



Figure 1. Flow diagram of inclusion and exclusion criteria

Table 1. Primary endpoint: EUS-TA diagnostic yield logistic regression analysis

| Univariate logistic regression (Crude effect) | Unit | OR | 95% Confidence Limits | | p-Value |
|---|---|---|---|---|---|
| Type of sedation (CS vs Anesthesia) | 1 | 0.565 | 0.34 | 0.938 | 0.0274 |

| Adjusted Effect | Unit | OR | 95% Confidence Limits | Column1 | p-Value |
|---|---|---|---|---|---|
| Type of sedation CS vs Anesthesia | 1 | 0.558 | 0.315 | 0.987 | 0.0451 |
| Location Abdominal (non-pancreas) vs (pancreas ampulla/uncinate/head) | 1 | 0.859 | 0.36 | 2.049 | 0.7311 |
| Location neck/body/tail pancreas vs (pancreas ampulla/uncinate/head) | 1 | 0.83 | 0.414 | 1.663 | 0.5987 |
| Location Others vs (pancreas ampulla/uncinate/head) | 1 | 0.46 | 0.2 | 1.063 | 0.0691 |
| Size of needle used 19g vs 25g | 1 | 0.583 | 0.092 | 3.707 | 0.5677 |
| Size of needle used 22g vs 25g | 1 | 1.215 | 0.662 | 2.231 | 0.5301 |
| Number of needle passes | 1 | 1.473 | 1.191 | 1.822 | 0.0004 |

Table 2. Adverse Events

| | Type of Sedation | | |
|---|---|---|---|
| | CS | Anesthesia | |
| Severity | | GA | MAC |
| Mild | 3 | 17 | 2 |
| Moderate | 2 | 6 | 0 |
| Severe | 0 | 3 | 0 |
| Fatal | 0 | 0 | 0 |
| Total | 5 | 26 | 2 |

**Total of 33 adverse events

- The incidence of adverse events was found to be significantly lower in the CS group as compared with the anesthesia group [95% CI]: 0.281 [0.095 - 0.833], P = 0.022).

- Intubation was found to be the main predictor for adverse events (adjusted odds ratio [95% CI]: 0.471 [0.081 - 2.721], P = 0.3998).

Table 3. Baseline Variables

| | Type of sedation | | | | |
|---|---|---|---|---|---|
| | Anesthesia | | Conscious Sedation | | |
| | N | % | N | % | P value |
| Sender: | | | | | 0.07 |
| Male | 110 | 47.21 | 51 | 37.5 | |
| Female | 123 | 52.79 | 85 | 62.5 | |
| ASA Class | | | | | <0.001 |
| 1 | 5 | 2.15 | 8 | 5.88 | |
| 2 | 45 | 19.31 | 63 | 46.32 | |
| 3 | 169 | 72.53 | 65 | 47.79 | |
| 4 | 14 | 6.01 | | | |
| Intubation | | | | | <0.001 |
| N | 35 | 15.02 | 136 | 100 | |
| Y | 198 | 84.98 | | | |
| Location | | | | | 0.001 |
| Thoracic | 1 | 0.43 | 1 | 0.74 | |
| Peritoneal (non-pancreas) | 26 | 11.16 | 22 | 16.18 | |
| Pelvic | 3 | 1.29 | 2 | 1.47 | |
| pancreas ampulla/uncinate/head | 130 | 55.79 | 42 | 30.88 | |
| Pancreas neck/body/tail | 50 | 21.46 | 46 | 33.82 | |
| SEL | 22 | 9.44 | 22 | 16.18 | |
| Cytologic Result | | | | | 0.007 |
| 1 (Unsatisfactory) | 14 | 6.01 | 22 | 16.18 | |
| 2 (Negative) | 43 | 18.45 | 33 | 24.26 | |
| 3 (Atypical/Indeterminate) | 30 | 12.88 | 15 | 11.03 | |
| 4 (Suspicious for malignancy) | 10 | 4.29 | 3 | 2.21 | |
| 5 (Positive for malignancy) | 136 | 58.37 | 63 | 46.32 | |
| Presence of ROSE | | | | | 0.48 |
| N | 174 | 74.68 | 106 | 77.94 | |
| Y | 59 | 25.32 | 30 | 22.06 | |
| EUS type | | | | | 0.501 |
| Upper | 230 | 98.71 | 133 | 97.79 | |
| LEUS | 3 | 1.29 | 3 | 2.21 | |
| Size of needle used | | | | | 0.374 |
| 19g | 9 | 3.86 | 5 | 3.68 | |
| 22g | 63 | 27.04 | 47 | 34.56 | |
| 25g | 158 | 67.81 | 81 | 59.56 | |
| Needle type | | | | | <0.001 |
| FNA | 140 | 60.09 | 115 | 84.56 | |
| FNB | 93 | 39.91 | 21 | 15.44 | |
| Immediate procedural complications | | | | | 0.007 |
| N | 205 | 87.98 | 131 | 96.32 | |
| Y | 28 | 12.02 | 5 | 3.68 | |

Table 3. Baseline Variables

(1) unsatisfactory specimen
(2) negative for malignancy
(3) atypical/indeterminate
(4) suspicious for malignancy
(5) positive for malignancy.

Figure 2. Cytology Categories



Table 4. Adverse events categories

## Materials and Methods

- Baseline statistical comparison was done using the Chi-square test and Wilcoxon two sample tests.

- Univariate and multivariate logistic regression analysis was conducted to further evaluate primary and secondary outcomes.

- All statistical analyses were performed utilizing SAS Software (version 9.4; SAS Institute Inc. Cary, NC, USA).

## Conclusion

- APS provides superior specimen adequacy and diagnostic yield of malignant lesions for EUS FNA/B.

- AEs occur more frequently in APS albeit most AEs are mild and associated with general anesthesia.