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Comparison of endoscopic ultrasound fine needle aspiration (FNA) versus fine needle biopsy (FNB) for preoperative grading of pancreatic neuroendocrine tumors: A systematic review and meta-analysis

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BACKGROUND

Preoperative grading of pancreatic neuroendocrine tumors (PNET) incorporating Ki-67 index can identify PNETs at low risk of progression and prevent unnecessary surgical resection. The aim of this study was to perform a comprehensive literature search and meta-analysis to compare the accuracy of Ki-67 based grading of PNETs between endoscopic ultrasound (EUS) guided fine needle aspiration (FNA) versus fine needle biopsy (FNB).

METHODS

Literature search was conducted on multiple databases (Cochrane, EMBASE, Medline, Google scholar) from inception to October 1, 2022, by an experienced librarian to identify studies assessing EUS in PNETs. The primary outcome was the accuracy for Ki-67 based PNET grading on EUS- FNA/FNB samples compared with surgical pathology as the gold standard reference. Analysis was conducted using R v4.1.0.

RESULTS

The literature search identified 1014 studies that were independently screened by two individuals. In total, 29 studies with 1851 individuals were included (22 studies of EUS-FNA, 5 EUS- FNB and 2 with both EUS-FNA and FNB). Concomitant grading with surgical pathology was available in 1015 cases (827 for EUS-FNA and 188 for EUS-FNB). Median age and tumor size were similar between the two groups (**Table 1**).

Overall pooled grading accuracy was (76.7%, 95%CI [72.2%-80.7%]) and was similar between FNA (76.1%, 95% CI [70.8 - 80.7]) and FNB (78.8%, 95% CI [69.2 - 86.0]; p=0.58). Upgrading of tumor grade on surgical specimen was seen in 17.5% cases and downgrading was observed in 5.0% cases. EUS-FNA had higher pooled rates for both tumor upgrading (19.2%, 95% [15.1 - 23.9] vs. 15.7%, 95% CI [10.0 - 23.8], p=0.41) and downgrading (7.5%, 95% CI [5.7 - 9.7] vs. 4.3%, 95% CI [2.2 - 8.3], p=0.13) suggesting less consistency with the surgical specimen; however, the results did not reach statistical significance (**Table 1**). On meta-regression, age, gender, tumor size or location were not associated with correct tumor grading for both EUS- FNA and FNB.

CONCLUSIONS

Overall pooled grading accuracy of PNETs with EUS sampling was 76.7% and similar between FNA and FNB. There was a trend towards lower changes in grading for specimens obtained via EUS-FNB. Prospective trials with head-to-head comparison are needed to select appropriate sampling strategy.

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