Brush cytology, forceps biopsy, or EUS-guided sampling for diagnosis of bile duct cancer: a meta-analysis

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Background/aims

Endoscopic sampling is essential for tissue diagnosis of cholangiocarcinoma (CCA). We wanted to evaluate and compare the diagnostic sensitivities of endoscopic retrograde cholangiopancreatography (ERCP)-guided brush cytology, biopsy, and endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) in patients with CCA.
Methods

A comprehensive literature search through multiple databases including PubMed and EMBASE was conducted for articles published between January 1995 and August 2020. The pooled rates of sensitivity for the diagnosis of CCA and of adverse events were compared among brushing, biopsy, brushing & biopsy, and EUS-FNA.
Results

Records identified through PubMed, EMBASE, and MEDLINE search: n = 3104

Records after removal of duplicate articles: n = 2603

Potential article identified on the basis of title and abstract: n = 111

Studies included in quantitative synthesis (meta-analysis): n = 61
(19 Prospective studies + 42 Retrospective studies)

Studies excluded after review of titles and abstracts, as being letters, commentaries, reviews, or obviously irrelevant: n = 2493

Studies excluded with reasons: n = 50
- Impossible extraction of patients with CCA: n = 45
- Small population (< 10) of patients with CCA: n = 4
- Overlapping population of patients: n = 1
Results: Pooled diagnostic sensitivities for cholangiocarcinoma

<table>
<thead>
<tr>
<th></th>
<th>ERCP-brush</th>
<th>ERCP-biopsy</th>
<th>Brushing &amp; biopsy</th>
<th>EUS-FNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pooled sensitivities</td>
<td>56.0% (48.8–63.1, 83%)</td>
<td>67.0% (60.2–73.5, 73%)</td>
<td>70.7% (64.1–76.8, 38%)</td>
<td>73.6% (64.7–81.5, 75%)</td>
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<tr>
<td>for cholangiocarcinoma</td>
<td>(95% CI, I²%)</td>
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</table>

*P* value of statistical significance

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</thead>
<tbody>
<tr>
<td>ERCP-brush</td>
<td>0.028*</td>
<td></td>
<td>0.013*</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>ERCP-biopsy</td>
<td>0.028*</td>
<td>0.553</td>
<td></td>
<td>0.257</td>
</tr>
<tr>
<td>Brushing and biopsy</td>
<td>0.013*</td>
<td>0.553</td>
<td></td>
<td>0.623</td>
</tr>
<tr>
<td>EUS-FNA</td>
<td>&lt;0.001*</td>
<td>0.257</td>
<td>0.623</td>
<td></td>
</tr>
</tbody>
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CI, confidence interval; ERCP, endoscopic retrograde cholangiopancreatography; EUS-FNA, endoscopic ultrasound-guided fine needle aspiration

*P < 0.05
Results: Pooled diagnostic sensitivities
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Results: Pooled adverse events (all $p > 0.05$)
Diagnostic sensitivity of ERCP between CCA and other malignant biliary strictures: Pooled odds ratio 1.73 (95% C 1.12-2.68, p=0.013)
Conclusions

Intraductal biopsy, brushing & biopsy, and EUS-FNA had comparable efficacy and safety for the diagnosis of CCA. Brushing was the least sensitive diagnostic tool compared with intraductal biopsy or EUS-FNA. Given the modest diagnostic sensitivities of intraductal biopsy and EUS-FNA in the diagnosis of CCA, further studies for complementing these techniques with biomarkers may be needed.