Cost-consequence of incorporating single-operator direct visualization cholangioscopy in the diagnosis of indeterminate biliary strictures in Saudi Arabia

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Introduction

Indeterminate biliary strictures have many underlying benign and malignant causes, including infections, pancreatitis, or cancer (cholangiocarcinoma is most common).[1] Endoscopic retrograde cholangiopancreatography (ERCP) brushing and biopsy is the standard of care for the diagnosis of indeterminate biliary strictures in Saudi Arabia.

Utilizing direct visualization single-operator cholangioscopy guided biopsy (SOC-B) with **SpyGlass DS II** improves the quality of the biopsy with advanced real-time visualization.[2]

Objective

In this study the cost-effectiveness of utilizing SOC-B compared to ERCP for the diagnosis of biliary strictures was evaluated.

Methods

A health-economic model was developed in Excel® comparing SOC-B to ERCP-based biopsy and brushing for indeterminate biliary strictures from the Saudi Arabian public payer perspective.

A decision-tree was utilized to model the initial cancer diagnosis of cholangiocarcinoma, followed by a Markov model exploring the disease-progression over a lifetime horizon. Model inputs were sourced from peer-reviewed literature as well as expert-interview derived micro-costing. Costs are reported in 2023 Saudi Arabian Riyals (SAR).

Sensitivity analyses were run and presented at the range of the 95% credible interval.

Figure 1 Clinical outcomes

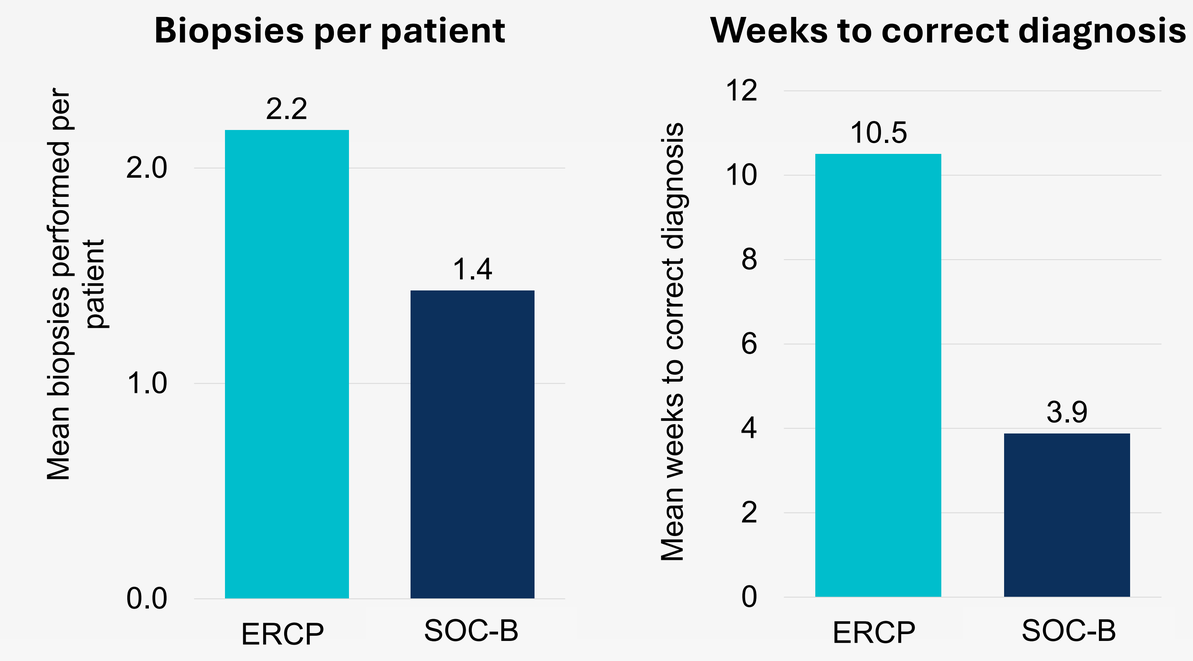
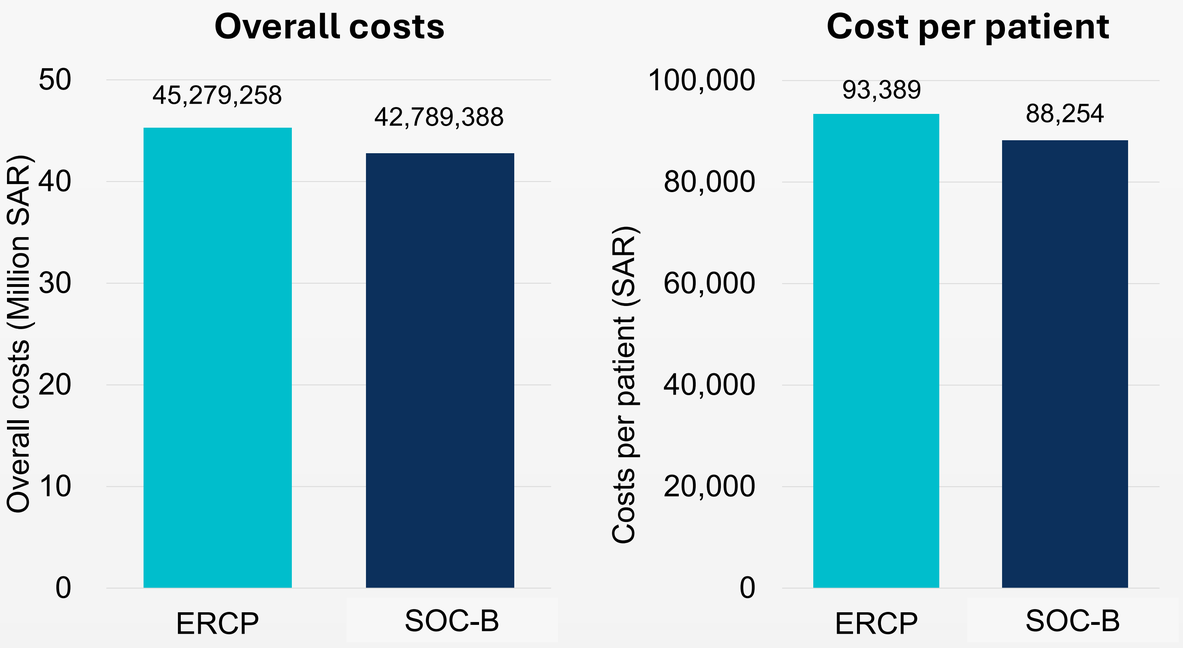


Figure 2 Costs



Conclusion

In our analysis, switching from ERCP to SOC-B with **SpyGlass DS II** was a dominant healthcare strategy for diagnosing cholangiocarcinoma in patients with indeterminate biliary strictures. In sensitivity analyses, **SpyGlass DS II was always cost-effective**. Overall, the number of biopsies required per patient reduced and cost savings were generated for the Saudi Arabian public payer.

Results

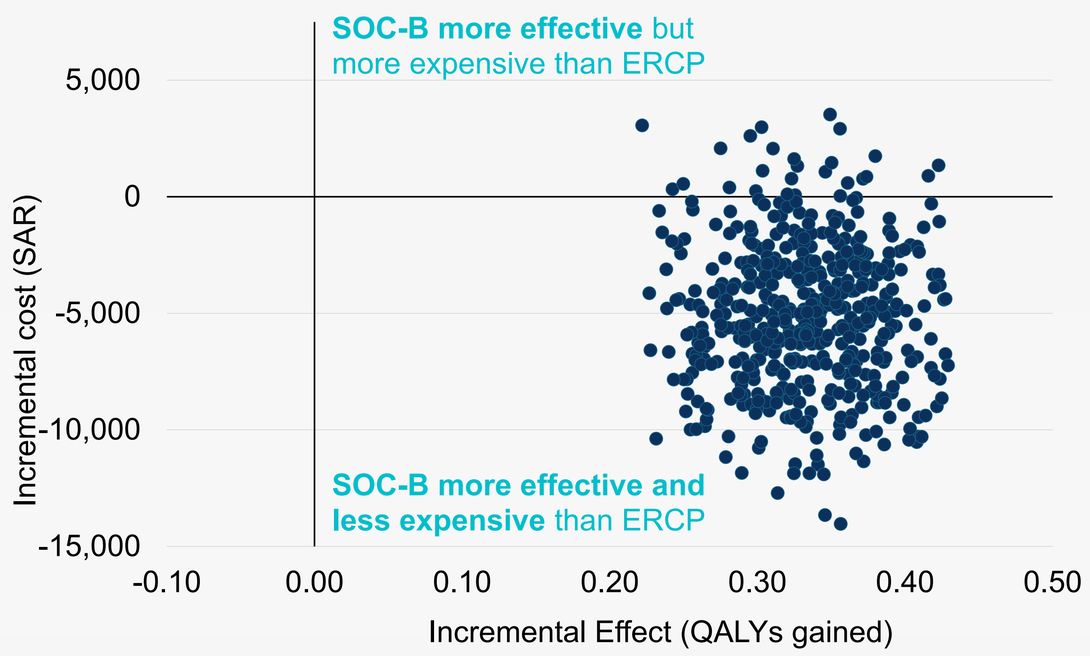
We estimate that a population of 485 indeterminate biliary strictures patients require diagnosis each year. The use of SOC-B for this indication resulted in fewer biopsies performed as well as a reduced time to correct diagnosis by -6.6 weeks (**Figure 1**). Compared to ERCP-based biopsy, **SOC-B reduced costs of care by 2.49 million SAR** (5,135 SAR per patient, **Figure 2**) and increased quality-adjusted life years (+0.8 QALYs) over the patient's lifetime. Hence, **SOC-B dominated ERCP**.

Outcomes were driven by early cancer detection and a greater rate of utilization of the only curative treatment option in the model; cancer surgical resection (as confirmed by the one-way sensitivity analysis).

Of note, the number of cancer patients detected in our model increased by 1.3% over the model time horizon, meaning that ~4 patients died from cholangiocarcinoma without ever being identified using the standard of care; ERCP. Moreover, the number of cancer patients becoming "Disease-free" increased by ~14 patients (from ~42 to ~56).

Probabilistic sensitivity analysis found that SOC-B dominated ERCP in 95% of simulations and had a net increase in costs in 5% of simulations that were all below 5,000 SAR (**Figure 3**). This means that **SOC-B would always be cost effective in Saudi Arabia**, assuming a willingness-to-pay threshold of 50,000 SAR per QALY[3].

Figure 3 Probabilistic sensitivity analysis of incremental effect and costs



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2. **Al Lehibi** et al. Arab J Gastroenterol. 2020;21(1):49-53.
3. **Al-Jedai** et al. J Med Econ. 2023;26(1):128-138.

Disclosures

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