

Cost-Effectiveness of a Preoperative 12-Week Smoking Cessation Program Prior to Arthroscopic Rotator Cuff Repair

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INTRODUCTION: Rotator cuff tears are prevalent, particularly among older adults, and often result in significant pain, disability, and functional impairment. Arthroscopic rotator cuff repair (ARCR) is the standard surgical treatment when conservative management fails, offering favorable clinical outcomes. However, re-tear rates remain a persistent issue, especially in high-risk populations such as smokers. Although smoking cessation is known to enhance tendon healing, the cost-effectiveness of structured preoperative smoking cessation programs (SCP) in patients undergoing ARCR remains unclear. This study evaluates the cost-utility of a 12-week SCP prior to ARCR and investigates its economic value compared to no preoperative intervention.

METHODS: A decision-analysis model was developed for a hypothetical adult smoker undergoing arthroscopic rotator cuff repair. Literature review data identified event probabilities, costs, and health utilities. Health outcomes were measured in Quality-Adjusted Life Years (QALYs). Base-case analysis calculated incremental cost and effectiveness of a 12-week preoperative SCP. Probabilistic sensitivity analysis evaluated model uncertainty and calculated mean incremental costs, effectiveness, and net monetary benefits. One-way sensitivity analysis identified variables with the greatest model impact.

RESULTS: The preoperative 12-week SCP was the preferred strategy in 98.4% of iterations. It demonstrated greater benefits and lower costs, with an incremental cost-effectiveness ratio below the willingness-to-pay threshold of \$50,000 per QALY. The use of preoperative 12-week SCP was associated with a mean incremental net monetary benefit (INMB) of \$16,338 (95% CI 15,889-16,787). One-way sensitivity analyses identified QALYs associated with avoiding revision surgery due to re-tear as a key driver of the cost-utility outcomes.

DISCUSSION AND CONCLUSION: Use of a preoperative 12-week SCP is a cost-effective approach to reduce costs related to revision surgery and providing higher QALYs at 5 years. The use of smoking cessation programs should be strongly considered as part of patient management strategies.

