Journal of the American College of Surgeons

Article in Press

Early Cholecystectomy for Acute Cholecystitis Offers the Best Outcomes at the Least Cost: A Model-Based Cost-Utility Analysis

Presented at the 2013 Canadian Surgical Forum, Ottawa, Canada, September 2013.

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DOI: http://dx.doi.org/10.1016/j.jamcollsurg.2015.10.015

Article Info

Publication History

Published Online: November 24, 2015
Accepted: October 22, 2015
Received in revised form: October 22, 2015
Received: August 14, 2015

Abstract | Full Text | Images | References | Supplemental Materials

Background

The application of early cholecystectomy for acute cholecystitis remains inconsistent across hospitals worldwide. Given the constrained nature of health care spending, careful consideration of costs relative to the clinical consequences of alternative treatments should support decision making. We present a cost-utility analysis comparing alternative time frames of cholecystectomy for acute cholecystitis.

Study Design

A Markov model with a 5-year time horizon was developed to compare costs and quality-adjusted life-years (QALY) gained from 3 alternative management strategies for the treatment of acute cholecystitis: early cholecystectomy (within 7 days of presentation), delayed elective cholecystectomy (8 to 12 weeks from presentation), and watchful waiting, where cholecystectomy is performed urgently only if recurrent symptoms arise. Model inputs were selected to reflect patients with uncomplicated acute cholecystitis—without concurrent common bile duct obstruction, pancreatitis, or severe sepsis. Real-world outcome probability and cost estimates included in the model were derived from analysis of population-based administrative databases for the province of Ontario, Canada. The QALY values were derived from utilities identified in published literature. Parameter uncertainty was evaluated through probabilistic sensitivity analyses.

Results

Early cholecystectomy was less costly (C$6,905 per person) and more effective (4.20 QALYs per person) than delayed cholecystectomy (C$8,511; 4.18 QALYs per person) or watchful waiting (C$7,274; 3.99 QALYs per person). Probabilistic sensitivity analysis showed early cholecystectomy was the preferred management in 72% of model iterations, given a cost-effectiveness threshold of C$50,000 per QALY.

Conclusions

This cost-utility analysis suggests early cholecystectomy is the optimal management of uncomplicated acute cholecystitis. Furthermore, deferring surgery until recurrent symptoms arise is associated with the worst clinical outcomes.

Abbreviations and Acronyms:

ED (emergency department), NMB (net monetary benefit), QALY (quality-adjusted life-years), RIW (resource intensity weight), WTP (willingness to pay)

CME questions for this article available at http://jacscme.facs.org

Disclosure Information: Authors have nothing to disclose. Timothy J Eberlein, Editor-in-Chief, has nothing to disclose.

Support: The project was funded by operating grants from the Canadian Surgical Research Fund and Physician Services Inc. Foundation. In addition, this study was supported by the Institute for Clinical Evaluative Sciences (ICES), which is funded by an annual grant from the Ontario Ministry of Health and Long-Term Care (MOHLTC). The opinions, results, and conclusions reported in this paper are those of the authors and are independent from the funding sources. No endorsement by ICES or the Ontario MOHLTC is intended or should be inferred.

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All cost data expressed in Canadian dollars can be converted to US dollars by multiplying by 0.989.

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