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SUMMARY WITH CRITICAL APPRAISAL

Day Surgery versus Overnight Stay for Laparoscopic Cholecystectomy and Laparoscopic Hernia Repair: A Review of Comparative Clinical Effectiveness and Guidelines

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Context and Policy Issues

Cholecystectomy and hernia repair are commonly performed surgical procedures for the treatment of different gallstone conditions or hernias. In Canada, over 90,000 elective cholecystectomies are performed every year, and many more are performed in the acute care setting.[1] Surgical repair of inguinal hernia is one of the most frequent surgical procedures performed, with an estimated 800 000 hernia repairs performed in the United States each year.[2] Laparoscopic cholecystectomy[3] and laparoscopic hernia repair[4] have replaced open surgeries as the first choice of treatment due to their better postoperative profiles and shorter length of hospital stay.

Recently, laparoscopic surgeries have been performed as a day-case where patients were discharged the same day (day surgery), while they can also be done with the patients staying overnight. Day surgery may help with inpatient bed shortages and reduces hospital costs, but feasibility and patients' safety may be an issue. The comparative clinical effectiveness between the two strategies is still unclear. This Rapid Response report aims to review the comparative clinical effectiveness of laparoscopic cholecystectomy or laparoscopic hernia repair performed as a day surgery versus overnight stay. Evidence-based guidelines regarding the performance of laparoscopic cholecystectomy or laparoscopic hernia repair as a day surgery will also be examined.

Research Questions

1. What is the comparative clinical effectiveness of laparoscopic cholecystectomy performed as a day surgery versus overnight stay (same-day admission)?

2. What is the comparative clinical effectiveness of laparoscopic hernia repair performed as a day surgery versus overnight stay (same-day admission)?

3. What are the evidence-based guidelines regarding the performance of laparoscopic cholecystectomy or laparoscopic hernia repair as a day surgery?

Key Findings

Findings from a systematic review and controlled clinical trials showed that day surgery led to comparable post-operative complication rates and similar quality of life compared with overnight stay in adult and pediatric patients undergoing laparoscopic cholecystectomy. There was no evidence on the comparative clinical effectiveness of laparoscopic hernia repair performed as a day surgery versus overnight stay. No evidence-based guideline was found regarding the performance of laparoscopic cholecystectomy or laparoscopic hernia repair as a day surgery.

Methods

Literature Search Methods

A limited literature search was conducted on key resources including PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also

limited to English language documents published between January 1, 2012 and May 16, 2017. Rapid Response reports are organized so that the evidence for each research question is presented separately.

Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Patients receiving non-emergent laparoscopic cholecystectomy Patients receiving non-emergent laparoscopic hernia repair
Intervention	Day surgery (discharge same day as procedure)
Comparator	Overnight stay (i.e., same-day admission; patient admitted overnight for monitoring and discharged next day)
Outcomes	Clinical effectiveness (e.g., pain, hospital re-admission rates, failed discharge rates or prolonged hospitalization, adverse events, time to return to activities) Evidence-based guidelines and recommendations, including considerations for patients who face extensive travel between hospital and home
Study Designs	Heath technology assessments, systematic reviews (SRs), meta-analyses, randomized controlled trials (RCTs), non-RCTs, evidence-based guidelines

Exclusion Criteria

Articles were excluded if they did not meet the selection criteria outlined in Table 1, they were duplicate publications, or were published prior to 2012, or were already reported in included SRs.

Critical Appraisal of Individual Studies

The included systematic review and clinical studies were assessed using the AMSTAR[5] and Downs and Black[6] checklists, respectively. Summary scores were not calculated for the included studies; rather, a review of the strengths and limitations of each included study were described.

Summary of Evidence

Quantity of Research Available

A total of 214 citations were identified in the literature search. Following screening of titles and abstracts, 206 citations were excluded and eight potentially relevant reports from the electronic search were retrieved for full-text review. No potentially relevant publication was retrieved from the grey literature search. Of these potentially relevant articles, four publications were excluded for various reasons, while four publications met the inclusion criteria and were included in this report. Appendix 1 describes the PRISMA flowchart of the study selection.

Summary of Study Characteristics

The literature search identified one systematic review[7] and three clinical studies[8-10] that compared the clinical effectiveness of day surgery versus overnight stay for patients undergoing laparoscopic cholecystectomy.

The 2015 systematic review[7] performed a meta-analysis of 12 studies (seven RCTs and five controlled clinical trials) that compared the clinical effectiveness of day surgery versus overnight stay for adult patients undergoing laparoscopic cholecystectomy (there was no mention of the severity of the condition among the patients in the included trials). Outcomes reported were postoperative complication rate, readmission rate, prolonged hospitalization rate, consultation rate, and quality of life. The review was conducted in China.

The 2015 RCT conducted in Malaysia[8] compared the clinical performance and patients' satisfaction between day surgery and overnight stay in 58 patients less than 75 years old undergoing laparoscopic cholecystectomy. Outcomes reported were hospital length of stay, postoperative complication rate, readmission rate, and patient satisfaction.

Two retrospective chart reviews conducted in 2015 in the US[9] and in Japan[10] in 2012 compared the clinical performance between day surgery and overnight stay in 227 children[9] and 69 adult patients[10] undergoing laparoscopic cholecystectomy. Outcomes reported were hospital length of stay, postoperative complication rate, and readmission rate. The three clinical studies included patients with chronic symptomatic gallbladder disease undergoing laparoscopic surgery.

Characteristics of the included studies are detailed in Appendix 2.

Summary of Critical Appraisal

The systematic review/meta-analysis[7] provided an a priori design, and described independent study selection and data extraction procedures that were in place. A comprehensive literature search was performed. A list of included studies, description of study characteristics, and quality assessment of included studies were provided and the quality assessment was used in formulating conclusions. Meta-analysis was performed. Heterogeneity of the patients in the included trials based on condition severity may be an issue. Assessment of publication bias was performed with no evidence of bias, and potential conflicts of interest were stated. The review did not provide a list of excluded studies.

All three included clinical studies[8-10] had their hypotheses, method of selection from the source population and representation, main outcomes, interventions, patient characteristics, and main findings clearly described, and estimates of random variability and actual probability values provided. One study was an RCT,[8] while two studies were observational in nature,[9,10] patients were not randomized leading to potential of selection bias. It was unclear in all three studies whether there was sufficient power to detect a clinically important effect.

Details of the critical appraisal of the included studies are presented in Appendix 3.

Summary of Findings

The main findings of the included studies are presented in Appendix 4.

What is the comparative clinical effectiveness of laparoscopic cholecystectomy performed as a day surgery versus overnight stay (same-day admission)?

A systematic review and meta-analysis compared the clinical effectiveness of adult patients undergoing laparoscopic cholecystectomy from data from 12 studies.[7] There was no mortality reported in both groups. No statistical difference between the 2 groups was found in terms of post-operative complications (relative risk [RR] 0.92, 95% confidence interval [CI] 0.63 to 1.33), prolonged hospitalization (RR 0.92, 95% CI 0.68 to 3.92), readmission (RR 1.21, 95% CI 0.61 to 2.38), consultation rate (RR 1.10, 95% CI 0.63 to 1.92), and quality of life including pain measured using a visual analogue scale (VAS) (weighted mean difference [WMD] 0.92, 95% CI 0.63 to 1.33), post-operative nausea and vomiting (PONV) score (WMD 0.00, 95% CI -0.30 to 0.30), time to return to activity (WMD -0.17, 95% CI -0.39 to 0.06), and time to return to work (WMD -0.05, 95% CI -0.35 to 0.26). The authors concluded that laparoscopic cholecystectomy can be performed safely in selected patients as a day surgery procedure.

An RCT compared the clinical performance and patients' satisfaction between day surgery and overnight stay in 58 patients <75 years old undergoing laparoscopic cholecystetomy.[8] No statistical difference was found between the two groups in terms of pain (VAS), fever, post-operative nausea and vomiting (PONV), readmission, and post-operative patient satisfaction (all *P* values are <0.05). All patients undergoing day surgery were back to work within 7 days but 38% of patients with overnight stay had to stay off work for more than a week (*P* = 0.01). The authors concluded that day surgery laparoscopic cholecystectomy is safe and feasible and suggested that the early discharge may have given a psychological perception of quick recovery and self-confidence leading to shorter time off work in the day surgery group, though evidence for this hypothesis was not presented.

A retrospective study compared the clinical performance between day surgery and overnight stay in 227 children undergoing laparoscopic cholecystetomy.[9] There was no statistical difference found between the two groups in terms of post-operative complications and unplanned visits (all *P* values >0.05). The authors concluded that day surgery appears to be safe in pediatric patients undergoing laparoscopic cholecystectomy.

A retrospective study compared the clinical performance between day surgery and overnight stay in 69 adult patients undergoing laparoscopic cholecystetomy.[10] There were no deaths, serious post-operative complications, or readmissions reported in both groups. The authors concluded that day surgery can be performed with a low rate of complications.

What is the comparative clinical effectiveness of laparoscopic hernia repair performed as a day surgery versus overnight stay (same-day admission)?

There was no evidence found on the comparative clinical effectiveness of laparoscopic hernia repair performed as a day surgery versus overnight stay.

What are the evidence-based guidelines regarding the performance of laparoscopic cholecystectomy or laparoscopic hernia repair as a day surgery?

There were no evidence-based guidelines found regarding the performance of laparoscopic cholecystectomy or laparoscopic hernia repair as a day surgery.

Limitations

The systematic review included trials of different quality, suggesting caution in the interpretation of results. It is unclear whether the clinical trials included enough patients in order to have power to detect clinically significant differences.

Conclusions and Implications for Decision or Policy Making

Current evidence showed that day surgery seems to be safe and feasible in trials with selected patients undergoing laparoscopic cholecystectomy, with comparable post-operative complication rates and similar quality of life than overnight stay. It is noteworthy that the included trials may not have enough power to detect differences. Psychosocial consideration may play a role in the choice of treatment, as a recent study in a developing nation found that the vast majority of patients, despite being fit for day surgery, prefer to stay overnight, which makes them happy and more psycho-socially confident.[11]

There was no evidence on the comparative clinical effectiveness of laparoscopic hernia repair performed as a day surgery versus overnight stay. No evidence-based guidelines were found regarding the performance of laparoscopic cholecystectomy or laparoscopic hernia repair as a day surgery.

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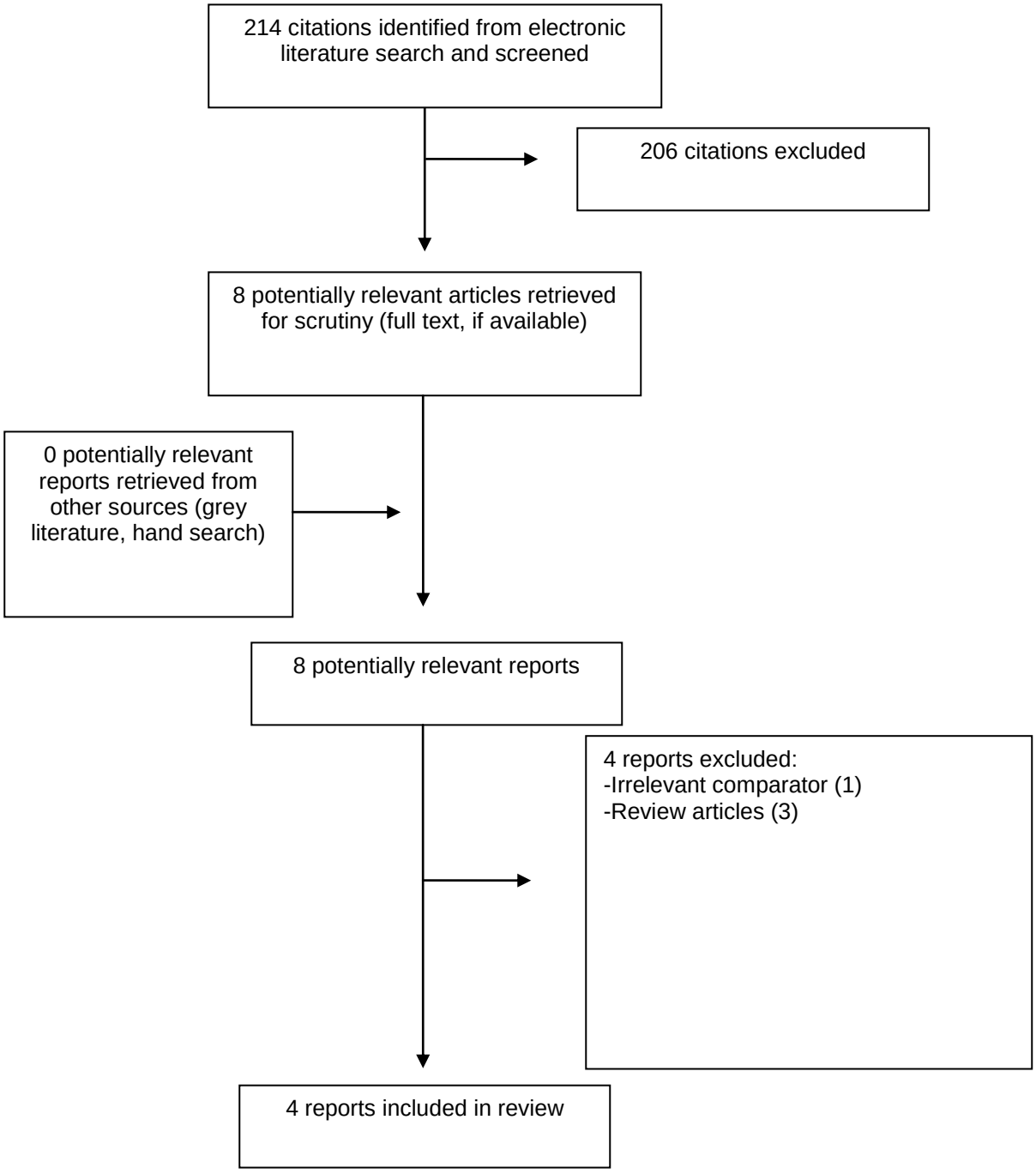
Appendix 1: Selection of Included Studies



Appendix 2: Characteristics of Included Publications

Table A1: Characteristics of Included Systematic Review

First Author, Year, Country	Objectives Literature Search Strategy	Inclusion Criteria	Exclusion Criteria	Number of studies included Main Outcomes
Tang,[7] 2015, China	*"To systematically assess the safety and efficacy of laparoscopic cholecystectomy as a day surgery procedure compared to overnight stay"* (p 556) *"A systematic literature search was independently conducted by two authors. They searched the following databases up to October 1, 2014: the Cochrane Central Register of Controlled Trials, Embase, Science Citation Index (Web of Knowledge), and PubMed. The search strategies were as follows: ("ambulatory care" OR "ambulatory surgical procedures" OR "day case" OR "day surgery" OR "day stay" OR "outpatient" OR "partial hospitalization") AND "Cholecystectomy, Laparoscopic"* (p 556)	*"Both RCTs and CCTs were considered for this review…We included trials comparing patients who underwent day surgery and overnight stay LC"* (p 557)	*"Cohort studies and case–control studies were excluded. Trials including patients with an average age more than 70 years or less than 18 years were excluded"* (p 557)	12 studies included (1430 patients, including 650 day surgery, 780 overnight stay patients) Mortality Morbidity (post-operative complications) Readmission rate Prolonged hospitalization (i.e., required admission for day surgery patients and >2 days of hospitalization for overnight stay patients) Consultation rate Quality of life (VAS core, PONV score, time to return to activity, time to return to work)

CCT = clinical controlled trial; LC = laparoscopic cholecystectomy; PONV = post-operative RCT = randomized controlled trial

Table A2: Characteristics of Included Clinical Studies

First Author, Year, Country	Study Design Study Objectives	Interventions/ Comparators	Patients	Main Outcomes
Salleh,[8] 2015, Malaysia	RCT "*This present study sought to review the performance and patient's satisfaction of laparoscopic cholecystectomy to be perform as day care procedure*" (p e165)	Day surgery Overnight stay	58 patients (mean age 49.8) undergoing laparoscopic cholecystectomy (29 patients for day surgery; 29 patients for ONS)	Post-operative pain score Fever PONV Readmission rate Post-operative patient's satisfaction
Dalton,[9] 2015, US	Retrospective chart review To compare same-day discharge to overnight stay in children undergoing cholecystectomy	Day surgery Overnight stay	227 children (mean age 13.7 years for day surgery, 13.9 years for ONS) undergoing laparoscopic cholecystectomy (57 patients for day surgery; 170 patients for ONS)	Post-operative length of stay Morbidity (complication rate) Readmission rate Unplanned visits
Sato,[10] 2012, Japan	Retrospective chart review *"To evaluate the applicability and safety of ambulatory laparoscopic cholecystectomy (LC) and to compare day case and overnight stay LC"* (p 296)	Day surgery Overnight stay	69 patients (mean age 53.6) undergoing laparoscopic cholecystectomy (50 patients for day surgery; 19 patients for ONS)	Post-operative length of stay Mortality Morbidity (complication rate) Readmission rate

ONS = overnight stay; PONV = post-operative nausea and vomiting score; RCT = randomized controlled trial

Appendix 3: Critical Appraisal of Included Publications

Table A3: Strengths and Limitations of Clinical Systematic Reviews using AMSTAR[5]

Strengths	Limitations
Tang[7]	
• a priori design provided • independent studies selection and data extraction procedure in place • comprehensive literature search performed • list of included studies, studies characteristics provided • quality assessment of included studies provided and used in formulating conclusions • assessment of publication bias performed • conflict of interest stated	• list of excluded studies not provided

Table A4: Strengths and Limitations of Clinical Studies using Downs and Black[6]

Strengths	Limitations
Salleh[8]	
• randomized controlled trial • hypothesis clearly described • method of selection from source population and representation described • loss to follow-up reported • main outcomes, interventions, patient characteristics, and main findings clearly described • estimates of random variability and actual probability values provided	• unclear whether study had sufficient power to detect a clinically important effect
Dalton[9]	
• hypothesis clearly described • method of selection from source population and representation described • loss to follow-up reported • main outcomes, interventions, patient characteristics, and main findings clearly described • estimates of random variability and actual probability values provided	• retrospective observational study, patients not randomized • unclear whether study had sufficient power to detect a clinically important effect
Sato[10]	
• hypothesis clearly described • method of selection from source population and representation described • loss to follow-up reported • main outcomes, interventions, patient characteristics, and main findings clearly described • estimates of random variability and actual probability values provided	• retrospective observational study, patients not randomized • unclear whether study had sufficient power to detect a clinically important effect

Appendix 4: Main Study Findings and Author's Conclusions

Table A5: Summary of Findings of Included Studies

Main Study Findings	Author's Conclusion
Tang,[7] 2015	
Mortality: there is no mortality reported in both groups Morbidity: no statistical difference between the 2 groups (RR 0.92 [0.63 – 1.33]) *P* = 0.65 Prolonged hospitalization: no statistical difference between the 2 groups (RR 0.92 [0.68 – 3.92]) *P* = 0.27 Readmission: no statistical difference between the 2 groups (RR 1.21 [0.61 – 2.38]) *P* = 0.58 Consultation rate: no statistical difference between the 2 groups (RR 1.10 [0.63 – 1.92]) *P* = 0.73 Quality of life - VAS score: no statistical difference between the 2 groups (WMD 0.92 [0.63 – 1.33]) *P* = 0.70 - PONV score: no statistical difference between the 2 groups (WMD 0.00 [-0.30 – 0.30]) *P* = 1.00 - Time to return to activity: no statistical difference between the 2 groups (WMD -0.17 [-0.39 – 0.06]) *P* = 0.14 - Time to return to work: no statistical difference between the 2 groups (WMD -0.05 [-0.35 – 0.26]) *P* = 0.76 Sensitivity analysis showed similar conclusions between high-quality studies (RCTs) and non-RCTs. Publication bias: there is no evidence of publication bias	*"Currently available evidence demonstrates that laparoscopic cholecystectomy can be performed safely in selected patients as a day surgery procedure, though further studies are needed"* (p 556)
Salleh,[8] 2015	
Post-operative pain score (median VAS) Day surgery: 2.93 Overnight stay: 3.59 *P* = 0.08 Fever (number of patients; %) Day surgery: 0 Overnight stay: 2 (6.9%) *P* 0.15 PONV (number of patients; %) Day surgery: 5 (17.5%) Overnight stay: 2 (6.9%) *P* 0.23 Post-operative patient's satisfaction (number of patients; %) Day surgery: 28 (96.9%)	"*Daycare laparoscopic cholecystectomy is safe and feasible*" (p e165)

Main Study Findings	Author's Conclusion
Overnight stay: 25 (86.2%) *P* 0.16 Readmission: none in both groups due to relevant medical condition Early return to work: (number of patients; %) Day surgery: 29 (100%) Overnight stay: 11 (37.9%) *P* 0.01	
Dalton,[9] 2015	
Postoperative length of stay: Day surgery: 4.1h - 1.8 h Overnight stay: 26.7h - 26 h (*P*< 0.01) Complications: Day surgery: 5.8% Overnight stay: 3.5% (*P* 0.43). The most common complication was umbilical wound infection. Unplanned visit: Day surgery: 4 patients (2 patients readmitted) Overnight stay: 5 patients (1 patient readmitted)	*"SDD appears safe for pediatric patients undergoing LC"* (p 418)
Sato,[10] 2012	
Postoperative length of stay: Day surgery: 41 patients/50 discharged less than 8 hours post op. 9 patients admitted for 2.1 nights ± 2.0 (2 as patient's request; 7 patients stayed because of PONV and for clinical observation) Overnight stay: 12 patients/19 discharged next day. 9 patients admitted for 3.1 nights ± 2.1 (5 as patient's requested; 2 patients stayed because of PONV and for clinical observation) Mortality: there is no mortality reported in both groups Morbidity: no serious morbidity in both groups Readmission: no readmission in both groups	*"Day case LC can be performed with a low rate of complications. In overnight stay patients, there are many who could be performed safely as a day case"* (p 296)

PONV = post-operative nausea and vomiting score; RR = risk ratio; VAS = visual analog scale score; WMD = weighted mean difference