



Original research

## Laparoscopic cholecystectomy in pregnancy: An Australian retrospective cohort study



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### HIGHLIGHTS

- Biliary tract disease is a common non-obstetric surgical presentation during pregnancy.
- There is scarce Australian data to support antenatal laparoscopic cholecystectomy.
- Twenty-two patients underwent laparoscopic cholecystectomy during pregnancy.
- No mortality and comparable morbidity was demonstrated.
- Our results support early laparoscopic cholecystectomy during pregnancy.

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### ABSTRACT

*Introduction:* Biliary tract disease is a common non-obstetric surgical presentation during pregnancy. Although small international series demonstrate favourable outcomes following laparoscopic cholecystectomy (LC) during pregnancy, there is a paucity of Australian data to complement these findings.

*Method:* Between 1st January 2003 and 30th June 2013, all patients undergoing planned LC during pregnancy at Western Health were retrospectively identified.

*Results:* Twenty-two patients underwent planned LC with 3 (13%) cases converted to open surgery. The median maternal age was 31 years (27.8–36) with an estimated median gestational age (EGA) of 19.5 weeks (16.5–23.5). Eighteen (82%) cases were performed during the second trimester. Nine (40%) patients had 2 or more hospital admissions for similar presentations. Twelve (54%) were performed as index cases. Operative indications included 12 (54%) with recurrent biliary colic, five (22%) with acute cholecystitis and 3 (14%) with gallstone pancreatitis.

Median operating time for completed LCs was 65 min (60–95). Intra-operative cholangiogram was performed in seven (32%) cases, 5 (71%) of which employed protective uterine lead shielding. There was no fetal loss or uterine injury. Median hospital stay was 3 days (2–7) for completed LCs. Major morbidity occurred in 2 (10%) completed LCs that required a return to theatre.

Five (23%) births were lost to follow up. The median time to delivery post-surgery was 13 weeks (11–15). Two (12%) preterm deliveries occurred, with subsequent neonatal complications.

*Conclusion:* Antenatal laparoscopic cholecystectomy demonstrated comparably safe outcomes. Increasing its utilization to manage symptomatic cholelithiasis during pregnancy may be considered.

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## 1. Introduction

Biliary tract disease is the second most common non-obstetric surgical presentation in pregnant women, with an incidence as

high as 0.8% [1]. It is thought that oestrogen and progesterone mediated saturation of bile is responsible for precipitating gallstone formation during pregnancy [2]. While most patients remain asymptomatic during pregnancy, a proportion of patients develop gallstone related complications.

Clear guidelines favour surgical management for gallstone pancreatitis and acute cholecystitis in the pregnant population. The Society of American Gastrointestinal and Endoscopic Surgeons

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(SAGES) recommends laparoscopic cholecystectomy (LC) as the treatment of choice for gallbladder disease regardless of trimester [3].

However, the decision to pursue surgery in the pregnant patient is not one to be taken lightly. It is clear that non-surgical management carries an increased risk of recurrence of symptoms as well as potentially life threatening gallstone pancreatitis, cholecystitis and cholangitis. Conversely, surgical intervention during pregnancy and the subsequent anaesthetic and radiation exposure poses a potential risk to both mother and foetus.

Historically, pregnancy was viewed as a contraindication to surgical intervention [4,5]. Advances in perioperative management, anaesthetic agents and laparoscopic surgery have allowed cholecystectomy to be a safe and feasible option during pregnancy, well supported in the literature [1–3,6–11]. However, there is a paucity of Australian data that corroborates this practice.

## 2. Objectives

The aim of this study was to demonstrate post-operative, obstetric and neonatal outcomes following laparoscopic cholecystectomy during pregnancy in an Australian population.

## 3. Methods [12]

After approval from an ethics committee, we retrospectively included all pregnant patients at Western Health undergoing laparoscopic cholecystectomy between the 1st January 2003 and 30th June 2013.

Patient data was de-identified. All planned open-approach cholecystectomies were excluded. The following variables were recorded: 1) operative records, 2) histopathology of gallbladder tissue, 3) date of surgery, 4) obstetric complications, 5) neonatal complications, 6) delivery records, 7) birth records, 8) blood results, 9) operative complications, 10) repeat procedures, 11) date of last contact and any recurrence of disease. Categorical data was presented as figures with percentages. All continuous variables were presented as medians with interquartile ranges. Given our small sample size, no other statistical analyses were undertaken.

## 4. Results

Laparoscopic cholecystectomy was performed on 22 pregnant patients between 2003 and 2013, with a median maternal age of 31 years (27.8–36) and median estimated gestational age (EGA) at time of surgery of 19.5 weeks (16.5–23.25). Nineteen (86%) patients were multigravida. While surgery was predominantly performed in the second trimester (82%), two patients (9%) were in their first trimester a time of surgery and two (9%) in their third trimester.

Nine (40%) patients had prior hospital admissions with biliary symptoms. Two (9%) of the multigravida patients had experienced similar symptoms in previous pregnancies. Initial clinical presentation included 12 (54%) with biliary colic, three (14%) with gallstone pancreatitis, five (22%) with acute cholecystitis, one (5%) with obstructive jaundice and one (5%) with concurrent acute cholecystitis and gallstone pancreatitis. Ultrasound reports were available for 21 patients (95%). Cholelithiasis was demonstrated in twenty of these patients (95%). Four patients (20%) demonstrated concurrent evidence of cholecystitis with one further case (5%) demonstrating choledocholithiasis. One patient with obstructive jaundice at five weeks gestation and one patient with gallstone pancreatitis at six weeks gestation presented in the first trimester and received emergent endoscopic retrograde cholangiopancreatography (ERCP) prior to semi-elective laparoscopic cholecystectomy.

Twelve cases (54%) were index cholecystectomies with the remaining 10 (45%) performed semi-electively. Three cases (14%) were converted to open-approach cholecystectomy. Reasons for conversion to open included: one case of an iatrogenic common bile duct injury requiring a formal choledochotomy and bile duct exploration and two cases with unclear anatomy during laparoscopy. Operative diagnosis varied amongst the cases. There were seven cases (32%) of acute cholecystitis, three (14%) of gallstone pancreatitis, three of chronic cholecystitis, one (5%) was diagnosed as concurrent acute cholecystitis and gallstone pancreatitis and one as a gallbladder mucocele. The remaining seven cases (32%) demonstrated cholelithiasis. Median operating time for all cases was 83 min (60–113) with the median operating time for completion LC of 65 min (60–95). One LC case had a concurrent umbilical hernia repair and another case had a concurrent neck dissection and removal of parathyroid adenoma. Intra-operative cholangiogram (IOC) was performed in seven (32%) cases, five of which (71%) deployed protective uterine lead shielding.

The median hospital stay was three days (2–7). There was no maternal or foetal mortality peri-operatively and no reported uterine injury. Major morbidity occurred in four cases (18%). Two of these complications occurred following complete laparoscopic procedures, while the remaining two, followed conversion to open-approach. In the complete-laparoscopic group one patient required return to theatre for a port site haemorrhage while the second required intubation and ICU admission for pre-operative sputum plugging. Of the converted cases, one was complicated by an iatrogenic common bile duct injury and the second was afflicted by atelectasis post operatively which was managed conservatively. Recurrence of symptoms occurred in one patient, which subsequently resolved without further intervention.

Birth records were not available for five cases (23%). Of the remaining 17 births, the median from gestation at delivery was 39 weeks (37–40) with a median interval from cholecystectomy to delivery of 13 weeks (11–15). Pre-term delivery occurred in two cases, with one case of post-term delivery. The median time between surgery and pre-term delivery was 11 weeks (10–13). Normal vaginal delivery occurred in 11 cases (61%), while four deliveries (22%) were performed by elective caesarian section. Median foetal birthweight was 3220 g (3030–3673). The only recorded neonatal complications occurred in the two pre-term infants. Both required intensive monitoring post delivery for neonatal hypoglycaemia and hypothermia.

## 5. Discussion

Whilst it was previously common practice to delay the surgical management of symptomatic biliary disease in pregnancy until the postpartum period, there is emerging evidence advocating for *early* surgical management in symptomatic patients. However, despite the wealth of literature regarding the safety and efficacy of laparoscopic cholecystectomy in pregnancy, there still continues to be some hesitancy surrounding the operative management of the pregnant patient. This hesitancy is understandable given the far-reaching implications of adverse outcomes such as harm to the developing foetus and ultimately, foetal loss.

From our series, LC was performed in all 22 cases with no operative mortality or recorded foetal loss for the duration of pregnancy. Indications for LC in our series were consistent with those reported in the literature, with biliary colic being the most common indication, followed by acute cholecystitis and gallstone pancreatitis. In particular, operating times, conversion rates and post-operative morbidity was comparable to existing case series in both pregnant and non-pregnant populations [8,9].

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