Observational Studies

Hayun Lee, Ahmed Askar, Dipak Makanji, Khadija Ranjha, Bishow B. Karki, Jade Courcol, Yuvraj Kukreja and G. Niraj*

The incidence of post cholecystectomy pain (PCP) syndrome at 12 months following laparoscopic cholecystectomy: a prospective evaluation in 200 patients

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Abstract

Objectives: Post cholecystectomy pain syndrome can cause significant distress, impairs quality of life and exacerbations often result in emergency visits. Poorly controlled postoperative pain is a recognized cause of persistent postsurgical pain. Abdominal myofascial pain syndrome is an underdiagnosed cause of persistent pain in this cohort. The objective was to estimate the incidence of poorly controlled postoperative pain in the first 48 h after surgery and the likelihood of developing persistent pain at 12 months.

Methods: The patients undergoing laparoscopic cholecystectomy at a tertiary unit were consented for participation in a prospective service evaluation. A telephone review was performed at three, six and twelve months after surgery. Incidence of poorly controlled pain in the first 48 h after surgery was assessed. Patients with persistent pain were referred to the pain clinic.

Results: Over a six-month period, 200 patients were assessed. Eleven patients were excluded (5.5 %). Twelve patients were lost to follow-up (6.6 %, 12/189). Patient satisfaction with acute postoperative pain management was low in 40 % (76/189). Poorly controlled postoperative pain was reported by 36 % (68/189) of patients. Incidence of persistent pain was 29 % (54/189) at 12 months post-surgery. Over half of patients with persistent pain (63 %, 34/54) reported poorly controlled postoperative pain. A somatic source was diagnosed in 54 % (29/54) with post cholecystectomy pain syndrome.

Conclusions: Poorly controlled postoperative pain was reported by a third of patients. Persistent pain was present in 29 % at twelve months post-surgery. Abdominal myofascial pain syndrome should be considered as a differential diagnosis in post cholecystectomy pain syndrome.

Keywords: laparoscopic cholecystectomy; post cholecystectomy syndrome; postoperative pain; abdominal myofascial pain syndrome; abdominal wall pain

Introduction

Persistent pain is a well-recognised complication after a variety of surgical procedures [1]. Poorly controlled postoperative pain is an accepted risk factor for persistent postsurgical pain [1–4]. Laparoscopic cholecystectomy is the gold standard in the management of symptomatic cholecystitis. It is frequently performed as an urgent procedure to reduce the incidence of complications including gall stone pancreatitis [5–7]. Over 66,000 laparoscopic cholecystectomies are performed in the UK annually [8]. A combination of significant visceral pain from cholecystitis and somatic pain from multiple port site trauma, often results in moderate to severe pain in the first 48 h after surgery [9, 10]. Effective postoperative pain management can be a challenge in this cohort [6].

Persistent pain after laparoscopic cholecystectomy is termed post cholecystectomy pain (PCP) syndrome with a reported incidence of 12–40 % [4, 11, 12]. Current literature appears to focus on visceral pathology as a cause for PCP [9, 13] (Table 1). A potential somatic source for persistent pain

***Corresponding author: Dr. G. Niraj**, Consultant, Department of Pain Medicine, Clinical Research Unit in Pain Medicine, University Hospitals of Leicester, Gwendolen Road, Leicester, LE5 4PW, UK, Fax: +0044 1162584661, E-mail: niraj.gopinath@smsimsr.org
Hayun Lee and Yuvraj Kukreja, Advanced Pain Fellow, Department of Pain Medicine, Leicester, UK
Ahmed Askar, Department of Hepatopancreaticbiliary Surgery, Leicester, UK
Dipak Makanji, Khadija Ranjha and Jade Courcol, Department of Anaesthesia, Leicester, UK
Bishow B. Karki, Department of Surgery, Leicester, UK

Table 1: Potential causes of post cholecystectomy pain syndrome [12, 13].

Structural	Functional
Retained stones	Irritable bowel syndrome
Papillary fibrosis	Biliary sphincter disorder
Biliary stricture	Functional dyspepsia
Chronic pancreatitis	Functional biliary-type pain
Peptic ulcer	Gastroparesis
Mesenteric ischaemia	
GORD	
ACNES	
Fatty liver disease	
Bile acid malabsorption	

GORD, gastro-oesophageal reflux disease; ACNES, anterior cutaneous nerve entrapment syndrome.

is abdominal myofascial pain syndrome (AMPS). It is often poorly recognised and underdiagnosed [14]. Patients who undergo laparoscopic cholecystectomy appear to be at a risk of developing AMPS [9].

The aims of this prospective evaluation were to assess the incidence of poorly controlled postoperative pain in the first 48 h, level of satisfaction with postoperative pain management and the incidence of persistent pain at three, six and twelve months after surgery.

Methods

Adult patients undergoing non-elective laparoscopic cholecystectomy at a tertiary hepato-pancreatico-biliary (HPB) unit were included in a prospective service evaluation. The patient population included those posted in the emergency theatre, who underwent non-elective surgery. They were a mix of patients with acute cholecystitis as well as those with recurrent attacks who were deemed high risk for pancreatitis or presented with gall stone pancreatitis.

This project was registered with the Clinical Audit Safety and Effectiveness (CASE 11216), University Hospitals of Leicester NHS Trust, UK. Written consent was obtained from the patients for telephone review at three, six and twelve months, as well as for the use of de-identified data for analysis and publication. Ethics approval was not required as it was a process audit and service evaluation.

The aim was to evaluate the incidence of poorly controlled postoperative pain relief in the first two days after surgery and patient satisfaction with postoperative pain management. In addition, we wanted to quantify the incidence of persistent pain at three, six and twelve months after surgery. Numerical rating scale (NRS) was used to assess the severity of pain. Poorly controlled postoperative pain was defined as having 5 or more episodes of severe pain (NRS >6/10 at rest or movement) in the first 48 h after surgery [3]. Patient satisfaction was graded as excellent, good, fair and poor. Exclusion criteria included patient refusal to consent for telephone review, conversion to open surgery and presence of learning disability.

Laparoscopic surgery was performed by consultant surgeons or senior surgical trainees. Surgical technique was kept standard and included four ports (epigastric, umbilical and two lateral ports). All patients underwent general anaesthesia. Intraoperative analgesia included intravenous morphine 0.1 mg/kg weight and local anaesthetic infiltration of port sites with 50 mL of 0.25 % levo-bupivacaine. Postoperative analgesia included regular acetaminophen 1 g six hourly, regular codeine 30 mg six hourly and oral morphine 10–20 mg as required on the day of surgery. Patients were discharged on the same day with advice for home analgesics including acetaminophen 1 g six hourly and codeine 30 mg six hourly. Patients were reviewed over the telephone.

The patients were contacted for the first telephone review at three months post-surgery where they were asked the incidence and frequency of poorly controlled pain in the first 48 h after surgery. Patients who complained of persistent pain at three months were subsequently referred to a pain medicine clinic for a review by a pain physician (GN) within 8–12 weeks of the referral. Patients underwent biochemical and radiological investigations to rule out the presence of new onset visceral inflammation including prior to the pain clinic review.

Collected data included age, gender, body mass index, postoperative port site infection and any emergency visit(s) for flare-up of persistent postsurgical pain. Persistent pain was quantified into mild (1–4/10), moderate [5–7] or severe (>7/10) using a numerical rating scale. Site of persistent pain was grouped into three types (right upper quadrant pain, epigastric pain and periumbilical pain) correlating with the laparoscopic port scars [9].

Pain clinic review

A pain medicine physician (GN) reviewed patients with persistent pain in whom investigations ruled out a visceral inflammation as a pain generator. Clinical history was elicited to identify somatic abdominal pain as per the diagnostic criteria described by Niraj et al. [14]. Clinical examination was performed to confirm the presence or absence of port site tenderness, allodynia, trigger points and Carnett's sign [14, 15].

Medical management was initiated with amitriptyline and pregabalin for three months. We have previously shown that amitriptyline and pregabalin can be beneficial in a subset of patients with AMPS [14]. Amitriptyline improves sleep and low dose pregabalin improves anxiety in this cohort. Both poor sleep and anxiety can aggravate AMPS. Although both drugs are primarily prescribed for neuropathic pain, they have well described additional effects that can be beneficial in myofascial pain.

Patients who responded to medical management were discharged. Patients who failed to benefit from medical management were offered diagnostic abdominal plane blocks and trigger point injections (epigastric and or umbilical) with a mixture of local anaesthetic and depot methylprednisolone [9]. Patients were reviewed in the pain medicine clinic at three months post intervention. Diagnosis of AMPS was confirmed if the patient reported >30 % relief at three-month review.

Results

Over a six-month period between March 2021 and September 2021, 200 successive patients who underwent

Table 2: Demographic data, patient satisfaction scores as well as the incidence, site, type and severity of persistent pain at 12 months in patients who underwent laparoscopic cholecystectomy.

Demographics	n=189
Age, years, mean ± SD	52.8 ± 17.9
Gender, n (%)	
Male	50 (26 %)
Female	139 (74 %)
Body Mass Index, mean ± SD	31.4 ± 6.64
Satisfaction, n (%)	
Excellent	83 (44 %)
Good	30 (16 %)
Fair	57 (30 %)
Poor	19 (10 %)
Severity of persistent pain, n (%)	54 (29 %)
Mild	8 (15 %)
Moderate	17 (31 %)
Severe	29 (54 %)
Site of persistent pain, n (%)	54 (29 %)
Epigastric	28 (52 %)
Right upper quadrant	23 (43 %)
Umbilical	3 (5 %)
Type of persistent pain, n (%)	54 (29 %)
Visceral	25 (46 %)
Somatic (AMPS)	29 (54 %)

AMPS, abdominal myofascial pain syndrome.

non-elective laparoscopic cholecystectomy were consented for prospective telephone review. Eleven patients were excluded (conversion to open surgery [6], learning disability [4] and refused to consent [1]). Twelve patients were lost to follow up (6.6 %, 12/189). Patient characteristics and demographic data are provided in Table 2. The incidence of poorly controlled pain in the first 48 h after surgery was 36 % (68/189). Patient satisfaction with perioperative pain management is detailed in Table 2.

Incidence of persistent pain

The incidence of persistent abdominal pain at three-month follow-up was 27 % (52/189). The intensity of persistent pain was mild (10/52, 19 %), moderate (18/52, 35 %) and severe (28/52, 46 %).

At six-month review, 54 patients (54/189, 29 %) reported ongoing upper abdominal pain. Four patients (4/52, 3 %) with mild persistent pain at three months reported complete resolution of symptoms. Six patients reported new onset upper abdominal pain between three and six-months post-surgery. The intensity of persistent pain was mild (6/54, 11 %), moderate (20/54, 35 %) and severe (28/54, 46 %).

At twelve-month review, 54 patients (54/189, 29 %) reported persistent abdominal pain. Two patients reported complete resolution of symptoms (2/54, 2 %) while two others reported new onset of upper abdominal pain between 6 and 12-months post-surgery. The intensity of persistent pain was mild (8/54, 15 %), moderate (20/54, 31 %) and severe (29/54, 54 %).

Overall, 60 patients reported persistent pain after laparoscopic cholecystectomy. Persistent pain resolved spontaneously in six patients. The remaining 54 patients were offered a pain medicine clinic review and 45 patients (45/54, 83 %) attended the clinic.

Site of persistent pain

Pain was localised to three different sites in the upper abdomen. Epigastric pain was the predominant site in 28 patients (28/54, 52 %). Right upper quadrant pain was reported by 23 patients (23/54, 43 %). The least common site was peri-umbilical (3/54, 5 %).

Type of persistent pain

A visceral pathology was identified in 25 patients who reported persistent abdominal pain (25/54, 46 %). These included gastritis (15/25, 60 %), new onset pancreatitis (2/25, 8 %), pain that was resolved following the removal of biliary stent (7/25, 28 %) and sphincter of Oddi dysfunction (SOD), which was diagnosed following hepatobiliary iminodiacetic acid (HIDA) scan (1/25, 4 %).

Pain medicine clinic review

Features suggestive of somatic pain (abdominal myofascial pain syndrome) were identified in 29 patients (29/54, 54 %). The following diagnostic criteria for AMPS modified after Niraj et al. was used [14].

(1) History: Constant dull achy pain in the abdomen with intermittent sharp flare-ups, referred to the flank, groin or the leg; aggravated on activity, relieved on curling up and a past history of visceral inflammation
(2) Absence of active visceral inflammation. Confirmed by investigations including tests for inflammatory markers, laparoscopic or endoscopic findings and appropriate imaging.
(3) Examination: Tender trigger points not localised to the lateral border of the rectus abdominis muscle, absence of cutaneous allodynia or hypoaesthesia and a positive Carnett's sign.

Medical management was initiated with amitriptyline and pregabalin, which provided significant relief in 5 patients (5/29, 17 %). The remaining 24 patients were offered diagnostic abdominal plane blocks and trigger point injections (epigastric and or umbilical) with a mixture of local anaesthetic and depot methylprednisolone [9]. Three patients refused to have the procedure due to needle phobia. The interventions were performed in 21 patients and all reported clinically significant relief (>30 %) at three-month review thereby confirming the diagnosis of AMPS.

Port site infection

Port site infection was reported by five patients (peri-umbilical, 100 %). It was managed with antibiotics as per local hospital policy. Three patients (3/5, 60 %) reported persistent pain, which was diagnosed as AMPS following a positive response to interventional treatment [9].

Emergency visit

Emergency visit following acute exacerbation of persistent abdominal pain was reported by 26 patients (26/54, 48 %). Five patients (5/26, 19 %) were diagnosed with new onset visceral inflammation [pancreatitis (1), gastritis (2) and SOD (2)]. Twenty-one patients (21/26, 81 %) were extensively investigated for visceral pathology and were subsequently diagnosed with AMPS.

Lost to follow-up

Twelve patients (12/189, 6.3 %) could not be contacted over telephone despite multiple attempts.

Discussion

The incidence of post cholecystectomy pain (PCP) at twelve months was 29 % in this prospective study that included 200 patients. This represents significant morbidity. Over a third of patients (68/189, 36 %) reported poorly controlled postoperative pain. The incidence of PCP was 60 % (41/68) in this subset when compared to the overall incidence of PCP (29 %, 54/189). This reaffirms the possible significance of adequate pain control in the immediate postoperative period [3].

Laparoscopic cholecystectomy is considered an ambulatory procedure. The postoperative pain management can be suboptimal [16, 17]. This cohort carries multiple risk factors for the development of persistent post-surgical pain [9]. These include female gender, obesity, recurrent cholecystitis and pancreatitis [9]. A large proportion of patients (43 %, 81/189) were unsatisfied with the postoperative pain management.

Although PCP is well recognised, the causation appears to be unclear. Majority of the published literature appears to focus on visceral entities. Diagnostic and therapeutic interventions are also primarily directed at ruling out visceral pathologies [9, 13]. In this cohort, a visceral pathology was identified in 25 patients with persistent pain (25/54, 46 %). However, a substantial proportion reporting persistent pain (54 %, 29/54) presented with non-visceral somatic pain. Subsequently this was confirmed as AMPS. There is limited information reported on somatic factors involved in the development of PCP. Chronic pain that arises from the abdominal musculature is termed AMPS, which is a somatic cause of PCP [9, 14]. Patients with cholecystitis who undergo surgery are at a risk of developing AMPS [9]. The underlying pathophysiology is a combination of viscerosomatic convergence and surgical port site trauma. Viscerosomatic convergence is a phenomenon of central and peripheral sensitisation [17–20]. Patients can suffer bouts of visceral inflammation such as recurrent cholecystitis, pancreatitis or concomitant gastritis. Furthermore, this occurs in a subset of patients with an increased risk of developing persistent pain such as female gender, raised BMI, history of anxiety or depression [9, 21, 22]. Sustained visceral inflammation results in possible sensitisation of the overlying abdominal muscles [14]. Thereafter, the sensitised muscles undergo trauma during port site insertion. Standard port sites include the rectus abdominis (epigastric and umbilical), oblique and transversus abdominis muscles (lateral). In addition, sensitisation of the overlying muscle can be further enhanced by perforation of gall bladder during surgery, biliary leakage, empyema, percutaneous drain insertion or postoperative wound infection [9]. These can result in the development of trigger points in the muscle with subsequent dysfunction and impaired muscle relaxation seen in AMPS [14].

Patients with PCP syndrome often have acute exacerbations. It can result in emergency visits and recurrent hospital admissions [23, 24]. Subsequently, these patients undergo extensive investigations. In a significant proportion of cases, the diagnosis is undetected since a somatic source (AMPS) is rarely evaluated. As a result, patients continue to experience significant distress that results in loss of work and excessive health care utilisation. In our cohort, 48 % of patients with persistent pain (26/54) reported to have emergency hospital visit(s) during the 12-month follow-up

period. Among those 26 patients, 21 patients were subsequently diagnosed with AMPS (21/26, 81 %).

In this report, the severity of postoperative pain was pre-defined as NRS >6 based on a previous work on patients undergoing open thoracotomy [3]. The definition for severity of persistent pain was based on published literature [25]. Patients who have undergone laparoscopic cholecystectomy can develop sudden onset of new pain in the upper abdomen (that persists) weeks and months after the surgery, which can be solely attributed to the surgical procedure. We have used the word 'Persistent' to denote chronicity.

The authors are aware of the limitation of this study including open label, service evaluation at a single tertiary HPB centre. In addition, data on pre-operative pain and opioid medication use was not collected. This could have helped in tailoring postoperative analgesia. Preoperative screening for anxiety, depression, pain catastrophising were not performed. A formal pain medicine clinic review was possible in 83 % of patients with persistent pain. Outcomes following interventional treatment requires further study as confounding factors include placebo effect, regression to the mean and natural course of this condition.

In conclusion, the provision of effective postoperative analgesia in this cohort of patients is paramount. Future studies should also evaluate pre-operative factor that can influence the development of persistent postsurgical pain. Patients presenting with persistent pain after laparoscopic cholecystectomy should be evaluated for somatic causes, specifically for abdominal myofascial pain syndrome. Further studies are required to confirm these observations.

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Research ethics: Research ethical approval was not required as this was a service evaluation.

Competing interests: None declared.

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Data availability: The raw data can be obtained on request from the corresponding author.

Addendum

Audit questionnaire

Verbal consent for telephone follow-up: Yes/No.

(1) Did you have any severe pain during the first 48 h after surgery? Yes/no.
(2) If yes, how many episodes of severe pain did you have during the first 48 h after surgery? 1–5, 5–10, >10.
(3) How would you rate the quality of your pain relief after first 48 h after surgery? Poor/fair/good/excellent.
(4) Do you still suffer with pain that you relate to the surgery on the abdomen? Yes/no.
If yes, continue.
If no, thank you and hang up.
(5) If yes, is this pain similar to the one before surgery? Yes/no.
(6) Which part of the abdomen is painful: Around the belly button/under your ribcage on the right side/under your rib cage in the middle.
(7) How would you describe the pain? Mild/moderate/severe.
(8) Have you had to visit the emergency department due to exacerbation of this pain? Yes/no.
(9) Does your pain make the skin abnormally sensitive to touch over the painful area? Yes/no.
(10) Did you have any infection in the scar(s) following surgery? Yes/no.
(11) Do you have pain over the scar/s on your abdomen? Yes/no.
(12) Has the pain improved with time? Yes/no.
(13) Are you receiving treatment or taking medication for this pain? Yes/no.
(14) Does the pain limit your daily activities? Yes/no.
(15) Would you like to be referred to the pain medicine clinic to manage this pain? Yes/no.

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