Mini Cholecystectomy now a day stay Surgery: Anaesthetic Management with multi modal Analgesia

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Abstract

Objective: To develop anaesthetic techniques for mini cholecystectomy in a day care set up.
Methods: Fifty patients in ASA grade I and II scheduled for minicholecystectomy were selected. They were given Inj. Ketoralac 30 mg intramuscular 45 minutes prior to surgery. lnj. pethidine 0.5 mg/kg intravenous was given at induction and lnj. bupivacaine 0.5% plain 10 ml was infiltered into the wound at the end of surgery.
Results: The mean age was 43.4±6.1 years with a preponderance of females (41 of 51). Thirty eight belonged to ASA grade I and 12 were in ASA grade II. Mean duration of surgery was 28.8±5.1 minutes. Size of minicholecystectomy incision was 3.9±0.4 cms. Two patients required additional opioid peroperatively, while two patients were given opioids post operatively. They were discharged from the PACUI at aldrete score >9 at 61.4±6.3 minutes while 47 patients were discharged from PACU II at PADSS score7 >9 172.1±11.4 minutes after surgery. The incidence of nausea was 6% with confidence interval of 95% range (5.0-23.3). Three patients were admitted. None of our patients required a readmission.
Conclusion: Miinicholecystectomy as a day care procedure is safe, with good pain relief facilitating mobility and recovery with multimodal pain management strategy (JPMA 52:291 ;2002).

Introduction

The ability to provide high quality and cost effective care has made out patient surgery one of the fastest growing area in the Health Care System all over the world[1-3]. But here the ambulatory surgery has so far been restricted to minor surgical procedures, due to non-availability of newer anaesthetic agents especially suited for day care surgery. In addition, there is a general concept in Pakistan that day care surgery may not be safe, as it does not conform to the traditional approach to surgery in which the patient has to be admitted and confined to bed after surgery[4].
This prospective study reports an anaesthetic technique using locally available anaesthetic and analgesic agents for patients with cholelithiasis undergoing minicholecystectomy as an ambulatory surgery.

Patients and Methods

With approval from the Institutional Human Ethical Committee informed consent was obtained from 50 patients with ultrasound proven cholelithiasis belonging to American Society of Anaesthesiologist (ASA) Status I and II, scheduled for minicholecystectomy at a private day care centre located at Hamdard University Hospital, Karachi. All the patients were admitted in the day care centre an hour

prior to surgery.
Patients over 60 years of age and those with significant cardiac, respiratory, renal, hepatic, hematologic disorders, contraindication to administration of anaesthetic and analgesic drugs used in these patients or history of gastrointestinal bleeding were excluded.

Premedication and Anaesthetic Requirements

Injection Ketoralac 0.5 mg/kg intramuscular was given 45 minutes prior to surgery to provide pre-emptive analgesia and to reduce opioid requirement per and post operatively.
All the patiens were induced with Inj. pethidine 0.5 mg/kg, Inj. propofol 2.5 mg/kg and Inj. atracurium 0.5 mg/kg followed by endotracheal intubation three minutes later. Anaesthesia was maintained with 60% Nitrous oxide in oxygen and 0.75-1% enflurane. Ventilation was controlled mechanically to maintain normocapnia with usual monitoring per operatively.
Patients manifesting clinical signs of inadequate analgesia e.g. sweating, lacrimation, increase in heart rate or mean arterial pressure values exceeding 20% of the baseline were given an additiohal dose of Inj. pethidine 10 mg intravenously, Inj. metoclopromide 10 mg intravenously was given 15 minutes before the end of surgery as a prophylaxis against postoperative nausea and vomiting (PONy). Ten ml of 0.5% bupivacaine was infiltered into the wound to provide post operative analgesia. All the patients were reversed with Inj. atropine 0.02 mg/kg and Inj. prostigmine 0.06 mg/kg and extubated when awake.
Early recovery variables that is command response and orientation time were recorded in operating room. Routine post anaesthesia care included monitoring of vital signs and oxygenation via face mask. Time required to achieve an aidrete score[5] >9, to sit without nausea or dizziness and ambulate was recorded. Post operatively the intensity of pain was assessed using a verbal pain score (VPS)6 ranging from 0 to 5 (Table 1)

Table 1. Verbal pain scores (VPS) recorded in pacu I and 2 in patients undergoing mini-cholesystectomy as dat care surgery.

VPS	0 Min		30 Min		60 Min		90 Min		120 Min		Discharge	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	26	52	27	54	27	54	28	56	30	60	32	64
1	18	36	19	38	21	42	20	40	19	38	17	34
2	04	08	03	06	02	04	02	04	01	02	01	02
3	02	04	01	02	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-

0 = no pain, 1 = mild, 2 = moderate, 3 = distressing, 4 = horrible, 5 = excruciating

while nausea was assessed clinically using a scale ranging from 0 to 3, where 0= no nausea, 1 = mild

nausea not requiring treatment, 2 = moderate, 3 = severe. A patient with a nausea score of 2 or more was given Inj. metoclopromide 10 mg intravenously.

All the patients were discharged from Post anaesthesia care unit I (PACU I) at aidrete score[5] > and from post anaesthesia care unit II (PACUII) according to Modified post anaesthetic discharge scoring system (PADSS) [7,8] score of >[9].

At discharge, patients were given a prescription of oral NSAID and antiemetic. They were asked to contact us by telephone if required. Causes for admission to the hospital were also determined.

Statistical Analysis

For quantitative data mean ±S.E. were computed to mention an estimated range of the parameters. The percentage of postoperative morbidity were mentioned as 95% confidence interval along with their actual proportion.

Results

Fifty patients underwent minicholecystectomy as a day stay surgery from January 2000 to August 2000.

The mean age was 43.4±6.1 years ranged 33-6 years with a mean weight of 67.1±6.5 kg. M:F ratio was 9:4. Thirty eight patients belonged to ASA grade I while 12 were in ASA grade II.

Operating room variables recorded were mean duration of surgery 28.8±5.1 minute range 18-40 minutes while mean duration of anaesthesia was 40.8±5.3 minutes. The size of minicholecystectomy incision was 3.9±0.4 cms patients were discharged from PACU II 172.± 11.4 minutes after surgery. Postoperative verbal pain score (VPS) was as shown in Table 2.

Table 2. Post operative morbidity recorded in PACU I and PACU II in patients undergoing day care cholecystectomy (n = 50).

	Number	Percentage	95% CI
Sore throat	8	16	20.2-45.8
Pain (requiring opioids)	2	4	0.8-12.6
Nausea requiring anti emetic	3	6	5.0-23.3
Dizziness	3	6	5.01-23.29
Cough	2	4	2.6-18.2
Headache	1	2	0.1-9.5

CI = Confidence interval.
PACU I = Post anaesthesia care unit I
PACU II = Post anaesthesia care unit II.

None had a score of 4 or 5. At the time of admission to recovery room, 52% were pain free, while 36% had mild pain but did not require treatment. Eight percent having moderate pain were given lnj. ketoralac 30 mgs intramuscularly while 4% patients having a pain score of 3 were given Inj. pethidine

10 mg intravenous along with Inj. ketoralac 30 mg intramuscular. At the time of discharge 64% patients were pain free, 34% had mild pain while 2% (one patient) had moderate pain.
The incidence of post operative nausea requiring antiemetic was 6% with a confidence interval of 95% (5.0-23.3) while none of our patients vomited.
Three patients were admitted. One had a surgical drain in situ while the other two were reluctant to go home although they had reached a PADSS score[7,8-9] at 130 and 145 minutes respectively. There was no mortality in this series with minor postoperative morbidity as shown in Table 2. mean with a range of 3-4.5 cms. Two patients required additional pethidine 10 mg peroperatively.
The vocal commond response was at 8.3±1.1 minute and orientation time was 11.7± 1.3 minutes after completion of surgery.
Recovery variables recorded in postanaesthesia recovery unit (PACU) I and II were as follows.
They reached an aldrete score[5] of 2:9 after 48.0±5.2 minutes and were able to sit without nausea or dizziness at 54.5±5.2 minutes and were shifted from PACU I to PACU II at 61.4±5.3 minutes. In PACU II they were able to ambulate at 88.9±13.8 minutes and achieved a mean PADSS score[7] >9 at 137.3±8.6 minutes. Forty seven We received no telephone calls from any of our discharged patients during first 24 hours after surgery and no one was re admitted.

Discussion

Laparoscopic cholecystectomy (LC) has rapidly replaced open cholecystectomy as the standard treatment for symptomatic cholelithiasis in the UK[9,10] and the trend is rapidly growing in other parts of the world as well. The perceived advantage of LC are a lower pain score during immediate post operative period and a more rapid post operative recovery and reduced hospital stay[10-12]. The evidence for this is less clear[13,14]. Audit has shown an increased incidence of bile duct injury[14,15] and other serious complications including vascular injury after LC[14,16] as compared to open cholecystectomy.
Minicholecystectomy has a conventional approach, but the incision is kept as small as possible. Proponents of this technique have claimed results similar to those achieved with laparoscopic cholecystectomy[16-19] and cost per cholecystectomy is relatively high for LC as compared to minicholecystectomy[20]. The pre-requisite for ambulatory surgery is cost effectiveness and safety therefore we had selected minicholecystectomy as day stay surgery.
Considering the anaesthetic technique, all the patients were induced on propofol because it is associated with rapid emergence as compared to other induction agents[21,22] while enflurane was selected for maintenence as compared to isoflurane because there are reports of rapid recovery with enflurane than isoflurane particularly in procedures lasting less than 90 minutes[23,24] and it is relatively cheaper.
The newer inhalation agents desfiurane and sevoflurane result in earlier awakening from anaesthesia than euflurane and isoflurane[25-28]. Desfiurane is not available in Pakistan while sevoflurane has recently been introduced. Since it is very expensive, we have restricted its use only for inhalational induction in children and patients with difficult airways. Propofol infusion for maintenence of anaesthesia is associated with faster recovery, awakening and discharge than isoflurane and enflurane[29,30] but the cost of TIVA with Propofol is 3-4 times more than balanced inhalational anaesthesia[31].
Postoperative pain and nausea are the most common complications which are likely to prolong discharge and contribute to unanticipated admissions after ambulatory surgery[32-34].
Several[33-55] investigators have proposed that multi modal analgesia, a combination of analgesics that act by different mechanisms, results in additive or synergistic effect with reduced side effects,

decreased pain scores or post operative analgesic requirements[33,34] and a combination of NSAIDS, opioids and local anaesthetics is highly recommended[33,35].

In our study we used injection ketoralac 0.5 mg/kg intramuscularly 45 minutes prior to surgery, Inj. pethidine 0.5 mg/kg intravenously, at induction and wound was infilterateded with Inj. bupivacaine 0.5% 10 ml at the end of surgery.

The choice of ketoralac for this study was based on its lack of effect on intrabiliary pressure[36]. Ketoralac acts as a cyclooxygenase inhibitor suggesting that it should be given preoperatively to achieve optimum effects before damage[33,35,37-39]. It also reduces the opioid requirements per and postoperatively[37,40].

Pethidine was selected because it causes less smooth muscle spasm and less increase in intrabilary pressure than Morphine[41] Secondly due to non availability of shorter acting opioids, recommended for per operative pain management in patients undergoing ambulatory surgery2, It is more suitable.

The choice of 0.5% bupivacaine for local infiltration after the surgery to reduce post operative pain was based on reports of randomized controlled trials that wound infiltration can provide postoperative analgesia facilitating smooth recovery in out patients[34,41-44].

The overall incidence of nausea in this series was relatively low (6%) at a confidence interval of 95% (5.1-23.3) compared to reports of a survey where overall incidence of PONV was 52%[45]. The balanced analgesic regimen adopted in this study along with prophylactic administration of metoclopromide could have been the cause of this low incidence of PONV as has been previously reported[46].

Though the efficacy of granisetron[47] and onandesteron[48] to control postoperative nausea and vomiting (PONV) has been found superior than metoclopromide but safety profiles of granisetron vs, metoclopromide were found similar[47]. No adverse effects like extrapyramidal symptoms or dizziness was noticed in this series. Onandesteron and granestron are 3 times more expensive than metoclopromide, prophylactic use of these agents must be weighed against the efficacy of treatment in this era of restricted resources[46].

The recovery variables recorded in PACU I were comparable with Michaloliakou et al. series[33] where patients were discharged from PACU I at an aldrete score of _9 at 63±10 minutes while our patients were discharged from PACU I at aldrete score[5] >.9 after 6 1.35±5.33 minutes. Our patients achieved a PADSS score[7] .>9 relatively earlier and were discharged from PACU II at 172.1± 11.4 minutes after surgery while in Michaloliakou et al. series, patients were discharged at 28 1.0±12 minutes, probably because their patients received more opioids per and post operatively as compared to our patients.

There was no mortality while morbidity recorded in this series was 96% (Table 2). Patients were discharged on the same day as compared to Michaloliakou et al[33] series where 90.5% patients were discharged after day care laparoscopic cholecystectomy. Another 4% could have been discharged because they had achieved a PADSS score[7,8-9].

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References

1.Bevan PG. The management and utilization of operating department N.H.S. Management executive. London: Value for money unit, HMSO, London, 1989, 33-34.

2.White PI. Ambulatory anaesthesia and surgery: past, present and future In: White PW, (ed). Ainbulatoiy anaesthesia and surgery. Philadelphia: WB Saunders, 1997. pp.3-34.
3.Thwaites AJ, Smith G. Novel anaesthetics and techniques for ambulatory surgery. Cuff, opinion in anaesth., 1997; 10:421-9.
4.Kamal RS, Reports of investigations, day care surgery in Pakistan. J. Anaesth. Crit. Care., 1996; 2:7-14.
5.Aidrete JA, Kroulik D. A post anaesthetic recovery score. Anaesth. Analgesia, 1970; 49:924-934.
6.Hukisson EC. Measurement of pain. Lancet, 1974; 11:1127-31.
7.Chung F, Chan VWS, Ong D. A post anaesthetic discharge scoring system for home readiness after ambulatory surgery (PADSS). J. Clin. Anaesth., 1995; 7:500-6.
8.Chung F. Are discharge criteria changing. J. Clin. Anaesth., 1993; 5 (Suppl.):64S-8S.
9.Gadauz TR, Talamini MA., Traditional VS. Laparoscopic Cholecystectomy. Am. J. Surg., 1991; 161:336-8.
10.Barkun JS, Barkun An, Sampalis 35 et al. Randomised controlled trial of laparoscopic versus minicholecystectomy. Lancet, 1992; 304:1116-9.
11.McMahon AJ, Russell, Romsey G, et al. Laparoscopic and mini laparotomy cholecystectomy a randomized trial comparing post operative pain and pulmonary function. Surgery, 1994; 115:533-9.
12.Mc-Ginn FP, Miles MG, Uglo M, et al. Randomised trial of laparoscopic cholecystectomy versus mini-cholecystectomy. Br. J. Surg., 1995; 82:1374-7.
13.Majeed AW, Troy G, Nichol JP et al. Laparoscopic vs small incision cholecystectomy: a randomised prospective comparison. Lancet, 1996; 347:989-94.
14.Dieziel DJ, Millikan KN, Economou SG. et al. Complications of laparoscopic cholecystectomy and analysis of 77609 cases. Am. 3. Surg., 1993; 165:9-14.
15.Go PM, Schol F, Gouma DG. Laparoscopic cholecystectomy in Netherland. Br. J. Surg., 1993; 80:1180-3.
16.Ledet WP. Ambulatory cholecystectomy without disability. Arch. Surg., 1990; 125: 1434-5.
17.Annstrong P3, Bengens RN. Choice of incision and pain, following gall bladder surgery. Br. J. Surg., 1990; 77:746-8.
18.Cheslyn A, Russel RCG. New Trends in gall stone management. Br. J. Surg., 1991; 78:143-9.
19.Squirrel DM, Majeed AW, Gilltroy et al. Original communications: a randomized prospective blinded comparison of post operative pain, metabolic response and perceived health after laparoscopic vs small incision cholecystectomy. Surgery, 1998; 123:485-95,
20.McMahan AJ, Gan TR, John NB, et al. Laparoscopic versus minilaparotomy Cholecystectomy a randomized trial. Lancet, 1994; 343:135-8.
21.Raeder JC, Mesvaer R. Comparison of propofol induction, with thiopentone or methohexitone in short out patient general anaesthesia. Acta
22.Servin F, Pommerea R. Comparison of intraoperative course and recovery following anaesthesia with etomidate or propofol in patients over 80 years. Anaesthesiology, 1990, 73:318A.
23.Valanne 3, Kortila K. Recovery following general anaesthesia with isoflurane or enflurane for out patient dentistry and oral surgery. Anaesth. Progress, 1988; 35:48-52.
24.Tracey JA, Holland AJC and Unser L. Morbidity in minor gynaecological surgery A comparison of halothane, enflurane and isoflurane. Br. 3. Anaesth., 1982; 54:1213-5.
25.Ghouri AT, Badner M, White PF. Recovery profile after desflurane, nitrous oxide versus isoflurane, nitrous oxide in out patients. Anaesthesiology, 1991; 74:419-24.
26.Smith I, Ringy M, White PF. Comparison of induction, maintenance and recovery characteristics of sevoflurane nitrous oxide and propofol, with propofol, isoflurane, nitrous oxide. Anaesth. Analgesia., 1992; 74:263-9.
27.Welban LG, Hannullah RS, Nordon JM et al. Comparison of emergence and recovery characteristics of sevoflurane, desfiurane and halothane in pediatric ambulating patients. Anaesth. Analgesia., 1996;

83:917-20.
28.Philp BK, Kaller SK . A multicentre comparison of maintenance and recovery with sevoflurane or isoflurane for adult ambulatory anaesthesia. Anaesth. Analgesia, 1996; 83:314-3 19.
29.Miller JM, Jewis CF. Recovery and morbidity after day care anaesthesia, Anaesthesia, 1988; 43:450-453.
30.Gold MI, Sacks DJ et al. Comparison of propofol with thiopental and isoflurane for induction and maintenance of general anaesthesia. 3. Clin. Anaesthesiol., 1989; 1:272-6.
31.Alhashemi JA, Miller DR, Drein HV, et al. Cost effectiveness of inhalational balanced and total intravenous anaesthesia in ambulatory knee surgery. Can. J. Anaesth., 1997; 44-8.
32.Farmer J, Chung SUJ. Predictive factors of unanticipated admission in ambulatory surgery: a prospective study. Anaesthesiology., 1996; 85:A27.
33.Michalaloliakou C, Chung F, Sharma S. Preoperative multi-modal analgesia facilitates recovery after ambulatory laparoscopic cholecystectomy. Anaesth. Analgesia, 1996; 82:44.51.
34.Tong D. Chung F. Post operative pain control in ambulatory surgery. Surg. Clin. North. Am., 1999; 79: 401-30.
35.Kehlel H, Dahl JB. The value of multi modal or balanced analgesia in post operative pain treatment. Anaesth. Analgesia., 1993; 77:1048-56.
36.Krimmer H, Bullingham RES, Loyd J, Bruch HP. Effect on biliary tract pressure in human's. Intravenous ketoralac tromethanine compared with morphine and placebo. Anaesth. Analgesia., 1992; 75:1204-7.
37.Charles R, Berton CRNA, Med Caral-Elliott, Case report. Keloralac as a preoperative non narcotic anaesthetic enhance anaesthesia and post anaesthesia recovery. Nurse Anaesth., 1993; 3:125-31.
38.Galard OM, Redder 3, Sore AA, et al. Out patient laparoscopie cholecystectomy. Br. 3. Surg., 1997; 84:961-85.
39.Wong HV, Carpenter RI, Kopac ZDJ, et al. A randomized double blind evaluation of ketoralac for postoperative analgesia in ambulatory surgery patients (Comments). Anaesthesiology, 1993; 78:6-14.
40.Wills VL, Hunt DR, Pain after laparoscopic cholecystectomy: review. Br. J. Surg., 2000; 87:273-84.
41.Tverskay M, Cozacov C, Ayache M et al. Post-operative pain after inguinal hemiorraphy with different types of anaesthesia. Anaesth. Analgesia., 1990; 170:29-35.
42.Alexander DJ, Ngoi SS, Lec L et al. Randomized trial of periportal, peritoneal bupivicaine for pain relief after laparoscopic cholecystectomy (Coments). Br. J. Surg., 1996; 83:1223-5.
43.BenDavid B, Katz E, Gaiti L, et al Comparison of intramuscular and local infiltration of ketoralac with and without local anaesthetic. Br. J. Anaesthesia, 1995; 75:409-12.
44.Patel JM, Lanzafame RJ, Williams JS, et al. The effect of incisional infiltration of bupivacaine hydrochloride upon pulmonary functions atelectasis and narcotic need following elective cholecystectomy. Surg. Gynecol. Obstet., 1983; 157:338-40.
45.Koivuranta M, Lairs E, Snore L, et al. A survey of post operative nausea and vomiting. Anaesthesia, 1997; 52:443-9.
46.Ericksson H, Karlkobila, Prevention of post operative pain and emesis. Curr. Opinion Anaesthesiology, 1997; 10:438-44.
47.laraka FH, Ic.awasaki L KandOmized clinical trial of Granisetron, droperidol and metoclopromide for the treatment of nausea after laparoscopic cholecystectomy. Br. J. Surg., 2000; 87:285-8.
48.Domunsch P, Consaller C, Cligti N, Mamet JP Ondansteron compared with metoclopromide in treatment of established nausea and vomiting. The metoclopromide in treatment of established nausea and vomiting. The French Ondansteron Study Group. Br. J. Anaesth., 1997; 79:322-6.