

Day Care Laparoscopic Appendectomy: A Prospective Study

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ABSTRACT

Background: Laparoscopic appendectomy is now a commonly performed minimal invasive surgery. However, practice of its use as an ambulatory surgery in our hospital settings is uncommon.

Objectives: The objective of this study is to evaluate safety and cost effectiveness of Laparoscopic Appendectomy as a day care surgery.

Methods: Study design is case series. 30 patients with uncomplicated symptomatic appendicitis were selected for day care Laparoscopic Appendectomy. They were operated in the morning hours and discharged after a check by the surgeon within 24 hours.

Results and Conclusions: Day care laparoscopic appendectomy is eminently feasible with anesthesia requirements included premedication with anxiolytics, sedatives to prevent postoperative nausea and vomiting; and general anesthesia with rapidly acting drugs having high clearance rate, minimal side effects and rapid recovery.

Most of the patients can be discharged by the evening of the same day, thus avoiding overnight hospital stay. Proper patient

selection prevents unplanned readmission and follow up, thereby increasing success rate. For surgeries of duration less than one and a half hours, the duration of surgery does not significantly affect the timing of discharge. There are many other factors, which affect the day care surgeries.

Keywords: Day Care Surgeries, Laparoscopic Appendectomy, Same Day Discharge, Appendicitis.

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INTRODUCTION

Day care surgery is described as the administration of selected patients to hospital for a planned surgical procedure, returning home on the same day.¹ The ability to provide high quality and cost-effective care has made outpatient surgery one of the fastest growing areas in our health care delivery system and the ability to perform more extensive operations on an outpatient basis has focused increasing interest on outpatient anesthesia.

The American author of the book 'major Ambulatory Surgery' described day care surgery as minor ambulatory surgery, as that care provided to non-hospitalized patients with immediate discharge of the patient and local anesthesia is almost invariably used in it. He defined major ambulatory surgery as the surgery done under general, regional or local anesthesia and a period of postoperative recovery and observation is utilized and then patient is discharged on the same day.²

Anesthesia forms the main stay of day surgery especially for laparoscopic day surgery, pre-anesthetic preparations with

NSAIDs, anti-emetics and sedatives/anxiolytics administered before the procedure help in the intra-operative as well as the postoperative recovery. The ability to deliver a safe and effective general anesthesia with minimal side effects and a rapid recovery is critical in outpatient surgery unit.

Rationale of day care surgery include-reduced hospital stay, early resumption to day- to- day activity, cost effectiveness, reduced anxiety of surgery, recovery in familiar surroundings, faster post-operative recovery, reduced patient over load in the hospital and reduced wait list for surgery. Pediatric and immune compromised cancer and transplant patients may also benefit as a result of the decreased risk of Hospital acquired infections.³

Laparoscopic appendectomy can be safely performed as a day-care or fat-track procedure, even for selected patients with gangrenous or perforated appendices.⁴⁻¹⁰

The present study demonstrated the safety of laparoscopic appendectomy in a day-care setting.

OBJECTIVES

The present study was carried out with the aim to demonstrate the safety and feasibility of laparoscopic appendectomy as a day-care surgery, in terms of the following evaluating parameters:

- Duration of hospital stay.
- Complications during hospital stay.
- Duration of return to full activities.
- Complications during follow up.

MATERIAL AND METHODS

After institutional review board approval, patients with uncomplicated appendicitis were considered for day care laparoscopic appendectomy. The demands of an expeditious discharge were discussed with the patient and his attendants before surgery. Informed consent after full explanation of day care surgery process was taken. Investigations included were Hemoglobin, B.T., C.T., T.L.C., D.L.C., S. Na+, S. K+, Blood Sugar, Blood urea, S. creatinine, ECG, USG, Liver function-if indicated. Close monitoring was done during post-operative period in terms of vitals, post-operative complications, morbidity, total hospital stay and complications in follow- up.

The protocol included antibiotic and pre-medication with Ramosetron (0.3mg) i.v. [serotonin 5- HT 3 receptor antagonist], Midazolam (2 mg) and Phenargan (25mg) i.m., 30 minutes before surgery. Induction was done with Glycopyrrolate (0.2mg) i.v., Fentanyl (3micro gm/kg) i.v., Propofol (1-1.5mg/kg) i.v.. Relaxation was rendered with Atracurium (0.3-0.5mg/kg) i.v.

Maintenance was done with O2, N2O, Isoflurane. Atracurium and Fentanyl was given as and when required. Regular monitoring of hemodynamic parameters including pulse rate, blood pressure, oxygen saturation and electro cardiogram was done. Surgical approach included three ports (one 10 mms and two 5 mms). If required, blunt dissection was used to identify appendix. After

ligation of the base, appendix was divided and delivered through umbilical port. Stump was cleaned, pneumoperitoneum deflated, trochars removed and incision closed aseptically. Post operatively, patient was monitored for vitals and immediate complications. Oral liquids were allowed after 6 hours of surgery.

Overnight stay was considered in cases of improper recovery, any complications (significant vomiting and uncontrolled pain) and social issues (transportation problem or family's will to stay).

Instructions On Discharge: Written and verbal instructions

- Explanation of procedure, post-operative medications and all possible complications
- Resume light activities at home as soon as possible.
- Do not lift anything heavier than 10 pounds.
- Limit sports and strenuous activities for 1 or 2 weeks.
- Shower as usual: Gentle wash around your incisions with soap and water. Patient should not bathe or soak in a tub until the incisions are well healed.
- Wear loose-fitting clothes.
- Do not drive till the patient is taking opiates for pain.
- Diet: bland, low-fat diet, such as well-cooked soft cereals, mashed potatoes, plain toast or bread or crackers, plain spaghetti, rice, macaroni (plain or with cheese), cottage cheese, puddings, low-fat yogurt, low-fat milk, ripe bananas. Patient should drink 6 to 8 glasses of water a day, unless directed otherwise. In case of constipation, fiber laxatives can be taken.
- Contact number of concerned doctor.

Patient's data (demographic, disease, treatment, outcome, and follow-up) was collected on pre-designed proforma. Patient's demographics, duration of surgery, length of stay after surgery, post discharge visit in emergency, readmission and complications were collated. The observations obtained were tabulated and analysed using appropriate statistical methods.

Table 1: Patient selection for day care laparoscopic appendectomy

Included	Excluded
<p>Uncomplicated symptomatic appendicitis.</p> <p>Medically fit and stable patients {ASA I, II, III (well controlled)}.</p> <p>Well motivated and psychologically / mentally</p>	<p>Multiple co-morbid diseases, coagulation disorders, adverse anesthetic history.</p> <p>Suspected/proven malignancy.</p> <p>ASA III (uncontrolled) or ASA IV.</p> <p>Unavailability of competent adult to accompany the patient.</p> <p>Age <14 and >60 years.</p> <p>Body mass index >35.</p> <p>Long distance from home (>30min travel)</p>

Table 2: Criteria for discharge.

<p>Stable vital signs for >30 min.</p> <p>No new signs or symptoms after the operation.</p> <p>No active bleeding or oozing.</p> <p>Minimal nausea and emesis for <30min.</p> <p>Orientation to person, time and place.</p> <p>Pain controllable with oral analgesics.</p> <p>Passed urine.</p> <p>No surgical complication.</p> <p>Minimal dizziness after sitting for <10min.</p> <p>A responsible escort.</p>

RESULTS

In order to evaluate the feasibility and safety of day care laparoscopic appendectomy, this study was carried out on 30 patients with diagnosis of appendicitis. All of them underwent laparoscopic appendectomy under day care anesthesia.

Parameters observed were as follows

1. Demographic data
2. ASA Grade
3. Duration of surgery
4. Time interval between ambulation and surgery
5. Length of stay after surgery
6. Complications during hospital stay

7. Complications during follow up
8. Duration of return of full activities

The mean age of patient presented with appendicitis was 29.60 years, with the range of 12 - 65 years. Twenty nine patients were normal and healthy (ASA I). Only one patient had ASA Grade II. The average duration of surgery was 55.50 hrs. The range was 35 – 80 minutes.

Time Interval Between Ambulation and Surgery: The average duration of mobilization after surgery was 5.87 hrs, with the range of 4 - 7 hrs. 22 patients ambulated within 6 hrs after surgery and rest of the patients ambulated within 7 hrs after surgery.

Length of Stay After Surgery: The average duration of hospital stay after surgery was 11.20hrs (range 7-23 hours).

Length of Stay in Patients who were Discharged on the Same Day: Total 26 patients were discharged on the same day. The average duration of stay for these patients was 9.62hrs (range 7-12 hours)

Length of Stay in Patients who were Discharged on the Next Day: Total 4 patients were discharged on the next day. The average duration of stay for these patients was 22hrs (range 20-23 hours)

Complications: There were no intra operative complications. During recovery, 10 patients (33.33%) had pain with VAS score 1, 17 (56.66%) had pain with VAS score 2 and 2 (06.66%) had pain with VAS score 4. 10 patients (33.33%) had nausea, 3 patients (10%) had vomiting (1 episode), 5 patients (16%) had drowsiness and 3 (10%) had shivering. During ward stay, 20 patients (66.66%) had pain with VAS score 1, and 9 (30%) had pain with VAS score 2. 4 patients (13.33%) had nausea, 11 (36.66 %) had

one episode of vomiting and 4 (13.33 %) patients had two episodes of vomiting.

During discharge, 21 (70%) had no distress (VAS =1), 8 (27%) patients had pain (VAS =2) and 1 patient had no pain.

During follow up, 13 patients complained of pain with VAS-1 for 2 days, 2 patients complained of pain with VAS-2 for 2days and 1 patient complained of pain for with VAS-2 for 5days

There were no serious complications observed

Duration of Return of Full Activities: Fifteen patients returned to their full routine activities within 3 days and remaining started doing their full activities within 7 days.

Table 3: Duration of surgery (n =30)

Duration of surgery	Minutes
Mean	55.50
SD	14.82
Minimum	35
Median	52.5
Maximum	80

Table 4: Length of stay after surgery (n = 30)

Length of stay	Hours
Mean	11.20
SD	4.29
Minimum	7
Median	10
Maximum	23

Table 5: Comparison of duration of discharge

Parameters	Same day	Overnight stay	P value
▪ No. of patients	26	4	-
▪ No. of patients with post-operative nausea, vomiting or pain with VAS≥2.	22	4	-
▪ No. of patients with VAS≥2. during discharge	5	2	-
▪ Average time of postoperative ambulation after surgery (hrs)	5.73 (range4-7)	6.75	P = 0.0246*
▪ Average length of hospital stay (hrs)	9.62 (range 7-12)	22.00 (range 20-23)	P = 0.0001*
▪ No. of patients with Nausea, vomiting or pain with VAS≥2 in follow up	2	2	-
▪ Readmissions	0	0	-
▪ Emergency follow up	0	0	-
▪ No. of satisfied patients	26	4	-

* = Statistical significant two-tailed P value (Unpaired t test results)

Comparison of Duration of Surgery: There were equal number of patients having duration of surgery ≤51min and those having duration >51minutes. There were no significant differences in both groups regarding postoperative complications and duration of ambulation after surgery. All four patients who stayed overnight had duration of surgery ≤51 min (which is significant). This shows that although prolonged surgery can delay discharge, but there are other significant factors, which affect the day care surgery.

Comparison of Duration of Discharge: Out of total thirty patients, twenty-six (87 %) were discharged on the same day, while only four were discharged on the next day. The average length of hospital stay and time of ambulation after surgery

between the two groups were significantly different. It can be inferred that time of ambulation after surgery significantly affects the timing of discharge, although the reason of delayed discharge could be social or medical. There was no incidence of emergency follow up or readmissions. All patients and their attendants were fully satisfied with the procedure and the day care discharge process.

All patients who underwent laparoscopic appendectomy were found eligible for same day discharge, except for one patient. Of the total thirty patients, 26 (87%) were discharged on the same day and the average post-operative length of stay in this group was 9.62 hrs (range: 7 to 12).

Four patients (13%) were discharged on next day in the morning. Out of the four, one patient (03%) stayed for medical reasons (nausea, vomiting and pain). The other three (10%) had to stay as their attendants declined to leave (social reasons), even though they were medically eligible for discharge from the hospital. The average post-operative length of stay in this group was 22hrs (range: 20 to 23). Overall the mean length of hospital stay was 11.20 hrs (range: 7 to 23). Average length of surgery was 55.50min (range: 35 to 80). Twenty-two (73%) patients were ambulated within 6 hours and given oral medications thereafter. Eight patients (27%) were ambulated after 6hrs because of vomiting, pain and less motivation. There were no significant post-operative complications except pain in all patients (VAS score ranging from 1 to 4 only) and mild to moderate nausea/vomiting in 24 (80%). At the time of discharge, 21 (70%) had pain with VAS =1, 8 (27%) patients had pain with VAS =2 and 1 patient had no pain.

All patients were provided a set of instructions regarding diet and to call in case of fever, nausea, vomiting, excessive pain, constipation, diarrhea and wound site discharge or redness. Follow-up was scheduled on 2nd, 5th and 10th day post-operatively. There was no urgent post-operative visit other than the scheduled follow-up. During follow up, fifteen patients complained of pain (VAS- 1 and 2) for 2 days and a single patient complained of pain (VAS-2) for 5days. There was no readmission. At the time of discharge all patients (100%) were highly satisfied and only 3(10%) requested for overnight stay.

DISCUSSION AND CONCLUSIONS

The ability to provide high quality and cost effective care has made the day care surgery one of the fastest growing areas in our health care delivery system and the ability to perform more extensive operations on an outpatient basis has increased the interest in outpatient (ambulatory) anesthesia.

Laparoscopic appendectomy has emerged as a safe procedure. Its potential advantages of shorter hospital stay, early mobilization, early return of bowel function, acceptable complication rate along with the recent enthusiasm of minimally invasive surgery, enhance consideration of this approach as the procedure of choice for uncomplicated appendicitis. Laparoscopic appendectomy can be safely performed as a day-care or fast-track procedure, even for selected patients with gangrenous or perforated appendices.

The present study was done to demonstrate the safety of the laparoscopic appendectomy in a day-care setting in a government hospital attached to a medical college in India. Through this study, we want to emphasize the importance of day care surgery and its advantages. This study was carried out on 30 patients with diagnosis of acute appendicitis. All of them underwent laparoscopic appendectomy under day care anesthesia. Pre-medication was given with Ramosetron (0.3 mg) i.v. [serotonin 5-HT-3 receptor antagonist], Midazolam (2 mg) and Phenargan (25 mg) i.m., 30 minutes before surgery. Induction was done with Glycopyrrolate (0.2 mg) i.v., Fentanyl (3 micro gm/kg) i.v., Propofol (1-1.5 mg/kg) i.v. Relaxation was rendered with Atracurium (0.3-0.5mg/kg) i.v. Maintenance was done with O₂, N₂O, Isoflurane. Atracurium i.v. and Fentanyl was given as and when required. After surgery, patient was regularly monitored for complications and vitals. After complete assessment, patients

were discharged as soon as they fulfilled the set criteria. All patients were found eligible for same day discharge, except for one patient. Of the total thirty patients, twenty-six (87%) were discharged on the same day and the average post-operative length of stay in this group was 9.62hrs (range: 7 to 12).

Four patients (13%) were discharged on next day in the morning. Out of the four, one patient (03%) stayed for medical reasons (nausea, vomiting and pain). The other three (10%) had to stay as their attendants declined to leave (social reasons), even though they were medically eligible for discharge from the hospital. The average post-operative length of stay in this group was 22 hrs (range: 20 to 23). Overall, the mean length of hospital stay was 11.20 hrs (range: 7 to 23). Average length of surgery was 55.50 min (range: 35 to 80). 22 (73%) patients were ambulated within 6 hours and given oral medications thereafter. 8 patients (27%) were ambulated after 6 hrs because of vomiting, pain and less motivation. There were no significant post-operative complications except pain in all patients (VAS score ranging from 1 to 4 only) and mild to moderate nausea/vomiting in 24 (80%). At the time of discharge, 21 (70%) had pain with VAS=1, 8 (27%) patients had pain with VAS=2, and 1 patient had no pain. All patients were provided a set of instructions regarding diet and to call in case of fever, nausea, vomiting, excessive pain, constipation, diarrhea and wound site discharge or redness. Follow-up was scheduled on 2nd, 5th and 10th day post-operatively. There was no urgent post-operative visit other than the scheduled follow-up. During follow up, 15 patients complained of pain (VAS-1 and 2) for 2 days and a single patient complained of pain (VAS-2) for 5 days. There was no readmission. At the time of discharge, all patients (100%) were highly satisfied and only three (10%) requested for overnight stay. After comparing the results with previous studies, the following conclusions were drawn:

1. Day care laparoscopic appendectomy is eminently feasible in government hospital settings in India.
2. Anesthesia requirements include premedication for anxiolysis, sedation and to prevent postoperative nausea and vomiting; and general anesthesia with rapidly acting drugs having high clearance rate, minimal side effects and rapid recovery.
3. Most of the patients can be discharged by the evening of the same day, thus avoiding overnight hospital stay (average duration of stay is 9.62 hrs). Only one of our thirty cases (03%) needed to be kept in the hospital overnight for medical reasons (nausea, vomiting and pain).
4. A curious feature of Indian scenario is that some patients insist on staying in the hospital overnight for social reasons as their attendants feel uncomfortable on leaving hospital so early. Thus, three (10%) of our patients had to be kept in the hospital overnight, although they could have been discharged safely.
5. Proper patient selection prevents unplanned readmission and follow-ups, thereby increasing success rate.
6. For surgeries of duration less than one and a half hours, the duration of surgery does not significantly affect the timing of discharge. There are many other factors, which affect the day care surgeries. Among them, social fear and reluctance is one of the important factors.
7. Finally, we advised further studies to develop stronger recommendations, as our study sample was small.

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