taken to distribute the water after partial defluoridation. This requires the synergistic action of health planners, health administrators, engineers and the water supply authorities. Research on the development of affordable technology for the partial defluoridation of household water is also critical. In this context, it is worth mentioning the successful use of granulated bone charcoal household defluoridators in Kenya and Thailand. Our study also underscores the need for conducting detailed fluoride mapping and geochemical surveys of existing water sources in Alappuzha. Clear guidelines to limit the exploitation of ground water should be formulated, so that sinking bore wells in high fluoride zones is either not attempted or is accompanied by necessary steps for defluoridation of water.

**Limitations of this study**

This is a cross-sectional study. The major risk factor in the development of dental fluorosis is drinking water. Fluorosis develops in an individual during the time of calcification of teeth, which takes place from early infancy. The fluoride content of the water which was consumed during that period is of critical importance, but cannot be measured now. It is presumed in this study that the fluoride content of water in each area has not changed over the last 15 years.

School children were selected for the present study because most of them could be available for investigation during working hours. It is likely that school drop-outs in the study area are excluded from our sample. This is not a major limitation because it is estimated that school drop-outs are very few in Kerala.

**Conclusion**

Our study suggests that dental fluorosis is a major public health problem among school children in Ambalappuzha taluk and is related to the high fluoride content of drinking water. There is an urgent need to institute partial defluoridation of drinking water in the area to lower the burden of dental fluorosis in this community.

**ACKNOWLEDGEMENTS**

We are indebted to officials of the Kerala Water Authority, Alappuzha for providing information regarding water fluoride content in various panchayats and municipalities and to the District and Assistant Education Officers, heads of schools, teachers and students for their assistance and cooperation in carrying out this study.

**REFERENCES**


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**Initial experience with day case laparoscopic cholecystectomy at a tertiary care hospital in India**


**ABSTRACT**

**Background.** Cholecystectomy is one of the commonest general surgical operations. Laparoscopic cholecystectomy is currently the most favoured approach. As it is associated with less postoperative pain and ileus, it allows early discharge of patients from the hospital. Studies from the West have reported that ‘day case laparoscopic cholecystectomy’ is feasible and safe. In India, the current practice is to admit patients for laparoscopic cholecystectomy 24–48 hours prior to surgery and to discharge most patients within one to two days of surgery. There is no report from any Indian centre describing ‘day case laparoscopic cholecystectomy’. We conducted a prospective study to assess the feasibility, safety and patients’ acceptance of ‘day case laparoscopic cholecystectomy’ in a tertiary care hospital.

**Methods.** Eighty-four patients with symptomatic cholelithi-
as, aged less than 65 years with ASA grade I and II, were offered
day case laparoscopic cholecystectomy. Seventy-four patients
consented to be included in the study. The nature of operation
and likely postoperative course were explained in detail to the
patients. Conventional 4-port laparoscopic cholecystectomy was
attempted in all patients. The main outcome measures assessed
were successful management of patients on day case basis and its
acceptance by the patients.

**Results.** Sixty-eight (92%) patients underwent successful
laparoscopic cholecystectomy. Fifty-five of these (81%) were
successfully managed as day case procedures. There were no
major complications. Three of the 55 patients (5.4%) needed
re-admission and could be managed conservatively. Fifty-three
(96%) patients described their experience as ‘pleasant’. None of
them described their experience to be ‘unpleasant’ or ‘bad’. Fifty-
four (98%) patients stated that they would recommend day case
laparoscopic cholecystectomy to close friends and relatives.

**Conclusion.** In selected patients, day case laparoscopic
cholecystectomy is safe and feasible in a developing country.

**INTRODUCTION**

Cholecystectomy is one of the commonest general surgical opera-
tions performed worldwide. As most patients stay for a few days
in the hospital after surgery, this procedure takes up a large share
of hospital beds and expenses. Currently, laparoscopic cholecys-
tectomy (LC) is considered to be the treatment of choice for
symptomatic cholelithiasis. As LC is associated with consider-
ably less pain and ileus, it allows the patient to be discharged even
on the same day. A number of reports from western countries have
shown the safety and efficacy of LC as a day case procedure. However, in India, there is a general perception amongst patients
as well as health care professionals that patients must stay in the
hospital for a few days after any major surgery (e.g. cholecystec-
tomy) as ‘complications’ may develop. The current practice is to
admit patients for LC 24–48 hours prior to surgery and to
discharge most patients within one to two days of surgery.
Although LC is performed at over 300 centres in the country, there
is no report from any Indian or Asian centre describing LC as a day
case procedure. This study was planned and conducted to assess
the feasibility, safety and patient acceptance of LC as a day case
procedure in the setting of an Indian tertiary care hospital.

**PATIENTS AND METHODS**

The study was conducted in one surgical unit at the All India
Institute of Medical Sciences, New Delhi, a tertiary care referral
centre. This unit has performed more than 1000 LC over the last
6 years. Patients meeting the inclusion criteria were offered day
case LC between October 1997 and April 1998. The inclusion
criteria were symptomatic ultrasound-proven cholelithiasis, age
less than 65 years, ASA (American Society of Anaesthesia) grade
I and II, willingness to participate in the study and easy accessi-

bility to the hospital in terms of communication and transport.
Patients suspected or proven to have choledocholithiasis on the
basis of history, physical examination, liver function tests or
ultrasound were excluded from the study. Also excluded were
patients unwilling to participate in the study or those coming from
distant areas with no transport or communication facilities. Eighty-
four patients meeting the inclusion criteria were offered day case
LC. Ten patients refused to be included in the study because of the
fear that ‘something may go wrong at home and when needed the
treating doctor may not be available in case of any emergency’.
Thus, 74 patients willing to undergo day case LC were included
in the study. They were given an information sheet describing the
benefits of day case surgery to the patient, hospital and society.
This was done to enable the patients to understand the concept of
day case surgery which is not yet widely practised in India. One
of the residents in the surgical unit spent time in the outdoor clinic
with these patients and explained the nature of the operation in
detail and highlighted the ‘active participation’ of the patients in
the postoperative recovery. Patients were explained the likely
postoperative course, i.e. waking up immediately after surgery,
being allowed oral intake of fluids, ambulated within a few hours
and likely discharge within 6–8 hours, if they were considered fit
by the operating surgeon. The possibility of the use of a drainage
tube, postoperative vomiting, pain or other problems requiring
admission were also explained. The patients were requested to
report at 7.30 a.m. on the morning of the surgery to the pre-anæs-
thesia room. In a majority of the patients, no pre-medication was
used. Anaesthesia was induced by thiopentone and maintained by
nitrous oxide with halothane or isofluorane. In the first 40 cases,
intravenous pethidine and diazepam were used for analgesia but
in subsequent 34 cases, fentanyl and midazolam were used for
the same, as these drugs were available in the market by that time.

At induction, patients were given ciprofloxacin 500 mg intra-
venously. Diclofenac sodium 75 mg was administered intramus-
cularly and ondansetron 8 mg was administered intravenously as
pre-emptive analgesic and anti-emetic, respectively. All the port
insertion sites were infiltrated with 0.25% bupivacaine. A con-
ventional 4-port LC was performed. The procedure was converted
to an open cholecystectomy in patients with dense adhesions at
the Calot’s triangle, which is considered risky for laparoscopic
dissection, and in patients with a cholecystoduodenal fistula. In
patients undergoing successful LC, a suction drain was placed
only when there was gross bile spillage or doubt about haemostasis.
At the end of the procedure, the insufflated CO₂ was meticulously
released by directing the tip of the 10 mm cannula with its valve
open in all directions and gently compressing the abdominal wall.
Postoperatively, patients were kept under observation in the
recovery room and a repeat injection of diclofenac sodium (75
mg) was administered intramuscularly 6 hours after surgery or
earlier if the patients complained of pain. In case of vomiting,
dondansetron (4 mg) intravenous was repeated. None of the pa-
tients required nasogastric tube insertion. As soon as the patients
gained consciousness, oral fluids were allowed. Patients were
encouraged to stand up and void urine in the toilet. In the evening,
a detailed evaluation of the patients was conducted by a surgical
registrar. An abdominal examination was performed and the level
of consciousness, presence and severity of pain and vomiting,
heart rate and blood pressure were checked.

Patients who were fully conscious, accepted oral fluids with-
out vomiting, voided urine and showed no tachycardia, hypo-
tension or abdominal signs were considered fit for discharge.
Among these patients, those who felt confident to go home were
discharged immediately, while those who expressed a desire to be
kept overnight were admitted. Patients who were still drowsy at
the time of evaluation or had severe pain, persistent vomiting,
tachycardia, hypotension or hypertension or any abdominal signs
were also admitted. All patients who underwent an open chole-
cystectomy as well as those who had a successful LC but required
insertion of a drainage tube were also admitted. These patients
were discharged as and when deemed fit. At the time of discharge,
all patients were given the telephone numbers of the consultants
as well as the surgical ward and were advised to contact them in case of any problem. In case of an emergency, they were advised to report to the emergency services and the senior registrar or consultant of the unit was informed. The rest were advised to report to the follow up clinic after two weeks. They were also advised to take ibuprofen tablets 400 mg 8-hourly for 48 hours and, whenever necessary thereafter. Oral metoclopramide (10 mg) was recommended for use as an anti-emetic, if required. Patients were advised to resume their household activity from the second postoperative day and normal activity as soon as their condition permitted. All patients were followed up in the follow up clinic at intervals of two weeks and three months thereafter. At the time of the follow up visit, the dose and duration of analgesics and anti-emetics requirements, and the pattern of resumption of physical activity of the patients were recorded. Patients were also asked to describe their experience of the day scale procedure as pleasant/tolerable/unpleasant/bad and whether, based on their experience, they would recommend a similar procedure to their close relatives or friends. All these observations were entered in a proforma and analysed at the end of the study.

RESULTS
The study population comprised 8 men and 66 women with the age ranging from 18 to 65 years (mean 49 years). Sixty-eight patients underwent successful LC but 6 (8%) needed an open cholecystectomy because of dense adhesions around the Calot’s triangle (n=3), cholecystoduodenal fistula, equipment failure, and large (4.5 cm) stone with thick gallbladder (which needed mini laparotomy incision at the epigastric port site for specimen delivery) in one each. All these patients were admitted: 5 of them were discharged the next morning and 1 patient (cholecystoduodenal fistula) was discharged after five days of surgery. Of the 68 patients undergoing successful LC, 55 (81%) were discharged the same evening (within 8–10 hours of surgery) while the rest (13) were admitted (Table I).

Of the 68 patients, 2 (3%) reported to the emergency room/surgical ward after discharge and were re-admitted. One patient called the ward complaining of fever, was advised to report to the ward and was subsequently admitted. The reasons for re-admission, management and their subsequent outcome are detailed in Table II. None of the patients required admission for any major complication. None of the 3 re-admitted patients developed any major complication after discharge and there was no mortality.

During the follow up visit, the operative experience was described as ‘pleasant’ by 53/55 (96%) patients and ‘tolerable’ by the other 2 (4%). None of the patients felt the experience was ‘unpleasant’ or ‘bad’. Fifty-four patients (98%) said that they would recommend this approach to close friends or relatives.

DISCUSSION
In view of the large number of patients with symptomatic cholelithiasis, cholecystectomy is responsible for a significant load on hospital beds and expenses. As LC is associated with reduced postoperative pain and a quicker recovery, it seems to be an ideal procedure for the ‘day case’ concept. This will have a tremendous impact on the ‘health economics’ of developed countries (in view of high cost of hospital beds in the West) and availability of more hospital beds in developing countries (in view of the limited number of hospital beds). Although this concept has been tested and proven to be feasible, safe and acceptable to patients in the West, it has remained untested till date in developing countries.

Serious doubts continue to persist in the minds of patients as well as health professionals in India regarding same day discharge from the hospital after a major surgical procedure. The very concept of ‘same day discharge’ appears alien to the time-honoured practice that ‘rest under medical supervision’ for a few days is ‘safe’ to perform LC as a ‘day case procedure’ in our country. It was extensively controlled with intramuscular diclofenac sodium and none of the patients needed opiates analgesics. No patient required oral analgesics beyond the first postoperative week. Nausea and vomiting were adequately controlled with ondansetron but were troublesome enough in 2 patients to require admission. No patient required anti-emetics after discharge from the hospital or re-admission because of nausea or vomiting.

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This study confirmed our belief that it is possible as well as ‘safe’ to perform LC as a ‘day case procedure’ in our country.

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Complaint</th>
<th>Treatment given</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC-converted (n=6)</td>
<td>1</td>
<td>Abdominal pain</td>
<td>US abdomen: No intra-abdominal collection. Symptomatic treatment, discharged next day</td>
<td></td>
</tr>
<tr>
<td>LC-day case (n=55)</td>
<td>1</td>
<td>Abdominal pain and fever</td>
<td>US abdomen: No intra-abdominal collection. Treated with anti-malarials; discharged next day</td>
<td></td>
</tr>
<tr>
<td>LC-admission (n=13)</td>
<td>1</td>
<td>Abdominal pain, fever and diarrhoea</td>
<td>US abdomen: No intra-abdominal collection. Treated with anti-diarrhoeals, responded; discharged on day 4</td>
<td></td>
</tr>
</tbody>
</table>

TABLE II. Reasons for re-admission (n=3)

<table>
<thead>
<tr>
<th>Reason</th>
<th>n</th>
<th>Treatment given</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intraoperative anaesthetic complication (hypotension 1, hypertension 1, arrhythmia 1)</td>
<td>3</td>
<td>Observation only</td>
<td>Discharged next morning</td>
</tr>
<tr>
<td>Intraoperative surgical complication (bleeding from the liver bed)</td>
<td>1</td>
<td>Observation only (no blood transfusion required)</td>
<td>Discharged next morning</td>
</tr>
<tr>
<td>Postoperative vomiting</td>
<td>2</td>
<td>Ondansetron, 2 doses intravenous</td>
<td>Discharged next morning</td>
</tr>
<tr>
<td>Lack of transport</td>
<td>1</td>
<td>Stayed overnight in hospital</td>
<td>Discharged next morning</td>
</tr>
</tbody>
</table>

TABLE I. Reasons for primary admission (n=19)

<table>
<thead>
<tr>
<th>Reason</th>
<th>n</th>
<th>Treatment given</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conversion to open surgery</td>
<td>6</td>
<td>Conservative management</td>
<td>5 patients discharged next day and 1 patient after 5 days</td>
</tr>
<tr>
<td>Use of intra-abdominal drain</td>
<td>6</td>
<td>Kept overnight, drain removed next morning</td>
<td>Discharged after drain removal</td>
</tr>
<tr>
<td>Intraoperative anaesthetic complication</td>
<td>3</td>
<td>Observation only</td>
<td>Discharged next morning</td>
</tr>
<tr>
<td>Intraoperative surgical complication (bleeding from the liver bed)</td>
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<td>1</td>
<td>Stayed overnight in hospital</td>
<td>Discharged next morning</td>
</tr>
</tbody>
</table>
proved to have high acceptance with patients. Over 98% of patients were satisfied and wanted to recommend it to their relatives or friends.

The reported incidence of primary admission after day case LC ranges between 6% and 20%. All these series, including ours, have a selected group of patients. In unselected patients, Tuckey et al. reported that 69% (22/32) were not fit for discharge at 6 hours and hence could not be treated as day case patients. The main reasons for primary admission are conversion to an open procedure; and pain, nausea and/or vomiting and not responding to medication.

Re-admission rates following day case LC vary between 2.5% and 8%. In our series, the incidence of readmission was 4%. Mjaland et al. reported that 9 of the 15 re-admitted patients needed immediate intervention and included patients with retained CBD stones (n=7) and CBD injury (n=2). However, in most of the other series including ours, no patient required re-admission for a major complication. Patients' acceptability of day case LC is more than 90% in most series. Mjaland et al. reported that 95% of the successful day case LC patients were 'very satisfied' with the procedure. Singleton et al. reported that 79% of the day case LC patients rated the management as 'very satisfactory' and 5% as 'satisfactory'. In our series, patient satisfaction was very high with 96% of the day case LC patients describing their experience as 'pleasant' and the remaining 4% as 'tolerable'. None of our patients considered the experience to be 'unpleasant' or 'bad'. Patients said that they would recommend day case LC to their close friends/relatives. The reason cited for this was that they preferred the comfort, convenience and privacy of home instead of the alien hospital atmosphere. In addition, as most of the patients were young and had family responsibilities, they felt that the family routine was less disturbed after day case LC. It is possible that there may have been a selection bias towards patients with a good socio-economic status because we included only patients staying in Delhi and having easy access to hospital in terms of transport and communication.

To achieve a safe and successful outcome after day case LC, several points need to be carefully looked into. In our experience, the most important factor determining the success of LC as day case procedure is careful patient selection and motivation. Although we had included only patients below 65 years of age and ASA grade I and II, we feel that day case LC could be offered to motivated ASA grade III and older patients also. We feel that patient motivation is the most important factor in a successful day case LC. We experienced this with our earlier LC cases where some motivated patients were happy and ambulatory on the evening of the surgery, while many others were reluctant to get out of the bed or eat anything even on the next morning. Therefore, for this study, one of the surgical residents spent time explaining the details of the surgery, the postoperative course as well as the benefits of going home early to all the patients and their relatives. They were encouraged to discuss their reservations and apprehensions, and these were clarified to their satisfaction. Infrastructure-related deficiencies such as non-availability of communication facility or ambulance services and whom and where to contact in case of any emergency were the main apprehensions in the minds of many patients. Detailed discussions allayed the fears of patients and encouraged enrolment in the study with a successful outcome.

Anaesthetic techniques need to be modified for day case LC. Regaining full consciousness at the end of the procedure is essential for early ambulation. Hence, the need for short-acting anesthetic agents and narcotic analgesics. For induction, propofol has been used in most of the reports. We used thiopentone, as propofol was not marketed in India during the period of our study. Midazolam and fentanyl are shorter acting than diazepam and pethidine and allow quicker recovery from anaesthesia. Nitrous oxide should be used to the minimum extent possible to decrease the incidence of postoperative nausea. The use of pre-emptive analgesic and anti-emetic agents at the beginning of the procedure has been highlighted in several reports. This has been shown to reduce the intraoperative analgesic requirement and the incidence of postoperative pain, nausea and vomiting. Diclofenac sodium and ondansetron have been used in most reports as analgesic and anti-emetic, respectively. Although, there are reports of the use of metoclopramide for anti-emesis, the centrally acting ondansetron has been shown to be better for postoperative nausea and vomiting. Additionally, a meticulous anaesthetic technique including careful intubation and conduct of anaesthesia contribute towards quicker recovery. Infiltration of all the intended port sites with long acting local anaesthetic agents also reduces the intraoperative analgesic requirements and postoperative discomfort.

Meticulous surgical technique such as gradual insufflation to avoid sudden stretching of the diaphragm which may cause postoperative pain, gentle dissection, and slow, but complete desufflation of the capno-peritoneum at the end of the procedure are vital for successful day case LC. Care must be taken while extracting the gallbladder, by careful suction of the bile and 'scooping out the stones' in case of a large stone load, so that the 'delivery port' is not enlarged. Precautions to avoid bile or stones coming in contact with tissues at the delivery port help to reduce wound infection. The use of smaller telescopes and instruments (mini and micro LC instruments), and adhesive glue to close the skin incision may further reduce the postoperative discomfort allowing faster recovery.

Certain administrative changes also need to be carried out in hospitals in India for day case procedures. These include creation of a separate 'day care' facility wherein patients report in the morning and stay for a few hours after spending an hour or two in the recovery room following surgery. The nursing personnel here could also take on the task of explaining the concept of 'day case' to the patients, giving them all the necessary pre- and postoperative instructions.

However, India is a vast country with a marked disparity in health care standards, and the socio-economic status of patients. Hence, day case LC should not be performed in all settings, in all patients, by all surgeons. We recommend that it should be attempted only at centres equipped with good surgical and anaesthetic expertise, and round the clock emergency services. In addition to the patients' general condition, a suitable home environment, including relative proximity to hospital, access to hospital by telephone and transport in case of need, and availability of at least one responsible adult at home to care for the patient during the first postoperative night are essential.

We found day case LC to be safe and feasible in 55 out of 74 (74%) selected patients. Careful selection of patients, meticulous surgical technique with a low threshold for conversion to an open procedure, good anaesthetic management and thorough post-operative evaluation are mandatory for a successful outcome. Further studies are warranted from various centres in tropical countries to establish the safety and feasibility of day case LC beyond doubt. In addition, a randomized trial comparing day case LC with conventional practice of at least one day postoperative stay is essential to conclusively prove the benefits of day case LC.
REFERENCES


Risk behaviour in an urban and a rural male adolescent population

J. KISHORE, A. SINGH, INDU GREWAL, SUSHMA R. SINGH, K. ROY

ABSTRACT

Background. There is an increasing trend of risk behaviour in adolescents worldwide but very little literature is available in India on this important subject. We surveyed an urban male adolescent population and a comparable rural population to determine the difference in their risk behaviour.

Methods. A comparative cross-sectional study was conducted among 199 and 152 male adolescents from an urban village of south Delhi and a rural village in Uttar Pradesh. A pre-tested semi-structured interview schedule with 36 items was applied on all subjects by trained interviewers.

Results. Consuming alcohol, smoking, pre-marital sexual intercourse and consuming bhang (cannabis) were present in 32.2%, 25.1%, 12.5% and 11.5% of the urban village adolescents and in 1.3%, 48.7%, 11.2%, and 16.5% of those residing in the rural village, respectively. About 66.8% of urban and 51.3% of rural adolescents had indulged in physical fights and 12.5% of urban and 6.6% of rural adolescents were in possession of assault weapons such as iron rods, chains or knives sometime in the 30 days prior to the interview.

Conclusion. The results of our study indicate that there is a high prevalence of risk behaviour in both urban and rural adolescents. However, except for smoking which was more common amongst rural adolescents all the other risk behaviours were more in those residing in urban areas. The reasons for this need to be ascertained, taking the geographical and socio-cultural factors into account, prior to considering the introduction of behaviour modification programmes.


INTRODUCTION

Adolescence is one of the most important and crucial phases of learning and development of an individual. Risk-taking is considered as one of the characteristics of adolescence. Unfortunately, adolescent sexuality and inclination to experiment carry a physical as well as a psychological risk. The former includes the risk of unplanned pregnancies and contracting sexually transmitted diseases (STDs) while the latter includes problems of sexual preference and delinquency as well as psychological disorders. In developed countries, individual risk behaviour has been studied extensively and an increasing trend towards smoking, alcohol intake, sexual intercourse, adolescent pregnancies and STDs and violence has been documented. Violence, such as vehicular accidents, and homicides or suicides account for 70% of all adolescent deaths. Consumption of alcohol is one of the underlying factors for these fatalities. Similar trends have been documented in developing countries also. The role of socio-cultural forces in adolescent development and risk-taking behaviour has been mentioned. The effect of the electronic audiovisual media on adolescents has been debated worldwide and many workers have observed its important role in the development of