A Comparative Study between Open and Laparoscopic Cholecystectomy

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Abstract: General surgery has undergone a revaluation in recent year by introduction of laparoscopic techniques. Laparoscopic choleystectomy is safe and easy and clear benefits in term of shortened hospital stay, less morbidity, a quicker return to work. The aim of our study is compare of open and laparoscopic cholesystectomy in term of duration of procedure analgesic and antibiotics requirement and hospital stay. In this study average time for open method is 67.2 minute and is Laparoscopic cholecystectomy is 89.2 minute and antibiotics requirement 4.2 days which is less then open cholecystectomy. Same in analgesic requirement and patients resumption normal diets early in Laparoscopic cholescytectomy.

Keywords :  L.C.-Laparoscopic choleystectomy
O.C. - Open choleystectomy

In our study, we have planned an attempt to compare the advantages and drawbacks of both the procedures.

Aims and objectives

The aim of this study is to compare conventional cholecystectomy and laparoscopic cholecystectomy with respect to:
1. Duration of the procedure.
2. Antibiotic requirement
3. Analgesic requirement.
5. Resumption of normal diet
6. Period of hospitalization (Hospital Stay)

Introduction

The word laparoscopy is derived from combination of two greek words lapara means flank (lateral abdomen wall) & skopos means a watcher but simply the term laparoscopy means the process of looking into abdomen,General surgery has undergone a revolution in the recent years by the introduction of laparoscopic techniques. Symptomatic cholelithiasis, which continues to be one of the most common digestive disorders encountered, was traditionally being dealt by conventional (open) cholecystectomy. With the introduction of laparoscopic cholecystectomy, the surgical community witnessed a revolution in post-operative recovery of the patient.

Laparoscopic cholecystectomy (LC) is safe and easy, which can be performed with much ease and safety because of the better magnification.

LC has shown clear benefits in terms of shortened hospital stay, less morbidity, a quicker return to work.

Some surgeons have suggested that the rates of serious complications, particularly bile duct injury might be significantly higher in laparoscopic procedure.

Table No.3
Duration of Surgery

<table>
<thead>
<tr>
<th>Minute</th>
<th>Laparoscopic cholecystectomy</th>
<th>Open cholecystectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-60</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>61-90</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>91-120</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>&gt; 120</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Table No.4
Duration of Antibiotics Given

<table>
<thead>
<tr>
<th>Days</th>
<th>Laparoscopic cholecystectomy</th>
<th>Open cholecystectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 4 days</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4-6 days</td>
<td>32</td>
<td>8</td>
</tr>
<tr>
<td>&gt; 6 days</td>
<td>1</td>
<td>25</td>
</tr>
</tbody>
</table>

min Minimum time for open method : 55 min
Maximum time for open method : 100 min
Average time for open method : 67.2 min
Minimum time for laparoscopic method : 65 min
Maximum time for laparoscopic method : 130 min
Average time for laparoscopic method: 89.2 min
Minimum days of antibiotic for open method: 5 days  
Maximum days of antibiotic for open method: 11 days  
Average days of antibiotic for open method: 6.8 days  
Minimum days of antibiotic for lap method: 4 days  
Maximum days of antibiotic for lap method: 7 days  
Average days of antibiotic for lap method: 4.2 days  

### Table No.5  
**Post Operative Pain**  
Number of patient in whom Analgesics Required

<table>
<thead>
<tr>
<th>Post Operative Day</th>
<th>Laparoscopic cholecystectomy</th>
<th>Open cholecystectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>II</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>III</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>IV</td>
<td>16</td>
<td>30</td>
</tr>
<tr>
<td>V</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>VI</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>VII</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>VIII</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Maximum days of analgesic for open method: 7 days  
Maximum days of analgesic for lap method: 5 days  

### Table No.6  
**Resumption of Normal Diet**

<table>
<thead>
<tr>
<th>Days</th>
<th>Laparoscopic cholecystectomy</th>
<th>Open cholecystectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 3 days</td>
<td>24</td>
<td>0</td>
</tr>
<tr>
<td>3-4 days</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>&gt;4 days</td>
<td>1</td>
<td>21</td>
</tr>
</tbody>
</table>

Minimum resumption of normal diet for open: 3 days  
Maximum resumption of normal diet for open: 6 days  
Average resumption of normal diet for open: 4.5 days  
Minimum resumption of normal diet for lap: 2 days  
Maximum resumption of normal diet for lap: 5 days  
Average resumption of normal diet for lap: 2.3 days  

### Table No.7  
**Hospital Stay**

<table>
<thead>
<tr>
<th>Days</th>
<th>Laparoscopic cholecystectomy</th>
<th>Open cholecystectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 3 days</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>3-5 days</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>&gt;5 days</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

Minimum post-op hospital stay for open: 4 days  
Maximum post-op hospital stay for open: 8 days  
Average post-op hospital stay for open: 5.18 days  
Minimum post-op hospital stay for lap: 2 days  
Maximum post-op hospital stay for lap: 7 days  
Average post-op hospital stay for lap: 2.5 days  

### Table No.8  
**Intra Operative Complications**

<table>
<thead>
<tr>
<th>Complications</th>
<th>Laparoscopic cholecystectomy</th>
<th>Open cholecystectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Bile duct injury</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bowel Injuy</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table No.9  
**Post Operative Complications**

<table>
<thead>
<tr>
<th>Complications</th>
<th>Laparoscopic cholecystectomy</th>
<th>Open cholecystectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wound infection</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Jaundice</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pulmonary Complication</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table No.10  
**Intra Operative Complication Table**

<table>
<thead>
<tr>
<th>Complications</th>
<th>Lap (n=33) (%)</th>
<th>Open (n=33) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td>2 (6.06)</td>
<td>3 (9.09)</td>
</tr>
<tr>
<td>Bile duct injury</td>
<td>1 (3.03)</td>
<td>1 (3.03)</td>
</tr>
<tr>
<td>Bowel injury</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>3 (9.09)</td>
<td>4 (12.12)</td>
</tr>
</tbody>
</table>

### Table No.11  
**Post Operative Complication Table**

<table>
<thead>
<tr>
<th>Complications</th>
<th>Lap (n=33) (%)</th>
<th>Open (n=33) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wound Infection</td>
<td>1 (3.03)</td>
<td>4 (12.12)</td>
</tr>
<tr>
<td>Jaundice</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pulmonary Complication</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>1 (3.03)</td>
<td>4 (12.12)</td>
</tr>
</tbody>
</table>

### Discussion  
In our study, 33 cases each for laparoscopic & open surgery were selected in such a way that all
cases has Gall bladder stone with atleast one attack of pain abdomen.

In our study, Laparoscopic cholecystectomy was found associated with a longer operating time than Open cholecystectomy. Mean operating time was 89.2 minute in laparoscopic cholecystectomy, significantly longer than open cholecystectomy.

Mean operative time in open cholecystectomy was 67.2 minute, significantly Less than open cholecystectomy.

Our results are similar to study of porte8, Trondsen3, Bosch13 and Hardy.

Porte and De vries8 in his study found mean operating time for Laparoscopic cholecystectomy 75 min Was significantly longer than for Open(55 min.).

Trondsen3 in his study found that Laparoscopic cholecystectomy take double time than open cholecystectomy group. Mean operating time for laparoscopic cholecystectomy was 100 minute and mean of open was 50 minute.

Bosch13 also found similar results. He found that Mean operating time for Open cholecystectomy was 66 minute which was significantly less than Laparoscopic cholecystectomy. Mean for laparoscopic cholecystectomy Was 90 minute.

Hardy5 also found that Laparoscopic cholecystectomy takes more time than Open cholecystectomy.

As experience is gained, the operating time is decreased in Laparoscopy. This “learning curve” represents adapting to operating in the 2-D Becoming familiar with the instrumentation and becoming accustomed to the technique.

In our study, the Antibiotic requirement was less in Laparoscopic cholecystectomy. Mean of antibiotic coverage was 4.2 days in Laparoscopic cholecystectomy and Mean for open cholecystectomy was 6.8 days.

Results of our study are similar to Supe AN et al16 & Foster et al

According to Supe AN et al16 patient who underwent open cholecystectomy need antibiotic coverage for at least 4 to 5 days more than the patient who undergo Laparoscopic cholecystectomy.

Antibiotic coverage was found less in Laparoscopic surgery also in study Of Foster DS et al.

Phillips et al in study also found less requirement of antibiotic in Laparoscopic cholecystectomy.

In our study, complication was more in Open cholecystectomy group than Laparoscopic cholecystectomy group.

Wound infection was more in Open cholecystectomy than Laparoscopic cholecystectomy. In four cases of open cholecystectomy wound infection occur and only one case show wound infection in laparoscopic cholecystectomy. Intra operative bleeding was present in three cases of open cholecystectomy and In two cases of laparoscopic cholecystectomy.

Our results are similar to study of Harris4, Trondson3, and Carbajo caballero et al15

In Carbajo caballero et al15 study the rate of complication was more in Open than laparoscopic group.

Thus all these study in favour of our results, reported more complication in Open cholecystectomy than laparoscopic cholecystectomy group.

In our study, Duration of analgesic used was significantly less in Laparoscopic cholecystectomy Than Open Cholecystectomy.

In laparoscopic cholecystectomy mean duration of analgesia was 3.6 days. This was significantly less than open cholecystectomy group. In Open cholecystectomy mean duration of analgesia was 5.3 day. This was due to lesser incision size In Laparoscopic cholecystectomy. There was more pain & more analgesics were required in open surgery.

Result of our study are similar to study of Schietroma et al12, Handolin et al11 and Chan et al6 and also proven by many other study.

Schietroma et al12 in 2001 observe significant difference concerning the number Of days of pain duration Of analgesia requirement is more in Open cholecystectomy.

Handolin11 in his study show patient had significant less post operative pain In Laparoscopic group than open cholecystectomy as reflected by opioid need.

Chan et al6 in his study show that patient who underwent Laparoscopic cholecystectomy require less Analgesia (467 mg V/S 224 mg mean pethidine dose).

Supe AN et al16, Hardy5, Buanes7, De Pourvoiville9 found pain was less in Laparoscopic group And requires less duration of analgesics.

In our study, The mean resumption of normal diet for open group was 4.5 days Compared to 2.3 days for Laparoscopic cholecystectomy group, study suggest Laparoscopic group return to normal Diet earlier.

Attwood2 & Schietroma et al12 also favour our study.

Attwood2 in his study found that Laparoscopic cholecystectomy was safe and lesser post operative morbidity and earlier return to normal diet than Open cholecystectomy group.

Schietroma et al12 in his study reported that Laparoscopic group significantly earlier return to normal diet.

In our study, the median duration of Hospital stay was 2.5 days for Laparoscopic group 5.18 days for Open cholecystectomy group. Hospital stay in Laparoscopic cholecystectomy group was significantly less. Hospital stay was more in Open.
group due to more pain, wound infection, injectable antibiotic and less mobilization due to pain. Porte in his study found that Post operative hospital stay was significantly shorter after Laparoscopic cholecystectomy compared to Open cholecystectomy.

Lujan et al in his study found that hospital stay was significantly shorter. In Laparoscopic cholecystectomy than Open cholecystectomy. After laparoscopic cholecystectomy mean hospital stay was 3.3 days , Significantly less than open cholecystectomy. Mean hospital stay was significantly more (8.1 days) in open cholecystectomy.

Hendolin, Schietroma, Capizzi et al also found similar results.

Summary

Laparoscopic cholecystectomy is a considerable advancement in the treatment of cholelithiasis. the advantage of laparoscopic cholecystectomy are several.

In our study the laparoscopic cholecystectomy surpasses the open cholecystectomy by the following:

- Shorter duration of antibiotic requirement.
- Shorter duration of analgesic requirement.
- Decreased wound infección.
- Less intra operative blood loss.
- Early resumption of normal diet.
- Shorter post operative hospital stay.

The disadvantage in the laparoscopic procedure is the prolong operative time which can be minimized in due course of time as the learning curve progresses.

Conclusion

66 patients admitted at government medical college & associated group of hospital kota with diagnosis of cholelithiasis with atleast one attack of upper abdomen pain was randomized to undergo open and laparoscopic cholecystectomy, 33 patients constituted in each group.

From this study the following conclusion were drawn:

1. The duration of laparoscopic procedure was significantly longer than open cholecystectomy procedure. The mean time taken in laparoscopic procedure was 67.27 minute for open cholecystectomy procedure. (P value=0.001)

2. The duration of antibiotic requirement in laparoscopic group was lesser compared to open cholecystectomy group. The mean duration of antibiotic requirement in laparoscopic group was 4.27 days as compared to 6.84 days for open cholecystectomy group.

3. The duration of analgesic requirement was significantly lesser in laparoscopic group than open cholecystectomy group. The mean duration of antibiotic requirement in laparoscopic group was 3.6 days as compared to 5.39 days for open cholecystectomy group.

4. In Laparoscopic group mean resumption of normal diet was 2.33 th day and in open cholecystectomy group it was 4.54 th day. So early resumption of normal diet in laparoscopic cholecystectomy group than open cholecystectomy group.

5. The complication rate was 12.12% in laparoscopic group as compared to 24.24% in open cholecystectomy group. So 12.12% reduction of complication rate occur in laparoscopic cholecystectomy group.

6. The maximum number of complication found in form of wound infection.(12.12% in open group and 3.03% in laparoscopic group)

7. The Bleeding rate was occur in 6.06% in laparoscopic group and was 9.09% in open cholecystectomy group. And bile duct injury was in 3.03% In each group.

8. The mean duration of hospital stay in laparoscopic cholecystectomy was 2.51 days and in open cholecystectomy group it was 5.18 days.

9. The duration of hospital stay was significantly longer in open group compared to laparoscopic group.

References


