INSTRUMENT FAILURE: A PREVENTABLE CAUSE OF CONVERSION IN LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT
Objective: This study was done to assess the association between quality of laparoscopic instruments and the incidence of conversion from laparoscopic to open cholecystectomy.
Design & Duration: Observational and descriptive study from October 2004 to September 2006.
Setting: This study was conducted at Baqai Medical University Hospital and two other private hospitals in Karachi.
Patients: All patients who underwent laparoscopic cholecystectomy, including those that had to be converted.
Methodology: The records of all attempted laparoscopic cholecystectomies were studied retrospectively. Apart from demographic data, the clinical diagnosis, histopathology, conversion rate and quality of the instrument i.e. old or new was studied. SPSS Version 11 was used for statistical analysis. The frequencies were drawn and association between conversion rate and quality of instruments was noted using odds ratio.
Result: Laparoscopic cholecystectomy was attempted in 93 patients during the study period. Amongst them 79 were females and 14 males, with an age range from 16 to 72 years (mean 46 years). Seven (7.53%) patients had to be converted from laparoscopic to open cholecystectomy. The causes of this conversion were instrument failure in five cases, CBD stone in one and unclear anatomy at Calot’s triangle in one case. The laparoscopic instrument that failed during surgery included insufflators in two cases while monitor, camera, and clip applicator, each in one case. Fifty six surgeries were performed with old instruments and 37 with new instruments. Correlating the two variables i.e. conversion rate and quality of laparoscopic instruments revealed that only one case was converted with new instrument, while six conversions were with old instrument. All the instrument failures were with old instruments and the odds ratio was 4.32.
Conclusion: The chances of conversion from laparoscopic to open cholecystectomy are 4.32 times more if old instruments are used compared to the new ones. The difference in conversion rate due to instrument failure is statistically significant.

KEY WORDS: Laparoscopic Cholecystectomy, Open Cholecystectomy, Conversion

INTRODUCTION
Gall stone disease is one of the common presentations seen in the surgical outpatients and emergency departments. The incidence of cholelithiasis increases with age, and about 30% of the patients above 70 years of age have biliary calculi. The advent of Laparoscopic Surgery opened a new chapter in the treatment of surgical diseases. The biliary tree specially benefited from it, so much so that now Laparoscopic Cholecystectomy (LC) is considered as gold standard for the treatment of symptomatic gall stone disease.

Although expertise has been established in this field, there are still cases which have to undergo conversion to an open procedure due to reasons which can be predicted pre-operatively or described as per-operative difficulties, such as bleeding, CBD injury, etc. Various predictive factors reported are age, male gender, high BMI, etc. However, Instrument failure as a cause of...
conversion, has not been discussed in detail. This study aims at highlighting the significance of this cause of conversion, and discuss measures to deal with this preventable, yet unreported cause in Pakistan.

PATIENTS & METHODS

This is an observational study of 93 Laparoscopic Cholecystectomies performed over a two-years period. The notes were consulted and data collected retrospectively. Apart from demographic data, conversion to open surgery and quality of the instrument i.e. old or new was studied.

The authors produced a classification and definition of old and new instruments, as there was none available. New instruments were those that were bought within the last three years as brand new and undergoing frequent maintenance, while old instruments were those which were either three or more than three years old, bought by the owner as second hand, and the entire setup was a combination of different makes.

The causes of conversion were noted in each group, including the reasons for conversion due to instrument failure. SPSS Version 11 was used for statistical analysis. The frequencies were drawn and association between conversion rate and quality of instrument was noted using odds ratio, while p-value of less than 0.05 was considered as significant.

RESULTS

There were a total of 93 patients in whom LC was attempted, including 79 females and 14 males. The mean age of the patients was 46 years, range being 16 to 72 years. Fifty six patients underwent LC with old instruments and six of these required conversion, revealing a conversion rate of 10.7%. On the other hand 37 patients underwent LC with new instruments, and only one was converted; the conversion rate being 2.7% (Table I).

Amongst the six cases of conversion with old instruments, five were due to instrument failure, while one was due to poor anatomy. In patients operated with new instruments, the only conversion was due to presence of a bile duct stone (Table II).

Table III shows that there were two cases of CO₂ Insufflator failure while there was one case each of monitor, camera, and clip applicator failure. The odds ratio was calculated to be 4.32. This signifies that the chances of conversion to open cholecystectomy are increased 4.32 times if old instruments are used. There was statistically significant difference in conversion due to instrument failure between the two groups (p<0.05).

DISCUSSION

Laparoscopic Cholecystectomy is now considered as the procedure of choice for symptomatic gall stone disease. However, there are still considerable numbers of cases that have to be converted to open cholecystectomy. Our study evaluated instrument failure as a reason for conversion.

In our study majority (85%) of the patients were females, a finding similar to that reported by Kama et al. The mean age was 46 years which is similar to the average age reported, however the minimum age was 16 years.

Table I. Conversion Rates

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Pts.</th>
<th>Conversion</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old</td>
<td>56</td>
<td>6</td>
<td>10.7%</td>
</tr>
<tr>
<td>New</td>
<td>37</td>
<td>1</td>
<td>2.7%</td>
</tr>
<tr>
<td>Total</td>
<td>93</td>
<td>7</td>
<td>7.53%</td>
</tr>
</tbody>
</table>

Table II. Causes of Conversion

<table>
<thead>
<tr>
<th>Group</th>
<th>Instrument Failure</th>
<th>CBD Stone</th>
<th>Poor Anatomy</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Equipment</td>
<td>5</td>
<td>--</td>
<td>--</td>
<td>6</td>
</tr>
<tr>
<td>New Equipment</td>
<td>--</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>

Table III. Causes of Instrument Failure

<table>
<thead>
<tr>
<th>Equipment</th>
<th>No. of Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂ Insufflator</td>
<td>2</td>
</tr>
<tr>
<td>Monitor</td>
<td>1</td>
</tr>
<tr>
<td>Camera</td>
<td>1</td>
</tr>
<tr>
<td>Clip Applicator</td>
<td>1</td>
</tr>
</tbody>
</table>
Instrument Failure in Laparoscopic Cholecystectomy  

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REFERENCES


CONCLUSION

This study indicated that old instruments are a risk factor for conversion from laparoscopic to open cholecystectomy.

Limitation of Study

It had to be designed as a matched case control study to establish the cause of conversion and further associations could be proved by applying multiple regression models.

