

## Experience of Three-Port Cholecystectomy – A Case Series

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### ABSTRACT

**Background:** Improvement of Laparoscopic Cholecystectomy (LC) technique in terms of reduction in size and number of ports is being tried to improve patient satisfaction and outcome. The present study was conducted to evaluate and compare the safety outcome and advantages of three-port and four-port LC. **Objective:** To determine the feasibility of three port cholecystectomy. **Study Design:** Descriptive prospective case series. **Settings:** Department of Surgery (Surgical Unit-V), DHQ Hospital, Faisalabad Pakistan. **Duration:** 1<sup>st</sup> April 2018 to 31<sup>st</sup> December 2018. **Methods:** Fifty patients of age 15 years or above who underwent laparoscopic cholecystectomy in the study period were enrolled. Preoperative workup performed. They underwent three-port cholecystectomy on an elective list by consultant surgeons. Post-operative outcome recorded on proforma and data was analyzed using SPSS. **Results:** A total of 50 patients underwent laparoscopic cholecystectomy procedure. 8 (16%) were males, and 42 (84%) were females. Age ranged from 15 to 75 years (mean  $38.28 \pm 10.546$ ). Results were satisfactory in clinical outcomes like the severity of pain and cosmesis in wound healing. **Conclusion:** It seems that three-port LC is a safe and feasible technique with superior clinical outcomes.

**Keywords:** Three port, Laparoscopic cholecystectomy, Severity of pain, Wound healing, Cosmesis.

### INTRODUCTION

Minimally invasive surgery was a goal that remained elusive for an older generation of surgeons. This goal was finally achieved with the successful performance of laparoscopic cholecystectomy in 1981 by Philippe Mouret.<sup>1</sup> It was followed in 1990 by Dubois and Perissat.<sup>2</sup> The idea of small key-hole incisions with putative advantages took the medical world by storm, and as technology moved further, more and more techniques were developed to add to the repertoire of surgeons.

The progressive evolution of the technique led this procedure to become the gold standard in the treatment of symptomatic gall stones.<sup>3</sup> It was the most accepted method by the National Institute of Health Consensus Development Conference since September 1992.<sup>4</sup> In-fact, it totally revolutionized the practice of general surgery.<sup>5</sup>

As the technology improved, many surgeons began to reduce the number and size of ports with the aim of achieving even less invasiveness, consequently reducing trauma and post-operative pain and hence improving the cosmetic results. Since the 90s, the use of single-incision laparoscopic surgery (SILS) has further reduced the number of trocars.<sup>3</sup> Various literature studies and meta-analyses have demonstrated that reducing the number of ports and length of incisions significantly minimizes post-operative pain, leading to a shorter hospital stay, reduced use of analgesics, earlier return to work, improved final aesthetic result and thus greater patient satisfaction.<sup>1</sup>

In our set-up, laparoscopic cholecystectomy is performed by using four ports such that the fourth port is utilized to retract the fundus of the gall bladder upwards. However, its utility for better exposure of Calot's triangle in all cases has been criticized and challenged multiple times.<sup>2</sup>

Proponents of three ports have been claiming enhanced advantages such as reduced pain while taking a similar operating time. There are two visible surgical scars only, the third being hidden in the umbilical cicatrix, so better cosmetic appearance. It also reduces the manpower in the form of a second assistant and gives operating surgeon a greater degree of independence.<sup>4</sup> It also maintains the benefits of classic laparoscopic triangulation. With some suitable adjustments, it can be used even in more complex emergency situations (1M). Some studies even showed that it also reduces the chances of wound infection.<sup>6</sup> Similarly, cost-effectiveness and patient satisfaction have been shown to be improved by reducing the size of the port as well, and some recent data supports it too.<sup>7</sup> It has been proved safe and technically feasible as well.<sup>8,9</sup>

In our set-up, laparoscopic cholecystectomy was routinely performed. Most commonly, it is performed using the four-port method. However, keeping in view the paucity of local literature and potential benefits, we started doing laparoscopic cholecystectomy using three ports with the rationale to assess cosmetic results and post-operative analgesia requirement.

## METHODS

This descriptive prospective case series was conducted at Department of Surgery (Surgical Unit-V), DHQ Hospital, Faisalabad Pakistan from 1<sup>st</sup> April 2018 to 31<sup>st</sup> December 2018.

Patients of both genders with an age range from 15 to 75 years and patients with symptomatic gallstones diagnosed on ultrasonography were included in the study.

Patients of Acute cholecystitis, Pregnancy, Mirizzi syndrome, BMI > 35 Kg/m<sup>2</sup>, Acute biliary pancreatitis, ASA >3, Previous upper GI surgery were excluded from the study.

Ethical committee approval was obtained. All patients were admitted in ward a day before surgery. Preoperative workup including USG findings recorded. Informed consent was taken from all patients who were operated by qualified surgeons.

**Three Port Technique:** Veress needle/ direct trocar insertion was used to create pneumoperitoneum followed by insertion of ports as follows:

- An umbilical (10mm) port as the camera port
- 10mm subxiphoid port (working port) and
- 05mm port midclavicular subcostal port to hold gallbladder infundibulum.

Dissection of Callot's triangle was done, stripping off peritoneum and fatty tissues progressively exposing cystic duct and cystic artery achieving a critical view of safety (CVS). Cystic duct and artery were clipped by clips of appropriate size via working port. Gall bladder retrieved via subxiphoid port and a silastic drain No 16 left in sub-hepatic space via 5mm subcostal port secured to the skin with heavy silk suture No 1. Closure of skin was done with polypropylene suture 2/0.

Post-operatively, patients were given Diclofenac sodium as I/M analgesia as per need to the patient by determining pain severity calculated by Wong-Baker Faces Pain Rating Scale. On the first post-operative day level of pain was measured by the patient over pain scale (0-10).

The cosmetic benefit was assessed by arranging a follow-up visit about three months post-operatively and recorded as being satisfactory or unsatisfactory. Data was collected on proforma and variables analyzed. Statistical analysis was done using IBM SPSS statistics version 27.

## RESULTS

A total of 50 patients fulfilling the inclusion criteria were included in the present study. Out of these, 8 (16%) were males, and 42 (84%) were females. Age ranged from 15 to 75 years (mean 38.28; std deviation 10.546). On the first post-operative day, 25 patients (50%) reported the severity of pain as "Hurts a little bit," and only 2(4%) found pain to be severe. Follow-up visits at three months showed that 47 patients (94%) were satisfied with the final cosmetic results.

**Table 1: Gender distribution of patients**

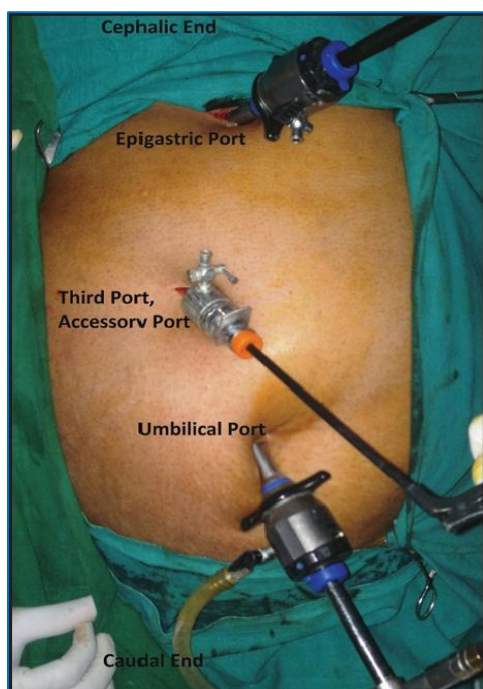
|        | Frequency | Percent | Valid percent | Cumulative percent |
|--------|-----------|---------|---------------|--------------------|
| Male   | 8         | 16.0%   | 16.0%         | 16.0%              |
| Female | 42        | 84.0%   | 84.0%         | 100.0%             |
| Total  | 50        | 100.0%  | 100.0%        |                    |

**Table 2: Wound healing (Cosmesis)**

|                  | Frequency | Percent | Valid percent | Cumulative percent |
|------------------|-----------|---------|---------------|--------------------|
| Satisfactory     | 47        | 94.0%   | 94.0%         | 94.0%              |
| Not satisfactory | 3         | 6.0%    | 6.0%          | 100.0%             |
| Total            | 50        | 100.0%  | 100.0%        |                    |

**Table 3: Severity of pain**

|                   | Frequency | Percent | Valid percent | Cumulative percent |
|-------------------|-----------|---------|---------------|--------------------|
| Hurts little bit  | 25        | 50.0%   | 50.0%         | 50.0%              |
| Hurts little more | 23        | 46.0%   | 46.0%         | 96.0%              |
| Hurts even more   | 2         | 4.0%    | 4.0%          | 100.0%             |
| Total             | 50        | 100.0%  | 100.0%        |                    |



## DISCUSSION

This is an era of minimally invasive surgery, and the primary aim of any surgical procedure is better care and early return to the workplace. It may be achieved by less post-operative pain. Another way of achieving this goal is the reduction in the number or size of ports used in Laparoscopic surgery.<sup>9,10</sup>

Traditionally four ports are used for laparoscopic cholecystectomy.<sup>3,11</sup> Later on, a few surgeons modified it being done by using three ports. The advantages of the three ports in terms of low analgesia requirement and cosmetically more appealing was proved earlier by Leow *et al.*<sup>12</sup> Similarly, it was declared safe and feasible by Mayir *et al.*<sup>13</sup> The population included in these studies underwent elective cholecystectomy. However, it was found effective in patients with acute cholecystitis by Al Azawi *et al.*<sup>14</sup>

In our study, the overall post-operative outcome was in favor of three-port cholecystectomy. We found that our patient experiences less pain. Almost half of our patients reported in terms of pain as being "little bit" 50%, and 46% reported as moderate pain. Only 4 % reported severe pain. Equivalent results were found by Shah SF in their study. The P-value was 0.015 in three-port laparoscopic cholecystectomies compared to the four-port laparoscopic cholecystectomy (P-value 0.32) group.

Reviewing further, it was observed by Kumar *et al.* that patients were undergoing three-port cholecystectomy were having less pain as compared to those who were operated on by using four ports. Two other studies, one being conducted in Ireland and the other in Nepal, also favor results.

However, Sun *et al.*<sup>15</sup> and Cerci *et al.*<sup>16</sup> reported no difference in the severity of pain in both groups of four ports versus three-port Laparoscopic cholecystectomy. The safety and absence of any significant complication are essential aspects of any surgical procedure. We did not have any serious bile duct injury in our approach clarifying that three ports laparoscopic cholecystectomy is a safe procedure. This has been supported in the past by a number of other studies.<sup>17,18,19,20</sup>

Recently, a few Indian and some studies conducted in Nepal in the past revealed that three-port laparoscopic surgery has fewer scars. The same idea satisfies our patients, as evident by results. Additionally, there is an advantage of less workforce in the three-port procedure.

## CONCLUSION

Based on our experience, three-port laparoscopic cholecystectomy is safe in patients with benign gall bladder disease. There is less post-operative pain, early

recovery, less hospital stay with early return to work, and the cosmetic outcome was superior in three-port laparoscopic cholecystectomy. Thus, it is a more cost-effective procedure with better satisfaction of the procedure.

## LIMITATIONS

Our study was evaluated in a single hospital with a limited number of patients

## SUGGESTIONS / RECOMMENDATIONS

Above mentioned limitations can be validated more by performing randomized control trials in large populations in different centers.

## CONFLICT OF INTEREST / DISCLOSURE

There was no conflict of interest.

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