

Three-port minilaparoscopic cholecystectomy in children: A single center experience

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Abstract. *Background:* Laparoscopic cholecystectomy is the treatment of choice in symptomatic pediatric cholelithiasis. This study attempts to determine whether further reductions in the number of ports and port size can improve postoperative pain and traumatism without compromising the efficacy of the surgery. *Methods:* From 2011 to 2016, 32 patients underwent laparoscopic cholecystectomy. Twelve out of 32 had a minilaparoscopiccholecystectomy (MLC) with three ports: one 5-mm umbilical port, one 3-mm subxiphoid port, and one 3-mm port in the right subcostal position. Data were collected prospectively for each patient on complications, operative time, post-operative pain and length

of hospitalization. These measures were compared with those collected from the group of patients who had undergone conventional laparoscopic cholecystectomy (CLC) with 4 ports (10 and 5 mm instruments). *Results:* Overall, 22 patients were males and 10 females, aged between 9 and 14. Operative time increased from 40 to 60 min in the group with 3-mm ports. Length of hospitalization was the same for both groups (72 hours). Two minor complications occurred during MLC (bleeding from the port site), while two CLCs required insertion of an additional trocar, due to the difficult exposure of the Calot's triangle, and one CLC was converted to an open procedure due to extensive intra-abdominal adhesions. No major complications occurred in both groups. Postoperative pain, evaluated through the Wong-Baker Faces Pain Rating Scale, ranged between 0 and 2 in the MLC group and between 2 and 4 in the CLC group. *Conclusions:* This study did not demonstrate a reduction in operative time or length of hospitalization. It did, however, show that ports could safely be reduced in size without a negative impact on the surgeon's ability to perform a cholecystectomy. Reducing port size can be a tool in the surgeon's armamentarium for use in the attempt to reduce post-operative pain and optimize cosmetic results.

Keywords. Laparoscopic cholecystectomy, Minimal Invasive Surgery, Laparoscopy, Laparoscopic surgery, Cholelithiasis

Introduction

Laparoscopic cholecystectomy is the treatment of choice in symptomatic pediatric cholelithiasis [1]. Since the first laparoscopic cholecystectomy in 1987, surgeons have been refining the procedure continuously. To optimize the benefits of this minimally invasive procedure, surgeons have attempted to reduce overall wound size [2-4].

In our attempts to reduce postoperative pain, lessen recovery time, and improve cosmetic appearance, we have decreased the number of ports and port size. Therefore, in this study, we compare a group of patients undergoing laparoscopic cholecystectomy using a 5-mm umbilical port and two 3-mm ports with the group who had the same procedure using a 10-mm umbilical port and three 5-mm ports.

Methods

From 2011 to 2016, 32 patients underwent laparoscopic cholecystectomy: 26 had symptomatic cholelithiasis, 5 had acute cholecystitis, and 1 presented with recurrent episodes of cholecystitis. Diagnosis was based on clinical presentation, lab values, and ultrasound imaging. In addition, four patients required a magnetic resonance colangiopancreatography (MRCP) to exclude choledocholithiasis. Patients were randomly assigned to undergo a minilaparoscopic (MLC) or a conventional laparoscopic cholecystectomy (CLC). Twelve out of 32 had a MLC with three ports: one 5-mm umbilical port, one 3-mm subxiphoid port, and one 3-mm port in the right subcostal position (Fig. 1, Fig. 2). Data were collected prospectively for each patient on complications, operative time, post-operative pain (Wong-Baker Faces Pain Rating Scale) and length of hospitalization. These measures were compared with those collected from the group of patients who had undergone CLC with 4 ports (10-mm umbilical port and three 5-mm ports).

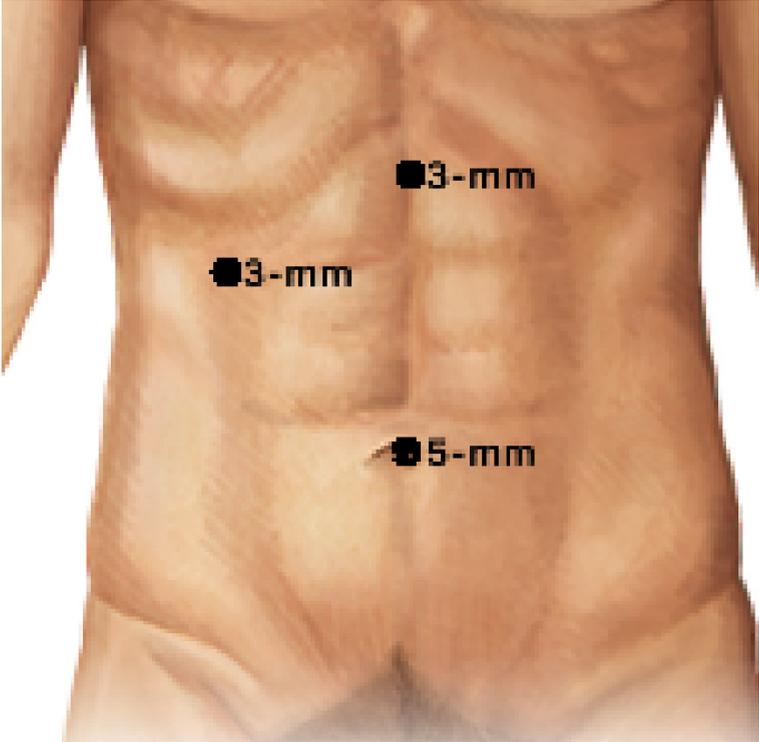


Figure 1: Ports placement for MLC.

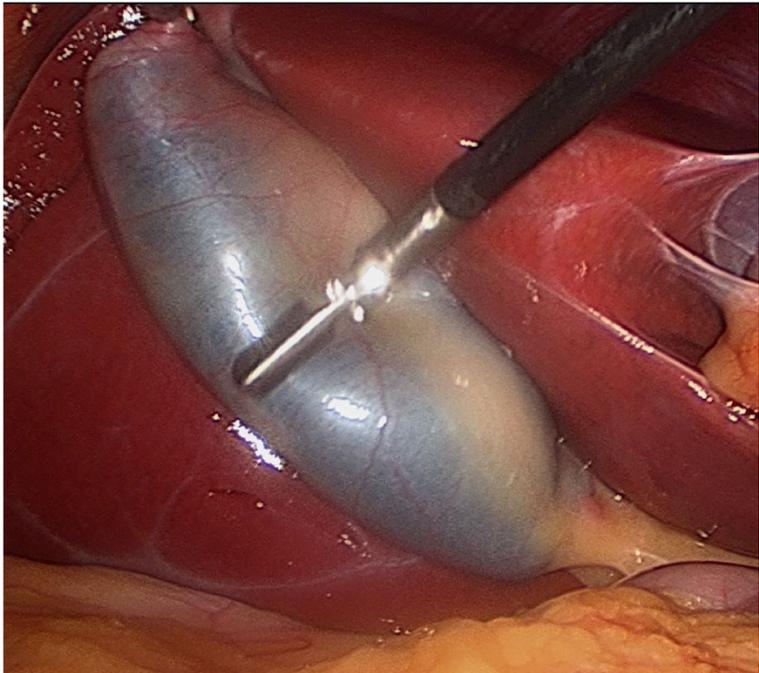


Figure 2 a: Intra-operative view.

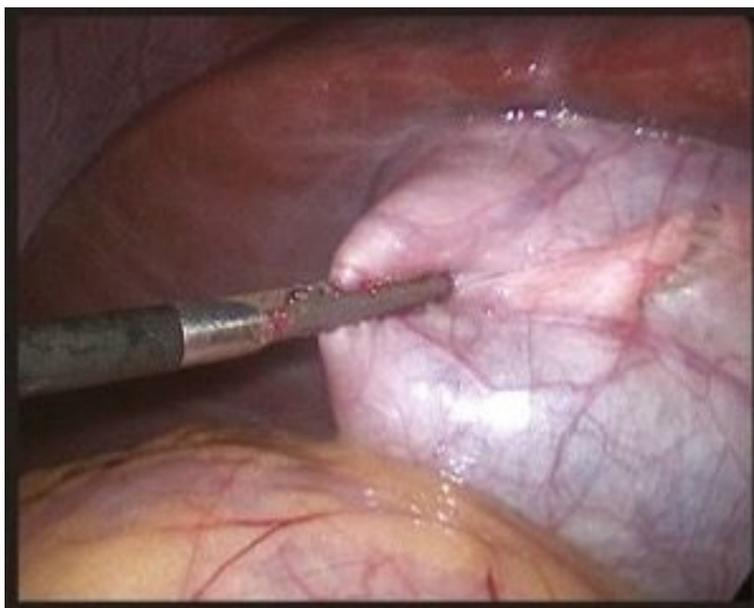


Figure 2 b: Intra-operative view.

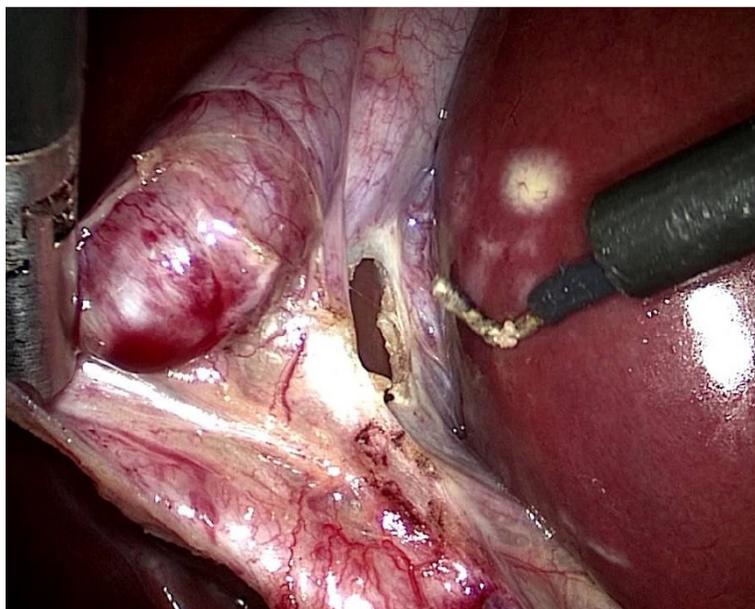


Figure 2 c: Intra-operative view.

Results

Overall, 22 patients were males and 10 females, aged between 9 and 14. Operative time increased from 40 to 60 minutes in the MLC group. Length of hospitalization was 72 hours for both groups. Two minor complications occurred during MLC (bleeding from the port site), while two CLCs required insertion of an additional trocar, due to the difficult exposure of the Calot's triangle, and one CLC was converted to an open procedure due to extensive adhesions, caused by recurrent episodes of cholecystitis. No major complications occurred in

both groups. Post-operative pain, evaluated through the Wong-Baker Faces Pain Rating Scale, ranged between 0 and 2 in the MLC group and between 2 and 4 in the CLC group.

Discussion

Surgeons continue to refine what has become one of the most common laparoscopic operations in the world: laparoscopic cholecystectomy. One area of refinement has been in reducing total wound size. Cholecystectomies have been performed with as few as one port [5-8], and with ports as small as 2 to 3-mm [9-11]. The aim has been to reduce postoperative pain, promote an earlier return to activity, and optimize cosmetic results.

In the current study, we used three ports and, instead of performing a cholecystectomy with 5-mm ports, we also reduced the size of right subcostal and subxiphoid ports to 3-mm. Our goals were to show the feasibility of this technique, to objectively quantify a reduction in postoperative pain, and to improve on return to activity. The average operative time for the group undergoing MLC was 60 min, which was longer than the 40 min required when performing CLC. We did not feel that the use of smaller instruments significantly hindered our ability to perform the procedure, as demonstrated by the fact that in only two MLC cases we had a minor complication, such as bleeding from the port site, which would occur independently from the port size. We did, however, need to add an additional trocar during two CLC procedures to allow a better dissection of the Calot's triangle and we also had to convert one CLC to open procedure due to extensive adhesions in a patient who presented with recurrent episodes of cholecystitis. All patients in both groups were discharged home 72 hours after surgery. We were able to objectively show a reduction in post-operative pain in the MLC group, through the Wong-Baker Faces Pain Rating Scale.

In conclusion, we were unable to show that reduction in the number of ports (from 4 to 3) and port size (from 5 to 3-mm) resulted in less operative time or length of hospitalization. This study did, however, show that ports could be safely reduced in size and number without a negative impact on the surgeon's ability to perform a cholecystectomy. This approach can be a tool in the surgeon's armamentarium for use in the attempt to reduce post-operative pain and optimize cosmetic results.

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