

# Minilaparoscopic cholecystectomy a one year record.



Ann. Ital. Chir., 2015 86: 528-531  
pii: S0003469X15024185

Nicola Di Bartolomeo, Federico Mascioli, Franco Ciampaglia

Department of Surgery, Casa di Cura "Villa Pini d'Abruzzo", Chieti, Italy

## Minilaparoscopic cholecystectomy a one year report

**PURPOSE:** *Our study is to demonstrate the feasibility and the safety of the Minilaparoscopic Cholecystectomy.*

**MATERIAL OF STUDY:** *During one year period 12 patients underwent 5mm Laparoscopic Cholecystectomy and 102 patients underwent Mini-laparoscopic Cholecystectomy. In this study the exclusion criteria for surgery have been analyzed as well as the technical difficulties, the operation time, the duration of hospital stay, the post-surgery pain, the complications and the aesthetic results*

**RESULTS:** *The operation time was 3 minutes longer for Mini-laparoscopic Cholecystectomy, the hospital stay was shorter in Mini-laparoscopic group. Patients that underwent 5mm Laparoscopic Cholecystectomy required a longer analgesic therapy. Complications occurred during the study were not related to the method. The aesthetic results were better in Mini-laparoscopic Cholecystectomy due to lower scars length. Only in two cases we converted the planned Mini-laparoscopic Cholecystectomy in 5mm Laparoscopic Cholecystectomy.*

**DISCUSSION:** *All the patients submitted to Mini-laparoscopic Cholecystectomy and 5mm Laparoscopic Cholecystectomy had the same therapeutic result. The Mini-laparoscopic Cholecystectomy gave advantages on post-surgery pain and recovery time.*

**CONCLUSIONS:** *In our experience the Mini-laparoscopic Cholecystectomy is a safe method that guarantees the same clinical results of conventional Laparoscopic Cholecystectomy. It shows some technical difficulties, but yet this surgery is to be recommended to expert surgeons.*

**KEY WORDS:** Gallbladder Polyps, Gallstone Disease, Mini-laparoscopic Cholecistecomy

## Introduction

Laparoscopic Cholecystectomy is the choice procedure in patients with symptomatic gallstone disease<sup>1</sup>, since the late 1980s open cholecystectomy has been gradually become as the preferred procedure for treating cholelithiasis, thanks to the lower invasive technique, a shorter

hospital stay, a lower post-operative pain and a more rapid recovery<sup>2</sup>. In the last years some surgeons have used instruments of lower caliber in order to make this method less invasive. In our study we want to demonstrate the advantages in the use of the miniaturized instruments for the elective surgery of gallstone disease and gallbladder polyps, comparing this method to 5mm Laparoscopic Cholecystectomy. The main instruments used in Minilaparoscopic Cholecystectomy were: one trocar of 10mm, three trocars of 3mm, a 10 mm laparoscope, a 3mm dissecting hook, a 3mm dissecting forceps, two grasping forceps of 3mm and a laparoscopic aspirator of 3mm; while to perform the 5mm Laparoscopic Cholecystectomy we used one trocar of 10mm, three trocars of 5mm, a 10mm laparoscope a 5mm laparoscopic dissecting hook, a 5mm dissecting for-

*Pervenuto in Redazione Maggio 2015. Accettato per la pubblicazione Luglio 2015*

*Correspondence to: Federico Mascioli, via Sallustio 21, 65127 Pescara, Italy; (e-mail: mascioli.federico@gmail.com)*

ceps, two grasping forceps of 5mm, an endoscopic clip applier and a laparoscopic aspirator of 5mm. The parameters that were analyzed in our study were operation time, duration of hospital stay, post-surgery pain, complications and aesthetic results. The study is based on personal clinical records on 114 patients. All patients were operated in our clinic during the period between the 1st of May 2012 and the 30th of April 2013, during this period we have treated all the patients affected by gallstone disease and gallbladder polyps.

## **Material and Methods**

From May 2012 to April 2013 114 patients with symptomatic cholelithiasis or gallbladder polyps have been treated, 102 patients underwent Minilaparoscopic Cholecystectomy, 57 females and 45 males, average age 54 years, range 83/23 and 12 patients underwent 5mm Laparoscopic Cholecystectomy 4 females 8 males, average age 67 years, range 83/36. Most of the patients were treated with Mini-laparoscopic Cholecystectomy with the exception of those showing a high thickness of gallbladder wall and patients showing stones in the common bile duct. Before surgery, all patients underwent abdominal ultrasounds to confirm the diagnosis and to study the thickness of the gallbladder wall. We observed that it was not advisable to use miniaturized instruments when the thickness of the gallbladder wall was higher than 6mm, because the small grasps instruments did not permit to grab safely the organ during the intervention. The study continued with the blood Gamma-Glutamyl Transpeptidase enzyme test, the Alkaline Phosphatase enzyme test and the Bilirubin test to verify the presence of Choledocholithiasis. When patients showed stones in the common bile duct, the 5mm Laparoscopic Cholecystectomy was the choice procedure because it was extremely difficult to perform the intra-operative cholangiogram with the instruments of our Minilaparoscopic kit. A detailed consent form was obtained for all patients. A single intravenous dose of antibiotic was administered to all patients with ASA superior of two. After general anesthesia, the sites of trocar insertion were infiltrated with a later dose of Ropivacaine 10 cc 1%. A 10mm trocar was inserted through the umbilicus and a pneumo-peritoneum was created using the Hasson open technique. A 10mm laparoscope was inserted in the trocar, permitting the complete visualization of the abdominal cavity. In Mini-laparoscopic Cholecystectomy three more trocars of 3mm were introduced under laparoscopic vision. Two grasping forceps, a dissecting forceps or a dissecting hook were introduced through the 3mm trocars. The gallbladder was dissected from the liver bed, the cystic artery was sealed by electro-cautery, while the cystic duct was sealed with surgical thread and cut. The gallbladder was retracted through the umbilicus. The endo-bag was used under visualization through a 3mm

mini-laparoscope to take out the gallbladder and to avoid bile leakage, when the organ was accidentally pierced during the intervention. The fascial defect was closed with absorbable suture and the skin of umbilicus was repaired with an intra-dermal suture. The 3mm wounds were closed with steri-strips. In the 5mm Laparoscopic Cholecystectomy, after the introduction of the 10mm laparoscope, three trocars of 5mm were inserted, two grasping forceps of 5mm, a dissecting hook or a dissecting forceps of 5mm were introduced through the trocars, the cystic artery and the cystic duct were sealed with clips and cut, then the dissection of gallbladder was retracted through the umbilicus. The fascial defect and the skin of both 10mm and 5mm wounds were repaired through surgical sutures.

## **Results**

During the period between May 2012 and April 2013, we have treated 114 patients with gallstone disease and gallbladder polyps. 102 patients underwent Mini-laparoscopic Cholecystectomy and 12 underwent 5mm Laparoscopic Cholecystectomy. Only in two cases we converted the planned procedure of Mini-laparoscopic Cholecystectomy in 5mm Cholecystectomy, because during the period between the diagnosis and the day of the intervention, an acute inflammation of the gallbladder occurred that did not permit the grasping of the organ with the 3mm instruments. In our study we had the same therapeutic results for the 5 mm Laparoscopic Cholecystectomy and the Minilaparoscopic Cholecystectomy. The impossibility of using clips with trocars of 3mm reduced hospital charges in the Mini-laparoscopic Cholecystectomy. The mean operation time was of 47 minutes for the 5mm Laparoscopic Cholecystectomy and 50 minutes for the Minilaparoscopic Cholecystectomy. This amount of time is necessary for the slower dissection of the gallbladder from the liver bed using small instruments, and for the intra-corporeal knot tying. The post-operative Hospital stay was 49 hours for the 5mm Laparoscopic Cholecystectomy, (range 14-74) and 18 hours for the Minilaparoscopic Cholecystectomy (range 50-8). When possible, the patients that underwent Mini-laparoscopic Cholecystectomy were treated in day surgery<sup>3</sup>. 73 patients of the Minilaparoscopic group were discharged from hospital on the same day of the intervention. We have paid much attention to the prevention of the postoperative pain. All sites of trocars insertion were infiltrated with a later dose of 10cc Ropivacaine 1%. The analgesic therapy consists in three intravenous administrations of Paracetamol 10 mg per day, and one administration of Ketorolac 30 mg if VAS was higher than 4. 78 Patients of the Minilaparoscopic Cholecystectomy group refused the analgesic therapy the day after surgery, while 5mm Laparoscopic Cholecystectomy patients requested the therapy for three

days. The lower postoperative pain of the Minilaparoscopic Cholecystectomy was correlated with the lower parietal damage. The complications occurred during the period of the study in patients that underwent Minilaparoscopic Cholecystectomy were: one umbilical suppuration, that was treated with antibiotic therapy and an abdominal wall hematoma that was surgically drained. In the 5mm Laparoscopic group, only one patient showed umbilical herniation, later repaired. The aesthetic results were better in the Minilaparoscopic Cholecystectomy, for lower tissues damage. The 3mm trocars left on the abdomen imperceptible scars.

## Discussion and Comments

All our patients treated for gallstone disease and gallbladder polyps with Minilaparoscopic Cholecystectomy and 5mm Laparoscopic Cholecystectomy had the same therapeutic results. We observed that the Minilaparoscopic Cholecystectomy gave advantages on postoperative pain<sup>4</sup> and recovery time. Further, the hours of hospital stay were less in the Minilaparoscopic Cholecystectomy group, but we acknowledge that patients who underwent 5mm Laparoscopic Cholecystectomy had worst clinical conditions. To take advantages of Laparoscopic Cholecystectomy with miniaturized instruments the method requires an expert laparoscopy-surgeon. Indeed Minilaparoscopic Cholecystectomy shows some technical difficulties, the first difficulty is on the choosing of trocars position, the surgeon must insert the 3mm trocars with high precision, in order to reduce the flexibility of the low caliber instruments that could complicate the operations. To further reduce the flexibility of the 3mm standard instruments, we started using pediatric instruments, however shorter. These instruments gave good results on thin patients, but were too short for patients with high Body Mass Index. On the basis of our experience, we deem that medical industries could build a Minilaparoscopic kit with instruments of intermediate length ranging between pediatric and standard instruments. Another difficulty is the impossibility to use clips with the 3mm trocars, the surgeon must seal the cystic artery using the electrocautery and needs the skill to tie intra-corporeal knots with surgical thread. The cystic artery sealing with electrocautery has been proved safe<sup>5-6</sup>, and we did not have any bleeding complications in all of 102 patients. The employment of thread for the sealing of the cystic duct reduces as well hospital charges<sup>7</sup>. The high frequency of gallstone disease in the population makes the operation of cholecystectomy very common to perform. Therefore we think that surgeons could take advantage to the technical difficulties of the Minilaparoscopic Cholecystectomy using this method as a training to get ready for interventions of advanced laparoscopy. The small-diameter instruments allow a reduction on the size of the abdominal incisions,

with a resultant reduction in local tissue damage<sup>8</sup>, that guarantees a good aesthetic result and a lower postoperative pain; indeed patients who underwent Minilaparoscopic Cholecystectomy experienced less pain and required fewer doses of analgesics for pain relief during the first 24 hours after surgery than patients who had 5mm Cholecystectomy<sup>9</sup>.

## Conclusions

With our study we demonstrate that Minilaparoscopic Cholecystectomy is a feasible and safe removal procedure<sup>10</sup>. It has lower hospital charges than 5mm Laparoscopic Cholecystectomy and the same therapeutic result. The lower parietal damage of the Minilaparoscopic Cholecystectomy gave a lower postoperative pain, a shorter hospital stay<sup>11</sup>, a rapid recovery and a better aesthetic result. The only two exclusion criteria were a high thickness of the gallbladder and the presence of stones in the common bile duct. Indeed we do not recommend the use of miniaturized instruments when the thickness of the gallbladder wall is too high. We have measured 6mm at ultrasounds as the limit of gallbladder wall thickness to perform Minilaparoscopic Cholecystectomy. In case of higher thickness we preferred to use instruments of 5mm. In patients showing stones in the common bile duct the 5mm Laparoscopic Cholecystectomy has been performed in order to localize the stones at the intra-operative Cholangiogram. Despite that, the Minilaparoscopic Cholecystectomy shows some technical difficulties that could be considered as a training for surgeons, but it requires skill to perform this intervention in an acceptable operative time. We agree with the assertion of G.L. Carvalho, who consider sufficient to perform ten Minilaparoscopic Cholecystectomies to be comfortable with the technique<sup>7</sup>; we also have noticed that the small difficulties of the method contribute to improve surgical technique and confidence during intervention of advanced laparoscopy.

## Riassunto

Negli ultimi anni, alcuni chirurghi hanno cercato di rendere sempre meno invasiva la procedura della colecistectomia videolaparoscopica, riducendo il calibro degli strumenti. Nel nostro studio si vogliono dimostrare i vantaggi nell'utilizzo di strumenti miniaturizzati (con diametro di 3mm), comparandoli con la colecistectomia laparoscopica realizzata con strumenti da 5mm. I parametri analizzati nello studio sono: la durata dell'intervento, la durata della degenza, il dolore post-operatorio, le complicanze ed il risultato estetico. Lo studio si basa su una casistica personale di 114 pazienti trattati in un periodo di 12 mesi. Tutti i pazienti sono stati trattati per calcolosi sintomatica della colecisti o per poliposi della colecisti.

In 102 pazienti si è trattato di colecistectomia minilaparoscopica e in 12 colecistectomia laparoscopica con strumenti da 5mm o perchè presentavano un eccessivo spessore delle pareti della colecisti che rendeva difficoltosa la presa sull'organo con strumenti di 3mm, o perchè presentavano calcoli lungo la via biliare principale e si rendeva quindi necessario eseguire una colangiografia intraoperatoria.

L'esecuzione della tecnica minilaparoscopica richiede particolari accorgimenti per superare piccole difficoltà tecniche in rapporto alla maggiore flessibilità degli strumenti di ridotto calibro e all'impossibilità di applicare clips metalliche con i trocar da 3mm. E' necessario legare con filo di sutura il dotto cistico mediante nodi intracorporei e coagulare l'arteria cistica con corrente monopolare. La durata dell'intervento risulta in media di 47 minuti per la colecistectomia con strumenti da 5mm e di 50 minuti per la colecistectomia minilaparoscopica. La degenza media è stata di 49 ore per la colecistectomia con strumenti da 5mm e di 18 ore per la colecistectomia minilaparoscopica; 73 pazienti sono stati dimessi lo stesso giorno dell'intervento. Il dolore post operatorio è risultato inferiore nei pazienti trattati con tecnica minilaparoscopica. Anche il risultato estetico è stato migliore per l'inferiore lunghezza delle cicatrici residue. Le complicanze post-operatorie, seppur di scarsa entità, non sono risultate correlate alla metodica. La tecnica minilaparoscopica può quindi considerarsi sicura ed in grado di garantire risultati clinici sovrapponibili alla laparoscopia tradizionale purchè eseguita da laparoscopisti esperti. Inoltre riteniamo che questa metodica, con le sue difficoltà tecniche, possa avere la funzione di training per la preparazione dei chirurghi ad interventi di laparoscopia avanzata.

## References

1. Fialkowski E, Halpin V, Whinney R: *Acute cholecystitis*. Clinical Evidence, 2008; 12:411
2. Hsieh CH: *Early minilaparoscopic cholecystectomy in patients with acute cholecystitis*. Am J Surg, 2003; 185(4): 344-48.
3. Gelmini R, Franzoni C, Saviano M: *Day surgery laparoscopic cholecystectomy: Initial experience in 43 consecutive patients*. Ann Ital Chir, 2013; 84(6):631-36.
4. Lee, PC, IR Lai, et al.: *Minilaparoscopic (needlescopic) cholecystectomy: A study of 1,011 cases*. Surg Endosc, 2004; 18(10):1480-484.
5. Carvalho LLoureiro MP, et al.: *Renaissance of Minilaparoscopy in the NOTES and single port era*. JSLS, 2011; 15(4):585-88.
6. Carvalho GL, Silva FW, et al.: *Needlescopic clipless cholecystectomy as an efficient, safe, and cost-effective alternative with diminutive scars: the first 1000 cases*. Surg Laparosc Endosc Percutan Tech, 2009; 19(5):368-72.
7. Carvalho GL, Cezário De Melo MA, et al.: *Clipless Minilaparoscopic cholecystectomy vs. conventional laparoscopy: a comparative study of the hospital charges for minimally invasive treatments for gall bladder diseases*. Bras J Video-Sur, 2010; 3(1):37-42.
8. Reardon PR, Kamelgard JJ, et al.: *Feasibility of laparoscopic cholecystectomy with miniaturized instrumentation in 50 consecutive cases*. World J Surg, 1999; 23(2):128-31; discussion 131-122.
9. Sarli L, D Iusco, et al.: *Randomized clinical trial of laparoscopic cholecystectomy performed with mini-instruments*. Br J Surg, 2003; 90(11):1345-348.
10. Huang MT, W Wang, et al.: *Minilaparoscopic and laparoscopic cholecystectomy: A comparative study*. Arch Surg, 2003; 138(9):1017-23.
11. Minni E, Pagogna S, et al.: *Mini-laparoscopic cholecystectomy: Indications, technique and results*. Ann Ital Chir, 2005; 76(1):51-5.