

Single Incision Laparoscopic Cholecystectomy: Description of a Series of 30 Cases of Laparoscopic Cholecystectomy Performed Using Conventional Instruments

Colecistectomia Videolaparoscópica por Incisão Única: Série de 30 Casos Realizados com Instrumental Convencional

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ABSTRACT

Introduction: Laparoscopic cholecystectomy was considered a major milestone in the evolution of surgical technique at the end of 20th century and is today the standard for gallbladder surgery. Special equipment and materials have been developed to facilitate this practice. The development of minimally invasive techniques has reduced tissue trauma and improved cosmetic outcomes. Among them is Single Incision Laparoscopic Surgery (SILS), a new surgical approach that uses a single incision for laparoscopic surgery. **Methodology, patients, and surgical technique:** We report a series of 30 cases of laparoscopic cholecystectomy performed by the same surgeon, from April 2010 to February 2011, using common instruments and conventional laparoscopic surgical equipment via access through a single incision in the umbilicus scar. Following the usual laparoscopic surgical technique, the gallbladder was dissected visualization using 10 mm optics, with 0 and 30 degrees angulations. In twenty-one patients the bladder was pulled from its base with the aid of a surgical thread inserted through the abdominal wall. Twenty-five of the thirty cholecystectomies were performed in women; five in men. The patients' ages ranged from 21 to 66 years, with a mean 43.5 years. The duration of procedures ranged from 30 to 60 minutes with a mean of 45 min. No complications were recorded. The average hospital stay ranged from 6 to 18 hours; the average was 12 hours. There were no hospital readmissions. At the first outpatient follow-up visit, 3 to 7 days postoperatively, patient report rapid improvement of postoperative pain. **Conclusions:** In our initial series, we observed that SILS can be performed using conventional equipment and materials with proper safety, although uncomfortably. Thus, this procedure is a viable and promising approach that can be performed with conventional laparoscopic instruments; surgical comfort, however, could be improved with new tools and smart solutions to technical difficulties encountered.

Key words: Cholecystectomy, laparoscopic surgery, Single-site laparoscopic surgery, SILS.

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INTRODUCTION

Since the end of the last century cholecystectomy performed by videolaparoscopy has been considered the gold standard technique for gallbladder removal due to its advantages over the open technique, including shorter surgical time, fewer complications related to surgical wound, fewer pulmonary complications, and faster return to work. Since then, surgeons have sought the development of less invasive techniques, reducing the number and size of the ports, thereby minimizing tissue trauma, further enhancing the aesthetic results, and ensure an even faster return to regular activities.

SILS (Single Incision Laparoscopic Surgery) is a new surgical approach that uses a single incision, preferably in the umbilicus for the performance of laparoscopic surgery. This new method has been used in a wide variety of laparoscopic surgeries, including tubal ligation,⁵ hysterectomy,⁶ appendectomy,^{7,8} cholecystectomy,⁹ gastrectomy,¹⁰ colectomy,¹¹ and nephrectomy.¹² Several advantages have been observed with the use of a single incision, including the reduction of postoperative pain fewer complications involving tissue damage in the port site and scar lesions, with better cosmetic results. Special equipment and materials have been developed to facilitate the practice of this technique. In this series, we present 30 cases of SILS cholecystectomy using conventional laparoscopic materials.¹³

METHODOLOGY, PATIENTS, AND SURGICAL TECHNIQUE

We report 30 videocholecystectomies performed by the same surgeon of the *Instituto de Mastologia e Clínicas Integradas* [IMAC] (Institute for Comprehensive Breast Care) between April 2010 and February 2011 in different hospitals, under general anesthesia, using common laparoscopic instruments and materials.

At the beginning of the procedure, the umbilicus was infiltrated with 10 ml of 1% Ropivacaine. Patients were positioned in dorsal decubitus, with the surgical team and the camera on the left, and the instrument nurse to the right of the patient. Pneumoperitoneum was established by Veres needle puncture and injection of carbon dioxide attaining a final pressure of 12 mmHg. (Figure 1)

Two 10 mm and one 5 mm diameter trocars were inserted in a single 15 to 20 mm “S” shaped incision in the umbilical scar. Under this single skin incision dissections of three areas in the subcutaneous tissue were performed through which trocars were placed seeking the formation of a triangle. (Figure 2)

Following the usual surgical technique the gallbladder was dissected and its hilum clipped, under



Figure 1 - Surgical positioning (surgeon of the left in the photos, assistant on the right).

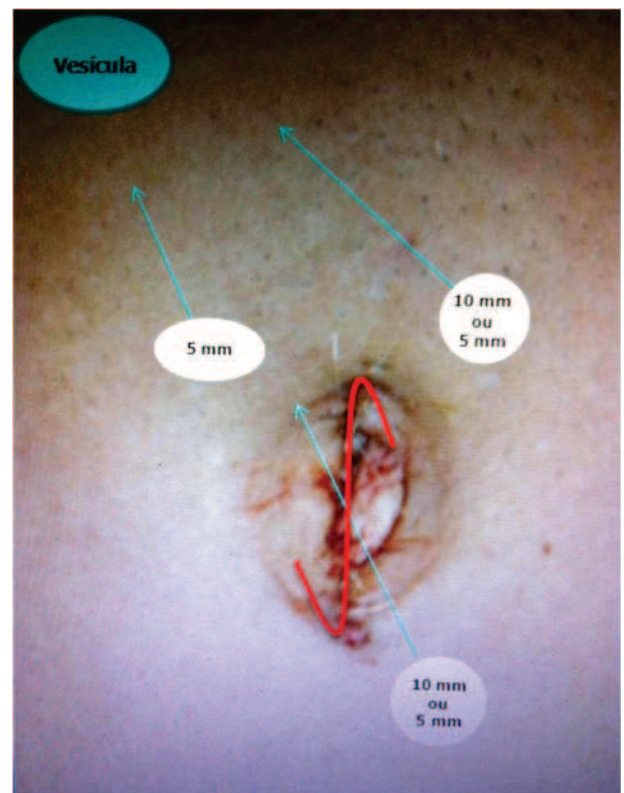


Figure 2 - Puncture locations (in turquoise) and location of the “S” shaped intra-umbilical incision (in red).

visualization of 10 mm diameter optics with 0 and 30 degree angulations. In 21 of the patients the bladder was pulled from its base with the aid of a surgical wire inserted through the abdominal wall. (Figure 3)

RESULTS

Twenty-five of the 30 cholecystectomies were performed in women, five in men. Patients' ages ranged from 21 to 66 years, with a mean of 43.5 years. The duration of the procedures ranged from 30 to 60 minutes with a mean of 45 minutes. No complications were recorded in intra- or post-operatively, except for 7 patients with bruising and maceration of the skin that resolved without repercussions or sequelae. The hospital stay ranged from 6 to 18 hours, with an average of 12 hours. There were no hospital readmissions. The first outpatient post-operative evaluation took place 3 to 7 days after discharge; all patients reported maximum pain on the Visual Analogue Scale (VAS) equal to 4 at that visit.

DISCUSSION

Cholecystectomy is the most frequently performed laparoscopic procedure around the world.¹⁴ This approach offers several advantages over the open technique, such as lower risk of wound infection, shorter hospital stay, faster return by the patient to their daily activities, and lower risk of incisional hernia.¹⁵⁻¹⁷ These risks are even lower when a single incision is used, and thus, there has been increased interest in minimally invasive techniques for various surgical procedures, including SILS cholecystectomy.

In 1992 Pelosi et al described for the first time laparoscopic surgery with a single incision in a child requiring appendectomy.¹⁸ In 1997 Navarra et al performed laparoscopic cholecystectomy with a single incision, using 2 transumbilical trocars and 3 transabdominal sutures passing through the base, neck and infundibulum of the gallbladder for better exposure of Calot's triangle.¹⁹ Since then, many techniques have been described, but there is still no widely accepted standard.

The recent interest in SILS has led surgeons to use existing instruments to perform single-incision laparoscopy and has encouraged the industry to develop a variety of new instruments to facilitate these procedures. Several types of portals are already

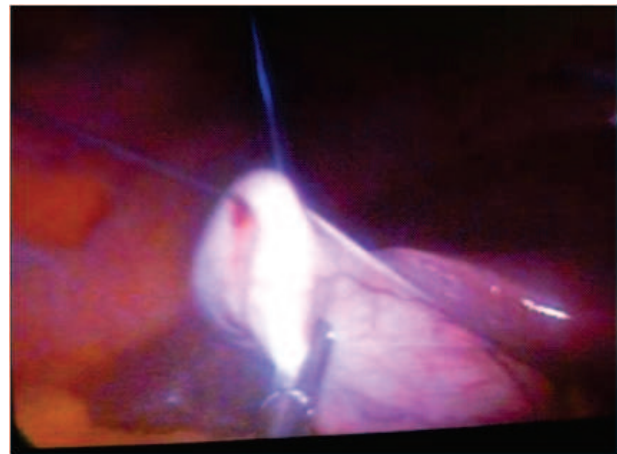


Figure 3 - Suture pulling traction on the Bottom/base of the gall bladder.

commercialized/sold, such as the TriPort (Advanced Surgical Concepts, Wicklow, Ireland), the SILS port (Covidien, Norwalk, Conn.), the Uni-X Single Port System (Pnavel Systems, Inc., Morganville, New Jersey), the Anchorport (Surgiquest Inc., Orange, Connecticut) and Gelport (Applied Medical, Rancho Santa Margarita, California).²⁰ Still, we note that with proper training SILS can be performed with existing technology by surgeons experienced in conventional laparoscopy. And probably in the near future new instruments and materials will make this method increasingly utilized, with comfort and security extended to a larger number of surgeons.

The biggest challenge to overcome in SILS is to avoid conflict between instruments and the optic and reduce stress during surgery, due to the space constraints generated by a single incision, which requires more work of the surgeon and his assistant. For this reason, authors of several articles have proposed the use of the endoscopic camera and semi-flexible forceps, which can make the procedure more comfortable.²¹ Several authors have also suggested percutaneous puncture of the gallbladder for drainage or for the introduction of suspension hooks for a better visualization of the triangle of Calot.²²⁻²³

Such maneuvers could increase the risk of gallbladder perforation with subsequent bile peritonitis, especially in the context of acute cholecystitis.²¹ In addition, some difficulties may be encountered in accessing the abdominal cavity through a single incision in patients with a small umbilical ring, with an increased BMI, or adhesions from previous surgery. There are also technical difficulties due to the unavailability of a suitable portal, lack of instruments with angulation, short

length of the instruments, inadequate image quality, small incisions which make specimen extraction challenging, or leakage of pneumoperitoneum.²⁴

The advantages of SILS cholecystectomy are related to a better aesthetic result, as it reduces the number of skin incisions to a single incision through a natural scar, the umbilical scar, leaving an almost invisible scar several months after the surgical procedure, and preserving body image. Moreover, it is believed that the SILS technique results in less postoperative pain, through the elimination of muscle damage and reduced tissue damage by virtue of the introduction of a single port, a lower risk of bleeding due to injury of the epigastric vessels,²⁵⁻²⁷ and an earlier return to regular activities.

CONCLUSION

We note that with the existing material and equipment, a team with advanced training in videolaparoscopy can perform videocholecystectomy through a single incision in reasonable time and with the proper safety. This procedure is feasible and promising, and can be performed with relatively less discomfort using conventional laparoscopic instruments. It will be important to conduct additional studies and develop new technologies that foster greater dissemination of the method, reduce the learning curve, and improve ergonomics affording increased comfort during surgery for the surgical team.

RESUMO

Introdução: A colecistectomia videolaparoscópica foi um marco na técnica cirúrgica no final do século passado, sendo hoje técnica padrão para remoção da vesícula. Têm-se buscado o desenvolvimento de técnicas minimamente invasivas e entre elas, a técnica denominada SILS (Single Incision Laparoscopic Surgery), a abordagem cirúrgica que utiliza uma única incisão, preferencialmente umbilical, para realizar a cirurgia videolaparoscópica. Diversos equipamentos e materiais especiais têm sido desenvolvidos para facilitar a prática desta técnica. Demonstramos nessa série, 30 cirurgias em que usamos material de videolaparoscopia convencional. **Metodologia:** Série de 30 casos de colecistectomias videolaparoscópicas realizadas por um mesmo cirurgião, entre abril de 2010 e fevereiro de 2011, utilizando material e equipamento comuns de videolaparoscopia e acesso cirúrgico por incisão única através da cicatriz umbilical. A técnica cirúrgica habitual foi seguida com dissecação da vesícula e clipagem de seu hilo, sob visão de ópticas de 10 mm de diâmetro e angulações de 0 e 30 graus. Em 21 destes pacientes a vesícula foi tracionada pelo seu fundo com auxílio de fio cirúrgico inserido através da parede abdominal. **Resultados:** A idade dos pacientes variou de 21 a 66 anos (média 43,5 anos). A duração média dos procedimentos foi de 45 minutos (variou de 30 a 60 minutos) e nenhuma complicação foi registrada no intra ou pós-operatório. O tempo médio de permanência hospitalar foi de 12 horas (variação de 6 a 18 horas) e todos os pacientes relataram dor máxima em E.V.A. (Escala Visual Analógica) igual a 4. Não ocorreram readmissões hospitalares. Na primeira reavaliação ambulatorial, entre 3 e 7 dias de pós-operatório, houve melhora significativamente rápida da dor pós-operatória. **Conclusão:** Observamos que com o material e equipamentos já existentes, uma equipe com treinamento avançado em Videolaparoscopia pode desempenhar em tempo adequado e com a devida segurança a videolecistectomia por incisão única. Esse procedimento é viável e promissor e ainda que com relativo desconforto, pode ser realizado com instrumentos da videolaparoscopia convencional, sendo importante a realização de estudos adicionais e novas tecnologias para que haja maior difusão do método e maior ergonomia com aumento do conforto no ato operatório para a equipe cirúrgica.

Descritores: Videolaparoscopia, Colecistectomia, Incisão única, SILS.

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