

# VIDEOLAPAROSCOPIC CHOLECYSTECTOMY. Analysis of the clinical and functional aspects of mechanical lifting of the abdominal wall<sup>+</sup>

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**ABSTRACT** – Background - Mechanical lifting of the abdominal wall, a method based on traction and consequent elevation of the abdominal wall, is an alternative procedure to create enough intra-abdominal space necessary for videolaparoscopic surgery, dispensing the need for intraperitoneal gas insufflation. Objective - This study aims to evaluate the technical feasibility of this procedure to carry out a videolaparoscopic cholecystectomy, while analyzing the clinical and functional aspects of this technique. Patients and Methods - In the Digestive Tract Surgery Discipline of the Medical School at the University of São Paulo, São Paulo, SP, Brazil, was created the equipment to perform videolaparoscopic surgery using this method. The equipment has two sections: an external part which consisted of a frame attached to the operating table, inside which there is a sliding steel cable, moved by a ratched which is located at the lower end of one of the frame rods; the internal rod, the support, has an “L” shape, and its horizontal branch is made up of three turning rods and which is connected to the steel cable after insertion into the abdominal cavity. Ten patients underwent videolaparoscopic cholecystectomy using this equipment. The time taken to install the equipment, the operating area characteristics, the interference from the lifting equipment on surgical movements and on the intra-operative cholangiography, the measurements made of the force used during traction and extension of the abdominal wall elevation, and the medication required for post-operative analgesia were all evaluated. Results - There were no intra-operative complications, and in none of the cases was it found necessary to convert to open surgery. We considered the insertion a safe and uncomplicated procedure, and the traction system efficient. Apart from the elevation of the abdominal wall, the distribution of the viscera inside the abdominal cavity is fundamental for the operating area. Depending on the position of the epigastric trocar, the lifting equipment can interfere with the surgical instruments mobility. It may be necessary to reposition the support to perform the intra-operative cholangiography. The tensional force applied to the peritoneal surface by the lifting rods is small, and no additional post-operative pain was observed using this procedure. Conclusion - These results show that using the equipment described in this study, mechanical lifting of the abdominal wall is a feasible alternative for undertaking videolaparoscopic cholecystectomy.

**HEADINGS** – Cholecystectomy, laparoscopic. Video-assisted surgery.

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## INTRODUCTION

Laparoscopic surgery is starting to develop; there is a need for the creation of new equipments<sup>(\*)</sup>.

An adequate intraperitoneal space is fundamental to be able to undertake laparoscopic surgery, giving a wide enough view for safe and precise surgery.

Mechanical lifting of the abdominal wall is an alternative which provides us with this space, a space which would normally be obtained by establishing a pneumoperitoneum by gas insufflation in the peritoneal cavity.

Videolaparoscopic surgery with pneumoperitoneum is not without risk. Potential complications include:

Complications related to the Veress needle insertion and the trocars:

- perforation of intra-abdominal viscera
- perforation of large vessels

Complications relating to the creation and maintenance of the pneumoperitoneum

- of a principally mechanical nature
  - extra-peritoneal insufflation of carbon dioxide
  - gaseous embolism
  - pneumothorax and pneumomediastinum
- of a principally physiological nature
  - cardio-vascular alterations
  - respiratory alterations
  - hypothermia

Although partially known, the various metabolic and hemodynamic alterations caused by the pneumoperitoneum are not usually detected, either because they occur ephemerally and are quickly corrected by the compensation mechanisms, or because of the difficulty in identifying them and evaluating their real effects<sup>(21)</sup>. We still lack the pre-operative conditions which will enable us to establish well-defined parameters which limit the indication of laparoscopy with pneumoperitoneum.

The mechanical lifting method of the abdominal wall, dispensed with gas insufflation, allows an adequate space to be created in the intra-abdominal region for laparoscopy surgery, based on the traction and subsequent elevation of the abdominal wall.

Items created specifically for this purpose<sup>(33)</sup> were evaluated with a view to technical viability in operations on the upper abdomen.

The analysis of the clinical and functional aspects took the following points into account:

- how long it takes to have the equipment installed
- the area to be operated on
- movements to be performed during the operation
- the intra operative cholangiography

the force required during traction and extension for the elevation of the wall  
post operative analgesics

## STANDARDS AND METHODS

Ten unselected patients were studied, suffering from symptomatic cystolithiasis and underwent videolaparoscopic cholecystectomy with mechanical abdominal wall lifting, admitted to the Digestive Tract Surgery Department at the Hospital das Clínicas, São Paulo University Medical School, between May and August of 1995.

The average age was 42, with a range from 19 to 58 years of age. Nine patients were female. Average weight was 64.4 kg, varying between 46.8 kg and 71 kg; average height 1.58 m, going from 1.47 m to 1.71 m. All of the patients' clinical histories showed cystolithiasis related symptoms. One patient presented a hiatal hernia and erosive reflux esophagitis recommended for surgery. Eight patients had ASA I surgery risk and two had ASA II. Three had already undergone pelvic abdominal surgery.

Mechanical lifting of the abdominal wall was obtained using equipment developed at the Digestive Tract Surgery Department at the "Hospital das Clínicas", São Paulo University Medical School together with the São Paulo State Technology Research Institute – IPT<sup>(33)</sup>. It consists of two sections: external, which provides traction, and internal, for lifting, which provides traction after inserting three metal rods in the peritoneal cavity by umbilical incision (Figure 1 a and b).

All patients were operated on under general anesthetic and tracheal intubation, were ventilated mechanically and were administered muscle relaxant, both controlled in the customary manner. All patients had nasogastric probes, kept only during the procedure. They underwent cardiac, monitoring controlling noninvasive arterial pressure and hemoglobin O<sub>2</sub> saturation by pulse oxymetry.

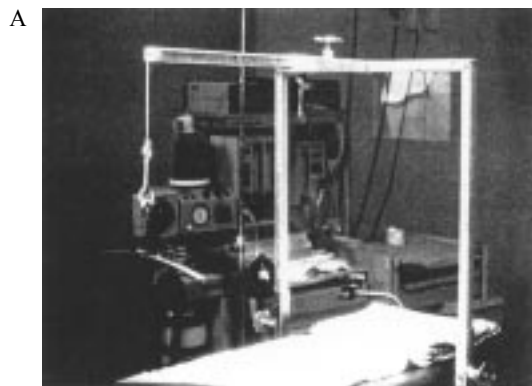
The surgical technique is based on the standard Department orientation<sup>(28,29)</sup>. The nine patients who underwent only cholecystectomy were laid in dorsal decubitus, with the right arm stretched along the body and the left stretched out at a right angle. Patient who underwent concurrent esophageal regurgitation treatment was placed in the same position with legs apart and half flexed. All patients underwent cholangiography during surgery, except the one in whom fundoplication was also performed. None of the patients underwent abdominal cavity draining.

## EVALUATIONS

Using the aforementioned equipment, we evaluated specific laparoscopic surgery situations when using mechanical lifting of the abdominal wall, collated with the practical experience of the surgical team in laparoscopic surgery with pneumoperitoneum. This evaluation system of comparison of procedures based on experiences from both methods is referred to by HASHIMOTO et al.<sup>(15)</sup>.

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(\*) Pinotti HW. Presented in the XVIII Atualization Course in Digestive System Surgery. São Paulo, University of São Paulo Medical School, 1991.



**FIGURE 1A** – External part – a frame attached to the operating table



**FIGURE 1B** – Internal part – the support with three turning rods

The analytical system of these situations was a classification in terms of there being any influence on the surgical procedure or not. This influence could be favourable or unfavourable; in the latter case, interference could be small, moderate or severe depending on the need for some maneuver of a specific nature or uncommon in pneumoperitoneal surgery.

small: specific maneuvers unnecessary;

moderate: specific maneuvers necessary to control difficulty;

severe: even after a maneuver, the difficulty remains, requiring technical rethinking.

### Equipment installation time

The time taken to install the internal section of the equipment was measured, starting at the cutaneous incision up to the intra-abdominal positioning of the rods.

### Operating area

The intra-abdominal space, the operating area, depends mainly on two factors: the elevation of the abdominal wall through traction of the support and the level of viscera distributed throughout the cavity, especially in the upper right quadrant, guaranteeing an adequate distance between both.

The operating area can be evaluated and compared by the pneumoperitoneum, and classified as **similar, worse, or better**.

### Influence of the epigastric trocar on surgical movements

Laparoscopic surgery depends on unimpeded movement of the instruments introduced into the abdominal cavity through the trocar. We evaluate the influence of the position of the epigastric trocars on the surgical movements, relating it to the presence of the lifting equipment in the space over the abdominal surface. The trocar position can be to the right, left or on the mid-line (Pd, Pe ou P1); and also high, next to the xiphoid appendix or low, at the same line of the trocar at the right hypochondrium. (Pa or Pb).

### Interference of the rods in the radiological images of the surgical cholangiography

The presence of the lifting rods can impede the interpretation of radiological images because they are radio opaque and can be superimposed on the biliary tract. We evaluated the position of the rods and their interference on radiological images, especially the rod next to the Teres ligament. This rod could be placed to the right or left of this ligament (Pd' or Pe').

### Force used during traction and lifting height

Before removing the intra-abdominal support, we measured the force required to lift the abdominal wall (Kgf) by using a dynamometer (Crown, 20 Kgf capacity), and height of the wall lifting (cm), both to obtain the operating area.

### Post-operative analgesia

The post-operative analgesia used was similar to that employed in pneumoperitoneum operations, being administered an intra-muscular injection of 75 mg of sodium diclofenac every 8 hours and, 2 mL of dipyrone intravenously according to the patients' requirements. The number of dipyrone applications was evaluated up until patient's discharge.

## RESULTS

There were no intra-operative complications. In none of the cases was a conversion to open surgery required.

The gallbladder was not perforated in any of the cases and it was easily removed by umbilical incision.

Average operating time exclusively for the cholecystectomy was 168 minutes, varying between 145 and 185 minutes, rising to 240 minutes when performed with concurrent esophageal regurgitation surgery. The nasogastric probe was removed at the end of the operation. Patient discharge was authorized the day after surgery for all patients who underwent only cholecystectomy, and extended to the second day after surgery for that who underwent gastro-esophageal reflux treatment.

The surgical incisions progressed satisfactorily; one patient had an infection in the umbilical scar which led to periodic bandaging.

### Equipment installation time

Installation of the support was safe and took on average 11.4 minutes to be installed, varying between 8 and 16 minutes; the longest time was caused by one patient having a slightly enlarged umbilical ring.

### Operating area

The upward movement of the viscera interfered in the operating area in six patients; in four it was slight and did not require any specific maneuver. In one case the interference was moderate requiring the periodic removal of the viscera (the hepatic angle of the colon) and the omentum to maintain a clear operating area. One other case suffered severe interference, compromising the operating area, even with the maneuvers intended to clear the area which demanded the insertion of another trocar through which a separator was inserted to keep down the viscera.

### Effect of the epigastric trocar position on surgical movements

Unimpeded movement of the instruments inserted through the epigastric trocar depends basically on its position.

In two cases where the epigastric trocar was inserted to the right of the mid-line and in a low position (the same line as the trocar on the right hypochondrium), the instruments which were inserted had their movements greatly restricted and which demanded the insertion of another trocar to the left of the mid-line. This interference was most noted when the instruments hit the vertical axis of the support, especially when connected to the electrocautery apparatus.

When the epigastric trocar is to the left of the mid-line, neither high nor low positioning has any effect and no interference from the support was seen. When the trocar is to the right of or on the mid-line, the high position avoids any interference with surgical movements.

### Support rod interference with intra-operative cholangiography radiological images

The intra-operative cholangiography could be taken to all patients undergoing only cholecystectomy. The slightly oblique aspect of the images had no influence at all on the interpretation of the radiology images. The possibility of superimposed images was related to the rod position next to the Teres ligament.

In one patient the intra-operative cholangiography interpretation was made difficult because the rods were superimposed on the biliary duct, and the exam was repeated once the rods had been removed from the abdominal cavity.

There was no interference from the rods when they were placed to the right of Teres ligament in any of the patients.

### Force applied during traction and lifting height

The average force applied during traction of the abdominal wall was 8.0 Kgf, varying between 6.5 and 9.0 Kgf; average lifting height of the wall was 7.1 cm, varying between 6.0 and 8.0 cm.

### Post-operative analgesia

Post-operative analgesia was sufficient for pain control, no indications of greater pain were noted using this technique. The average number of diclofenac applications was three doses, and dipyrone (when requested), was 1.1 dose.

## DISCUSSION

The laparoscopic method has become the preferred mean for undertaking cholecystectomy, and is used in the treatment of a series of other digestive tract problems. The main characteristic of this new method is the trauma reduction which is achieved without disrupting the operating field, within CUSCHIERI's<sup>(8)</sup> concept of **minimum access surgery**.

Carbon dioxide is the most common gas used for establishing the pneumoperitoneum, due to its physical characteristics. As it is not combustible, it can be used in electrocautery applications; its diffusion characteristics reduce the risk of venous embolism, usually a fatal complication. The high diffusion characteristics, on the other hand, means greater transperitoneal absorption, increasing its total blood content<sup>(30)</sup>, which causes a series of physiopathological effects, in conjunction with alterations caused by intra-abdominal hypertension.

Other gases have not been considered successful; although nitrous oxide could reduce post-operative pain and discomfort as it causes less peritoneal irritation<sup>(23)</sup>, and fewer arrhythmias<sup>(34)</sup>, thus preventing hypercapnia and electrolytic disturbances associated with this

condition<sup>(12)</sup>, the cardiovascular effects due to intra-abdominal pressure increase<sup>(18)</sup> and the albeit remote possibility of combustion<sup>(7, 10)</sup>, recommended it not be used.

Experimental research on animals using inert gases such as argon have shown that there are no respiratory changes, especially hypercapnia; hemodynamic changes still persist, though, caused by the reduction of the systolic volume and increased of the peripheral vascular resistance<sup>(11)</sup>. These characteristics, in conjunction with the increased risk of embolism<sup>(31)</sup>, have meant that these gases have not been put into clinical use.

This means that, from this point of view, only carbon dioxide has been used to create the pneumoperitoneum, notwithstanding the risks involved.

Although rare, the potential complications have stimulated the search for alternative methods of obtaining the intra-abdominal space necessary for laparoscopic surgery.

These complications have been the reason pointed out by various authors who use mechanical lifting of the abdominal wall<sup>(1, 5, 6, 16, 19, 25, 35, 38)</sup>.

Many of the aforementioned alterations go unnoticed, or are quickly balanced by compensation mechanisms, present in healthy patients. If there are cardiorespiratory malfunctions, which may take up the compensation reserves, this can cause serious complications. A profound understanding of the physiopathological aspects of the pneumoperitoneum is necessary to carry out perfect diagnosis and treatment of the many and varied complications which it can cause. However, laparoscopy procedure anesthesia presents many properties<sup>(2, 24, 37)</sup>, which means, among other things, the need for continuous control of CO<sub>2</sub> blood tension using capnography, which is not always accurate when compared to CO<sub>2</sub> blood levels, particularly during prolonged interventions, in older patients or those with heart or lung dysfunction<sup>(14, 20)</sup>.

Although we do not yet have ideal circumstances for determining those at risk from pneumoperitoneum, those patients which have serious cardiorespiratory problems will possibly can have clinically serious complications.

AZEVEDO et al.<sup>(3)</sup> support the use of mechanical lifting when operating on critical patients with cardiorespiratory problem who would benefit most from laparoscopic surgery due to the reduced trauma and advantages for recovery.

The lifting equipment used in this study was developed from a combination of the various system in use today, providing total wall traction. Fixing the external section of the equipment to the operating table helped reach the lateral and inclination positions required.

The system used made the pneumoperitoneum totally unnecessary since the abdominal cavity lifting equipment is inserted directly, in a similar way to that used in the open technique for trocar insertion. This open technique, which avoids the **blind moment** in

laparoscopy using pneumoperitoneum, is already being used by many authors<sup>(4, 13, 27, 36)</sup>, and is especially recommended in situations of previous abdominal surgery because there may be points of adherence which increase the risks of perforation lesions. In Brazil, according to national research<sup>(32)</sup>, in 6.3% of cases opted for this **open** technique for creating the pneumoperitoneum.

The average time taken to insert and position the lifting device in the peritoneal area was around 11 minutes, longer when compared with HURD et al.<sup>(17)</sup> and DONAVAN et al.<sup>(9)</sup> – approximately 5 and 4 minutes to install the pneumoperitoneum using the open technique and the puncture technique, respectively.

ARAKI et al.<sup>(1)</sup> relate that the traction system required only 3 minutes to install. However, they did not include in their calculations the time required to insert the first trocar using the **open** technique, which is required for insertion of the optic and visual controls for the steel wire to be inserted in the intraperitoneal area. SPERANZA and ANTORSI<sup>(35)</sup> found the process for intra-abdominal insertion of the support easy and risk free.

The lifting of the abdominal wall is based on the traction mechanism and whose aim is to create a safe and efficient intra-abdominal operating area. This operating area is different from that created by gas insufflation because it is irregular, and restricted mainly to the area to be operated on, although it allows a complete view of the cavity. MELZER et al.<sup>(22)</sup> call this irregularity the **tent effect** because of its similarity caused by the abdominal wall slope radiating from the traction point. The support with three rods gives a bigger space projection and minimizes this effect; compared to the space obtained using a support with one or two rods it is considerably bigger and distribute the force better.

Another fundamental characteristic of the device is the ease of use. Made up of 6 metal parts which fit together, it can be very well cleaned and sterilized using either a heat or a chemical process; the free rotation of the two lower rods which are controlled by small levers placed on the upper part of the vertical branch, enables adjustments to be made to the desired position. The locking system maintains the rods in the correct position.

The operating area does not depend solely on the traction and extent of lifting of the abdominal wall, but also on the relative distance obtained between the internal surface of the abdominal wall and the viscera distributed throughout the cavity. With no visceral compression, which would have been provided by the pneumoperitoneum, the surface of the internal structures can rise and reduce the distance to the internal wall and the effective space.

Although the average extension was 7 cm, three patients had relative reduction of this distance because of the rising viscera and subsequent deterioration of the operating area. One patient had very little interference; another showing moderate deterioration of the operating area required the viscera to be periodically moved away.

One patient however, had such interference from the viscera that another trocar with a separator had to be introduced to push down the viscera, which shows how important this factor can be in establishing an operating area.

Various authors restate the similarity of the operating areas obtained in both procedures, via pneumoperitoneum and mechanical lifting<sup>(16, 19)</sup>. SPERANZA and ANTORSI<sup>(35)</sup> consider pushing down the viscera, and report that the space available after mechanical lifting is invariably inferior to that obtained using pneumoperitoneum, although it permits similar surgical access.

NAGAI et al.<sup>(25)</sup> compared the creation of the operating area using pneumoperitoneum and mechanical lifting in 10 patients undergoing laparoscopic cholecystectomy: in nine cases it was similar, the least favorable was an obese patient. According to the authors, obesity is one of the biggest obstacles for mechanical lifting. PAOLUCCI et al.<sup>(26)</sup> believes that the difficulties involved with obese patients can be reduced.

Obesity is certainly a limitation for the mechanical lifting method. However there are no direct indications for not using this method in such a situation.

Laparoscopic surgery using this method can face other difficulties which arise from the presence of the equipment above the abdomen.

HASHIMOTO et al.<sup>(15)</sup> also found difficulties arising from the presence of the lifting equipment; in some cases instrument movements were restricted. This problem has been solved by placing the epigastric trocar more to the left and below the point of the left cutaneous traction, the trocar being inserted obliquely, through the falciform ligament.

In those systems in which only one line of traction is used and located next to the edge of the right costal area, such as those proposed by ARAKI et al.<sup>(1)</sup>, KITANO et al.<sup>(19)</sup> and BANTING et al.<sup>(5)</sup>, the trocars are normally distributed and no interference with the surgical movements was noted.

The presence of external device also affects the intra-operative cholangiography. The difficulties arise from the possibility of superimposed images between the radio-opaque support and the biliary duct.

When there are superimposed images and the exams has to be repeated, we face the possibility of changing the procedure. There are two alternatives, moving the suspension rods and turning them totally to the right, which was done successfully in two cases, or their removal. Both options require the support to be repositioned, which is not difficult to accomplish. The radiology images showed no interference from the vertical branch.

The possibility of manufacturing the support in radio transparent material would, obviously, overcome this problem.

NAGAI et al.<sup>(25)</sup> refer to the possibility of performing intra-operative cholangiography, but do not describe their technique or

difficulties. In those systems which use transparietal steel wires the limitations for this procedure are probably greater due to the number of metal devices on the abdominal surface. SPERANZA and ANTORSI<sup>(35)</sup> report the rotation of the rods of the support when coming up against superimposed images.

Although more detailed studies are needed regarding the effects of lifting on the abdominal wall<sup>(21)</sup>, and also on the trauma caused to the peritoneal surface which undergoes traction, which can lead to adherence<sup>(22)</sup>, the results obtained when measuring the force applied to obtain traction show that tensional force was reduced.

To obtain an average abdominal wall elevation of 7,1 cm an average force of 8,0 Kgf was required.

The intra-abdominal carbon dioxide pressure when using pneumoperitoneum is on average 15 mm Hg. However, this pressure corresponds to approximately 0.02 Kgf/cm<sup>2</sup>, pressure which is distributed evenly throughout the abdominal cavity; in other words, every 1 cm<sup>2</sup> of the abdominal cavity is subject to a tensional force of 0.02 Kgf.

The average force applied for mechanical lifting is distributed only through the three horizontal rods; however, only the peritoneal surface in contact with the rods is subject to tensional force. As the average force was 8 Kgf, each rod is subject to approximately 2.7 Kgf. As the area of each rod is around 15 cm<sup>2</sup>, the peritoneal surface in contact with the rod is subject to around 0.2 Kgf/cm<sup>2</sup>, which corresponds to about 10 times the pressure when using the pneumoperitoneum.

Although this may seem a high pressure, 0.2 Kgf/cm<sup>2</sup> is the same as the pressure exerted on a body immersed in 2 m of water. It is, of course, much lower than the pressure exerted by the steel wire traction when inserted through the abdominal wall, as the contact area is much smaller in this situation.

HASHIMOTO et al.<sup>(16)</sup>, using a 2-wire traction in a subcutaneous trajectory do not refer to any tissue damage; they point out, however, the possibility of lesions occurring due to the high traction, which is not necessary with the use of muscle relaxants. NAGAI et al.<sup>(25)</sup> who also used 2-wire traction, point out that no parietal lesion occurred. With the steel wire in contact with the peritoneal surface, as put forward by ARAKI et al.<sup>(1)</sup>, no adverse effects were seen. Adopting the cannula used by KITANO et al.<sup>(19)</sup> and the BANTING et al.'s<sup>(5)</sup> plastic tube, no abdominal wall lesions were observed.

The equipment used by SPERANZA and ANTORSI<sup>(35)</sup> and the Laparolift<sup>®(6)</sup> has a mechanism which limits the applied force. The other systems referred to do not have any means of measuring the traction force.

Traction of the wall does not imply greater post-operative pain. The need for complementary analgesics came to around one ampoule of dipyrone.

The average time of the operations was longer than of the laparoscopic cholecystectomy normally performed using pneumoperitoneum. However, being a new technique, this does not automatically mean that it is any more difficult to undertake, principally when we take into account the time taken in the initial phases of the pneumoperitoneum method; add to this the continuous evaluation of various factors, among which there is the intra-operative cholangiography, which requires a pause from when it is performed until it can be interpreted. It may be possible to reduce the time taken to install the equipment and to carry out the operation just as safely when we have more experience.

As laparoscopic surgery advances to other areas of digestive tract, performed in older and frailer patients, with longer and more complex procedures and consequently less tolerance for maintaining the pneumoperitoneum, mechanical lifting of the abdominal wall is a valid alternative, allied to the possibility of spinal anesthesia.

The aim of the development of this specific equipment was to provide a simple, practical and cheap method which can be widely used in digestive tract surgery.

## CONCLUSIONS

The evaluation of this method, using the equipment described herein, to perform a videolaparoscopic cholecystectomy leads us to the following conclusions:

Installation of the support is safe and needs a short time for positioning.

Apart from the lifting of the abdominal wall, the operating area provided by mechanical lifting also depends on the level of the viscera in the peritoneal cavity. The free movement of the pinchers to carry out the operation depends on the epigastric trocar position.

To undertake the intra-operative cholangiography it may be necessary to reposition the support.

Post-operative pain can be controlled using small doses of analgesic.

The tensional force applied to the peritoneal surface by the lifting rods is small.

Mechanical lifting of the abdominal wall, using the equipment described in this study, is a technical alternative for performing a videolaparoscopic cholecystectomy.

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*Santo MA, Domene CE, Nasi A, Onari P, Volpe P, Pinotti HW. Colecistectomia videolaparoscópica. Análise de aspectos clínicos e funcionais da suspensão mecânica da parede abdominal. Arq Gastroenterol 2001;38(1):32-39.*

**RESUMO** - Racional - *A suspensão mecânica da parede abdominal, método baseado no mecanismo de tração e conseqüente elevação da parede abdominal, é procedimento alternativo para a criação de adequado espaço intra-abdominal necessário à cirurgia videolaparoscópica, prescindindo-se da insuflação gasosa intra-peritoneal. Objetivo - Avaliar a viabilidade técnica desse procedimento para realização da colecistectomia videolaparoscópica, com a análise de aspectos clínicos e funcionais da suspensão mecânica da parede abdominal. Pacientes e Métodos - Na Disciplina de Cirurgia do Aparelho Digestivo da Faculdade de Medicina da Universidade de São Paulo foi criado equipamento para realização de cirurgia videolaparoscópica por esse método, constituído de duas partes: a externa consiste em um pórtico acoplado à mesa operatória, no interior do qual desliza um cabo de aço que é tracionado por um sistema de catraca presente na extremidade inferior de uma das hastes do pórtico; a interna, o dispositivo suspensor; tem o formato em "L", cujo ramo horizontal é constituído de três hastes giratórias, o qual é conectado ao cabo de aço após introdução na cavidade abdominal. Com esse equipamento 10 pacientes foram submetidos a colecistectomia videolaparoscópica; em um deles foi associada hiatoplastia e funduplicatura. Foram avaliados o tempo de instalação do equipamento, as características do campo operatório, a interferência provocada pela presença do equipamento de suspensão nos movimentos operatórios e nas imagens da colangiografia intra-operatória; foram medidas a força aplicada na tração e a extensão da elevação da parede abdominal e, por fim, a necessidade de medicação para analgesia pós-operatória. Resultados - Não houve qualquer complicação intra-operatória, não sendo necessária conversão para cirurgia aberta em nenhum caso. Observou-se facilidade e segurança na introdução do suspensor, bem como eficácia do sistema de tração. No campo operatório, além da elevação da parede abdominal, desempenha papel fundamental o nível de distribuição das vísceras no interior da cavidade. Dependendo da posição do trocarte epigástrico, a presença do equipamento de suspensão pode interferir na movimentação dos instrumentos. Para realização da colangiografia intra-operatória pode ser necessário o reposicionamento do suspensor. É pequena a força tensional aplicada na superfície peritoneal pelas hastes do suspensor; não se observando qualquer indicativo de maior dor pós-operatória com esse procedimento. Conclusão - Em face desses resultados, a suspensão mecânica da parede abdominal, realizada com o equipamento descrito nesse trabalho, é alternativa viável para realização da colecistectomia videolaparoscópica.*

**DESCRITORES** – *Colecistectomia laparoscópica. Cirurgia video-assistida.*

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