

Laparoscopic Surgery: What Is Scientifically Demonstrated At Present?

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Abstract

Laparoscopic surgery (LS) has supposed a true revolution in the conventional surgery, until the point that at the present time most of the abdominal procedures can be made by this approach; however only 20% of the interventions that are carried out for this approach they are validated with the maxim evidences scientific. We have carried out a review of the surgical procedures that can be at the present carried out by laparoscopic pathway; we have analyzed the grade of scientific evidence that exists about these procedures and the recommendation grade.

INTRODUCTION

Laparoscopic surgery (LS), has modified only in two decades the surgical practice, until the point of overcoming amply, the initial expectations, until settling down firmly in the current surgical practice. LS has supposed a series of substantial changes regarding the Conventional surgery (CS): The CS requires of big incisions, the LS requires of small incisions, the CS one works on surgical wide fields, in the surgery endoscópica one works on big fields of vision, the CS technique should be careful, the endoscopic technique should be millimetrical and in the CS one works directly on the tissue, in the LS one works at distance of the tissues. The two ways of surgical boarding have the same results in common as for functionality, security and effectiveness. LS offers advantages as for the morbidity of the surgical wound, postoperative comfort, and to the hospital stay associated to the procedure and an earlier to normal activity.

ANALYSIS OF THE LEVEL OF IT EVIDENCES OF EVIDENCE OF THE PUBLISHED STUDIES ON LAPAROSCOPIC SURGERY

LS has supposed a true revolution of the surgery, as it is demonstrated in the 18.814 documents published until the present time. 788 (4,2%), of these studies are randomised clinical trials (RCT) and 21 (0,1%) Meta-analysis. Of them, 645 (81%) correspond to gynaecology, anaesthesia, pharmacology of the pain, instrumental specific or physiology of the endoscopic surgery (ES), while 143 (19 and 0,8% of the total of documents) only correspond to

comparative studies between open and endoscopic surgery. Of the 21 registered meta-analysis, 33% refers to the treatment of hernias, 4 (20%) to acute appendicitis, 1 at the cholecistectomy and 9 to other areas related with SE₁.

Along the present year, 61 works have been published about LS (Cochrane Library), in diverse fields: Gallstone disease, appendix, gastro-intestinal tract, colorrectal, hernias and morbid obesity. However, only 7 procedures of 33 more frequently carried out, they have been evaluated by means of randomised clinical trials₁.

The success reached by the medicine based on the evidence (EBM), in the last years comes from offering objective data obtained from starting the clinical practice, what allows to apply the therapeutic most appropriate procedure, homogenizing the medical performance and avoiding the subjectivity of the medical practice and the personal decisions. Hence unanimity exists in the scientific community that the key instrument of EBM is the controlled study and with aleatory distribution whose information is the one from higher quality to our reach. However, the randomised clinical trials are less frequent in the surgical specialties, as it is demonstrated in the revised publications, for the multiple difficulties that they involve to carry out this type of studies in surgery. Among those that highlight: Lack of specific formation in methodology of the investigation in the surgical specialties, difficulty to obtain funds from the investigation agencies, difficulty to include patients in the studies with aleatory distribution, for the complexity every time bigger than the surgical techniques that require more

and more expert surgeons, more and more limited economic resources, to the assistance, social and industrial pressure. Another added difficulty corresponds to the moment of realization of RCT, since the quick evolution and introduction of technical novelties don't allow the development of the study, because RCT requires several years. However, many of the endoscopic procedures that have not been evaluated by means of RCT are habitual practice, accepted by the scientific community and for the patients. This takes to outline the doubt on if RCT is the only method to verify the evidence in the surgical practice. It corresponds to the surgical society, with the purpose of obtaining the maximum and more objective information of the knowledge, not only developing RCT, but to look for or to explore other methods of generating evidences, as the case-control studies, metaanálisis, Etc., which allow obviate or minimize the difficulties of the controlled and randomised studies₂.

LEVELS OF SCIENTIFIC EVIDENCE

Diverse levels of scientific evidence exist based on the type of carried out (Centre for Evidence-Based Medicine of Oxford) study₃:

- Level 1a: Systematic review of clinical randomized tests, with homogeneity.
- Level 1b: Randomized clinical assay with narrow interval of trust.
- Level 1c: Clinical practice
- Level 2a: Systematic review of studies of cohorts, with homogeneity.
- Level 2b: Study of cohorts or clinical randomized study of low quality.
- Level 2c: "Outcomes research", ecological studies.
- Level 3a: Systematic review of studies case-control, with homogeneity.
- Level 3b: Study case-control.
- Level 4: Series of cases or study of cohorts and case-control of low quality.
- Level 5: Experts' opinion without critical explicit valuation.

Consequently, the grade of recommendation of a surgical

procedure depends on the level of scientific evidence scientific existent, in that moment.

GRADES OF RECOMMENDATION OF A PROCEDURE

Recommendation grades according to in evidence level (Centre for Evidence-Based Medicine of Oxford)₃:

- Grade to: Level studies 1
- Grade B: Level studies 2-3, or extrapolation of level studies 1
- Grade C: Level studies 4, or extrapolation of level studies 2-3.
- Grade D: Level studies 5, or non conclusive studies of any level.

SURGICAL PROCEDURES THAT CAN BE AT THE MOMENT CARRIED OUT BY LAPAROSCOPIC SURGERY

It has been speculated that at least 90% of the interventions could be made for laparoscopic approach. However, this doesn't seem to be so, since there is a limit between the possible thing and the logical thing in surgery.

French Society of Digestive_{4,5} Surgery, at the present time considers that for its high level of scientific evidence and recommendation grade A, it only indicates for laparoscopic approach, the following procedures: Cholecystectomy, antireflux procedures, colectomy, ileo-cecal resection for Crohn disease and duodenal perforated ulcer.

CHOLELYTIASIS AND CHOLEDOCHOLITIASIS

Laparoscopic cholecystectomy, constitutes the "Gold Standard" of the endoscopic surgery for the cases of symptomatic cholelytiasis (recommendation grade A) and selected cases of acute cholecystitis, since the morbidity and mortality in these cases (3-4%), continue being high, in spite of the experience and the improvements in the technology₆.

Laparoscopic treatment of the choledocholithiasis, in the operative same act of the cholecystectomy, has not had the acceptance expected, due mainly to the effectiveness and demonstrated security of the preoperative endoscopic extraction. On the other hand, even in experienced hands, the laparoscopic extraction of the ductal calculi, accompanies of a rate of therapeutic failure that oscillates between 5 to 10% (recommendation grade B/C)_{7,8}.

ESOPHAGEAL AND GASTRIC SURGERY

At the present time, the LS is indicated in: Hiatus hernia with gastro-esophageal reflux, para-esophageal hernia, achalasia, esophageal resection and gastric resection.

The results of the laparoscopic antireflux funduplication, in the treatment of the hiatus hernia with reflux, they have been evenly good and at the present time numerous studies have been published in those that it is demonstrated that their effectiveness remains to 5 years_{9,10} (recommendation grade A/B). While the results obtained after the laparoscopic treatment in giant hiatus hernia (type III), have been controverted. However, with the purpose to obtain better results, there is consent among the surgeons that the following technical aspects should be included in this repair: Reduction and division completes of the hernial sack, mesh repair mesh of the diaphragm defect, funduplication, and drainage of the mediastino, to impede the seromas formation after the surgery. For the repair of the defect hiatal, habitually it can be carried out with loose points. Nevertheless, in big defects it can be necessary, to use a mesh for the closing of the defect around the esophagus, without trying to approach the pillars. The intent of closing of the pillars bears to apply a great tension that gives place to the longitudinal opening of the muscular fascicles with formation of holes to each side of the suture. On the other hand, the closing of the defect by means of a mesh without tension, it won't lose temper with the cough or vomits₄.

Laparoscopic cardiomyotomy for achalasia has substituted the open surgery and other forms of endoscopic treatment, due to their excellent results with a low morbidity. The doubt at the moment is about the utility of an additional funduplication. For some surgeons the funduplication type Dor is of utility because for that protects the exposed esophagus maintains separate the edges of the myotomy and avoids the reflux that is unavoidable after the cardiomyotomy. (recommendation grade C/D)₁₁.

Anterior gastrectomy and posterior vagotomy for laparoscopic pathway, it is a simple, effective and sure procedure, for the treatment of the chronic duodenal ulcer₁₂.

Gastric Stromal Tumors (GIST) resection for laparoscopic pathway is a technique well documented₁₃. However, GIST located near the esophagogastric union or in the hole pilórico or in the later pred, they can be technically more difficult of extirpating for this portway. In these cases it suits more the resection in wedge that the enucleation.

Gastric resection for SL, in the early cancer is a sure technique and with an earlier recovery (recommendation grade B)₁₄. There is less certainty regarding the resection D2 in patient with advanced gastric cancer (recommendation grade C/D)₁₅.

Laparoscopic surgery in esophagus cancer, can be performed as safety as conventional esophagectomy and has considerable perioperative advantages: lung morbidity smaller, intensive cares less, perioperative blood less, analgesic requirements and mean length of hospital stay were reduced (recommendation grade C/D).

MORBID OBESITY

The world epidemic of overweight, obesity and morbid obesity (MO), affect to 1.700 million people. Although the bariatric surgery represents the effective treatment only of MO, it doesn't reach to 1% of the patients benefited by this technique. Buchwal et als.₁₆ review, in the period 2002-2003, they were carried out in the world 146.310 operations of this type, of those that 63% was made for laparoscopic portway. These data demonstrate that the laparoscopic portway comes substituting to the conventional partway, in the surgical treatment of MO, due fundamentally to a smaller morbidity hospital postoperative, smaller stay, a quicker recovery and to a better quality of life. The biggest cost in the intervention laparoscopic is compensated by a hospital smaller stay.

At the present time, the two techniques more frequently carried out for SL are gastric Bypass and the gastric band. Gastric Bypass is carried out completely by 70% of the surgeons around the world and it is considered at the moment as “ Gold Standard” of the surgery of MO, for security, experience and cost-effectiveness (recommendation grade B)_{17,18}.

The gastric band for SL constitutes a valid technique and it has their indications in the treatment of MO. However, the loss of weight with this technique is not as marked as the one that has place after the gastric derivation. The technology of the gastric band has evolved toward the introduction of narrow devices and of low pressure. On the other hand and thanks to the experience, the localization of the band has moved near of the esophagus-gastric union with the purpose to diminish the slip rate₁₉.

COLORECTAL SURGERY

At the present time among the main indications of the surgery endoscópica in the pathology colorrectal are:

Segmental resection, hemicolectomía, resection of right and mesorrecto. The demonstrated benefits of this surgery for endoscopic porthway in front of the open porthway technique are: a postoperative much more comfortable, a postoperative smaller ileo and a smaller stay²⁰. As for the evolution of the tumoural disease, the results obtained in clinical tests made with aleatory assignment have not demonstrated a worse evolution after the laparoscopic porthway (recommendation grade B)²¹.

The total resection of the mesorrecto for LS offers some results that open porthway in expert hands²².

As for the initial concerns of the tumoural implant in the access orifices that were observed in some of the first works, the study COST (Clinical Outcomes of Surgical Therapy Study Group)²³ clears these doubts and it confirms that this complication is due to a faulty technique than to a dissemination for the boarding porthway.

In spite of the kindness of the technique, recent studies²⁴, demonstrate that at the present time the laparoscopic colorectal surgery, is more expensive in relation to the open technique, nevertheless it is expected that the less you enlarged the experience, the reduction of costs can be feasible.

ABDOMINAL WALL

After revising 41 studies (7161 patients) about laparoscopic inguinal hernia repair versus open repair, they concludes that in the laparoscopic repair more time is used and it has a rate of more serious complications in relation to visceral (bladder, small bowel, colon) and nervous injury, vascular lesions; However, the postoperative recovery is quicker and more comfortable. This procedure at the present time can be indicated in incisional hernia, bilateral hernia, reproduced hernia and obese patient (recommendation grade B)²⁵.

LAPAROSCOPIC SURGERY RETROPERITONEAL PORTHWAY

For this boarding way, adrenalectomy, nefrectomy, colposuspension, lumbar simpatectomy, and abdominal aorta aneurysm resection, can be carried out with a recommendation grade B/C.

Adrenalectomy and esplenectomy for LS offers a clear vantage, if we compare it with the open porthway in morbidity terms and postoperative recovery, aspect universally accepted by the surgical community; for what the open boarding is only justifiable in massive splenomegalia

and in suprarenal malignant tumours. Although they are evident the benefits that are obtained after the bilateral adrenalectomy in the Cushing disease, these patients continue having problems of health so much if they are operated for open or closed porthway²⁶.

Laparoscopic nephrectomy in the alive donor's has constituted a significant advance. The reduction of the morbidity and the donor's stay, it has given rice to an increment in the donations, due to their early recovery without damage of the quality of life.

ACUTE ABDOMEN

Laparoscopy in the acute abdomen frequently offers besides the diagnosis, the possibility of therapeutic solution, in the case in which one is not able to solve the problem through this porthway it can be carried out a laparotomy directed with the information obtained after the laparoscopy. The demonstration of absence illness avoid laparotomy unnecessary, reduces the period of observation, the necessity of repeating tests and explorations. The laparoscopy avoids the derived complications of the laparotomy: Infections, incisional hernia, adhesences, etc. .Nevertheless, it presents some limitations: areas like the retroperitoneo and the posterior face of the liver are of difficult access. The control of important haemorrhages is difficult for this porthway.

Laparoscopy is indicated in to the acute abdomen of uncertain origin, and in the differential diagnosis of gynaecological pathology in the young woman.

In the case the acute appendicitis and after analyzing 54 comparative studies among the appendicectomy for conventional versus laparoscopic porthway²⁷, it was observed a smaller incidence of infection of the surgical wound, a smaller pain, and a quicker incorporation to their normal activity after laparoscopic appendicectomy, but the incidence of intraabdominal abscess was bigger, the costs were higher and the surgical biggest time. The patients that especially benefit of this boarding way they are the young women and the obese adults, with a recommendation grade B.

ABDOMINAL TRAUMA

The application of the laparoscopy in the abdominal trauma, maintains a conflict with other diagnostic procedures, as the peritoneal washing, the ultrasound and compute tomography (CT).

The objectives that it pursues the laparoscopy diagnostic in

these cases, are the one of discarding a lesion intraabdominal and if it is possible to repair it through sutures and the haemostatic substance application. It is indicated in patient stable that don't impress of graveness.

Laparoscopy is an exploration diagnostic superior to the peritoneal washing to indicate the necessity of a laparotomy urgent₂₈.

SOLID ORGANS

CL has demonstrated its utility, in surgical procedures on liver, pancreas, spleen, thyroid and parathyroid.

Laparoscopic hepatic resection has been carried out with favourable results, especially the left lobectomy and multiple segments resections. The favourable most frequent effects are the reduction of the sanguine losses and the shortest stay. Nevertheless, contrary to the open interventions the surgical time and the clamped of the triad portal are bigger in the laparoscopic hepatic resection. The morbidity rate is similar in the two approaches. (Recommendation grade C)_{29*30*31*32}.

Laparoscopic resection of benign liver tumours is feasible and safe for selected patents with small tumours located in the left lateral segments or in the anterior segments of the right liver.

In patients with small malignant tumours, located in the left lateral segments or in the anterior segments of the right liver, laparoscopic resection is feasible and safe. The complication rate is low, except in patients with hepatocellular carcinoma on cirrhotic liver. The late outcome needs to be evaluated in expert centres.

Laparoscopic enucleation or resection of the insulinomas, located with laparoscopic intraoperative ultrasound, represent an important advance in the treatment of these tumours₃₃.

Laparoscopic distal pancreatectomy carried out in cases of insulinomas of great size is a sure technique. Distal pancreatectomy with spleen preservation is also a practicable technique for these approach, whenever the brief vessels of the spleen are preserved, to avoid the splenic infarct_{34*35}.

Pancreatic pseudocysts constitutes a pathology that has benefited of the LS and it is carried out by means of a transgastric cystogastrostomy, using an stapler or by means of a cystoenterostomy through a window carried out in the transverse mesocolon₃₆. Laparoscopic drainage is associated to a low morbidity, since it eliminates the haemorrhage

danger and believe a wide communication that facilitates the cleaning of the content of the cyst and, therefore it diminishes the infection or relapse danger.

Conclusions: Laparoscopic pancreatic resection is feasible and safe in selected patients with presumed benign and distal pancreatic tumours. The management of the pancreatic stump remains a challenge. The role of these technique for pancreatic malignancies remains controversial (recommendation grade C/D).

Laparoscopic splenectomy is a real alternative to conventional splenectomy for some hematologic diseases, particularly idiopathic thrombocytopenic purpura and haemolytic anaemia. The advantages are an uneventful postoperative course, a lower morbidity rate, a shorter hospital stay and an earlier return to normal activity. The limits of this technique are related to the operator's experience, the size of the spleen, the nature of the underlying disorders and patient characteristics, mainly obesity. (Recommendation grade B/C)_{37*38}.

At the present time the endoscopic surgery has more than enough thyroid and parathyroides, it is in its beginnings, for what it requires of a bigger experience to value its true advantages (recommendation grade D)_{39*40}.

THORACOSCOPIC SURGERY

The biggest advance achieved in thoracic surgery in the last decade is, maybe, the video-assisted thoracoscopic, for the treatment of the diseases of the thorax. These techniques, although they don't substitute to the conventional ones, they allow the surgeon to achieve the same goals, but with a smaller morbidity.

Some accepted indications exist and other controversial indications for the video-assisted thoracoscopic surgery:

Among accepted indications they are the diagnostic thoracoscopic (biopsy) and the therapeutic thoracoscopic surgery as the pleurodesis, benign tumour resection and thoracic simpatectomy (recommendation Grade B). Among the controversial indications they are the mediastino tumour resection, carcinoma broncogenic T1 excision, emphysematous uproars extirpation, lobectomy, esophageal miotomy, and esophageal leiomioma excision.

Among the contraindications of the thoracoscopic surgery they are the resection of firm adherences and the impossibility of tolerating the ventilation with a single lung_{41*42}.

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