



Original article

Cost-Benefit Analysis Comparing Laparoscopic and Open Ventral Hernia Repair^{☆,☆☆}

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A B S T R A C T

Objective: Laparoscopic surgery is a successful treatment option offering significant advantages to patients compared with open ventral hernia repair. A cost-benefit analysis was performed to compare the clinical results and economic costs of the open and laparoscopic techniques for anterior abdominal wall hernia repair, in order to determine the more efficient procedure.

Materials and methods: We performed a prospective study of 140 patients with primary and incisional hernia, and analyzed clinical data, morbidity, costs of surgery and hospital stay costs.

Results: The cost of disposable surgical supplies was higher with laparoscopic repair but reduced the average length of stay ($P < .001$) and patient morbidity ($P < .001$). The total cost of the laparoscopic procedure was, therefore, less than initially estimated, yielding a savings of 1260€ per patient (2865€ vs 4125€).

Conclusions: Laparoscopic ventral hernia repair is associated with a reduced complication rate, a lower average length of stay and with lower total costs. Laparoscopic repair can save 1260€ for each patient, and so this procedure should be considered a cost-effective approach.

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Estudio de coste-beneficio comparando la reparación de la hernia ventral abierta y laparoscópica

R E S U M E N

Objetivo: La laparoscopia ofrece importantes ventajas clínicas respecto a la técnica abierta en la reparación de las hernias de pared abdominal. Se realiza un estudio coste-beneficio con el objetivo de analizar los resultados clínicos y los costes económicos comparando la técnica abierta y la laparoscopia en la reparación de la hernia de pared anterior abdominal y así determinar el procedimiento más eficiente.

Palabras clave:

Laparoscopia

Reparación ventral incisional

Estudio de coste-beneficio

Eficiencia en cirugía

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Material y métodos: Estudio prospectivo de cohortes sobre 140 pacientes consecutivos con hernias ventrales, con el objetivo de evaluar el coste de ambas técnicas. Se analizan datos clínicos, morbilidad, estancia hospitalaria, complicaciones y costes.

Resultados: La vía laparoscópica presentó menor estancia media ($p < 0,001$), menor morbilidad postoperatoria y complicaciones ($p < 0,001$) y reducción en la tasa de reingresos. El coste del material laparoscópico fue más alto, aunque el coste total del procedimiento por paciente fue menor (2.865 €) vs reparación abierta (4.125 €).

Conclusiones: La reparación laparoscópica de las hernias ventrales de pared abdominal aporta beneficios para los pacientes y presenta, además, un coste final del procedimiento sensiblemente menor, evitándose un gasto de 1.260€ por cada paciente intervenido por esta vía. Además de ser una técnica eficiente, la reparación laparoscópica es coste-efectiva.

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Introduction

Laparoscopy has become an alternative approach for many surgeries. Since its development in 1990, it has brought about a transformation of multiple procedures by progressively demonstrating its advantages over the open approach.

These benefits arise from its less invasive nature on the patient's abdominal wall, which reduces pain during surgery, thus requiring less analgesia during the surgery phase, less postoperative pain, lower morbidity, and a reduction in the rate of ventral hernias.¹⁻⁴ With regard to work and social aspects, it also has advantages, such as better postoperative recovery, earlier return to usual activity, decrease in the loss of working days,^{2,5} and therefore, a financial benefit to health systems.

Cholecystectomy was the first procedure to use laparoscopy, and laparoscopic cholecystectomy has become the "gold standard".² The open approach has become the exception, used only in complex cases and in conversions. However, ventral hernia repair has been one of the last conditions to incorporate laparoscopic access. This is due mainly to the particular difficulties posed by the separation of adhesions, with the possibility of inadvertent bowel lesion, and it can even cause death without the proper experience.⁶

LeBlanc⁷ published a study with long-term results of over 10 years of follow-up, which demonstrates the superiority of laparoscopic ventral hernia repair based on improving patient recovery and reducing the rate of complications and infections by less handling of the mesh. It also discloses a lower recurrence rate than open surgery.^{8,9}

Moreover, from the perspective of sustainability and cost containment, it must be considered that a health system needs to introduce a new public funded technique when cost-benefit studies are available that can demonstrate, not only its efficacy, but also the efficiency of its use. There are some studies on laparoscopy showing clear hospital cost and work^{2,5} related financial advantages.^{8,10,11} However, all were performed after it was accepted.

In our setting, studies have been published on cost effectiveness for inguinal hernias¹² and primary hernias repaired by an anterior approach by comparing the types of anesthesia.¹³ No studies were found to assess the level of efficiency of laparoscopic surgery of the anterior abdominal wall, which would be greatly useful to assess the cost of

funding that this prevalent condition may represent for the health system.

This work aims to perform a cost-benefit study to compare anterior abdominal wall hernia repair by open surgery with the laparoscopic approach, in order to determine whether the clinical and financial benefits of laparoscopic surgery outweigh those of conventional surgery, thus determining if it is more efficient than the conventional procedure.

Materials and Methods

A controlled non-randomized cohort prospective study was performed on 140 consecutive patients operated at the Servicio de Cirugía General y Digestivo del Hospital Universitario de Getafe de Madrid [Department of General and Digestive Surgery, University Hospital of Getafe in Madrid] (Spain), who were diagnosed with ventral abdominal wall hernia. The study period included from January 2004 to January 2009.

Inclusion Criteria

Adult patients with normal mental capacity, and elective surgical indication for the following hernias, classified according to the EuraHS Working Group¹⁴:

- Primary midline ventral hernias: umbilical, epigastric, both, or Spiegel, with size at scan greater than 3 cm in transverse diameter or less than 3 cm in patients with body weight index greater than 30.
- Ventral incisional hernias with transverse diameter less than 20 cm, which would not require related dermolipectomy or other skin correction techniques.

No additional radiological scans were performed, unless for other indications.

Patients were divided into 2 groups controlled prospectively. Allocation was performed randomly by the attending surgeon during the abdominal wall-specific outpatient clinic of the department. Open surgery was performed by 2 abdominal wall experienced surgeons, and the laparoscopic procedure by 2 who had training in this technique. Resident

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