

# Should we treat white line hernias by laparoscopy?

## About a prospective study of 42 cases



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### Should we treat white line hernias by laparoscopy? About a prospective study of 41 cases

*We report a prospective study of 42 cases of primary uncomplicated umbilical and epigastric hernia operated by laparoscopy with a 1 year mean follow-up. The purpose of our study is to investigate the contribution of laparoscopy in the treatment of in terms of results in the short and medium term. Early surgical morbidity was 14.3%. There was no mortality. At 6 months of the intervention, 28.5% of patients have kept umbilical pain. At 1 year of intervention, 2 patients have kept umbilical chronic pain. No case of recurrence was noted. In conclusion, the laparoscopic approach should be reserved for cases of large hernias and for recurrent and incisional hernias.*

KEY WORDS: Epigastric hernia, Laparoscopy, Mesh, Umbilical hernia

### Introduction

White Line Hernias (WLH) are all hernias located on the midline of the abdomen. They often sit between the xiphoid process and the umbilicus. This represents a common reason for parietal surgery. Like any parietal hernia, the only curative treatment is surgical. Several techniques are proposed to date for the repair of this type of hernia<sup>16</sup>. The aim of these techniques is to have less morbidity, lower recurrence rates, the lower cost and less esthetical damage. In the last decade, most studies have focused on laparoscopic surgery but with conflicting results.

We conducted a prospective study of patients operated for white line hernia by laparoscopic approach. The aim

of our study was to investigate the feasibility and results of laparoscopic approach in order to clarify its indications.

### Patients and Methods

We conduct a prospective study extended between January to December 2012 and including 42 cases of non-complicated WLH operated by laparoscopic approach in the General Surgery Department of Habib bourguiba's hospital at Sfax. All patients were followed for 12 months. All our patients were operated under general anesthesia. A standardized surgical technique was adopted. All patients were placed in a supine position, lower limb joints, left arm along the body. The creation of pneumoperitoneum at 12 mm Hg was made by «open laparoscopy» in all cases through the left flank. Three trocars were always used. We used an intra-peritoneal polypropylene mesh measuring 10 x 10 cm. The fixation of the prosthetic mesh was made by two techniques: Tackers of 5mm and non absorbable suture tied to the

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cutaneous surface after being externalized through a Reverdin needle.

The data for each observation were noted in a canvas including: age, sex, the patient's anterior medical history, the intra-abdominal hypertension factors, the body mass index ( $BMI = \text{weight (kg)} / \text{size}^2 \text{ (cm)}$ ); data of biological and imagery tests, the type of WLH and there characteristics (size, collar, length); the performed operative procedures, intra operative incidents and conversions, the method of fixing the prosthetic mesh: Reverdin or Tackers, duration of surgery, the short post operative courses: evaluation of post-operative pain based on a numerical scale (EN) by asking patients to give a score from 0 to 10 (pain score was noted 0 as "no pain" while note 10 to "unbearable pain"), and the length of hospital stay. Post-operative complications in the medium term were also noted (12 months of follow-up for all patients). A postoperative clinical control was performed at 1 month, 6 months and 12 months to assess the degree of wound pain, detect recurrence or complications and the degree of patient satisfaction.

Data was analyzed through statistical software (SPSS 11.0), which allowed us to conduct a descriptive and analytical study of different data comparing the two methods of attaching the prosthetic mesh by laparoscopy: absorbable suture (Reverdin) versus Tackers and comparing the two approach modes. For qualitative data, the comparison was performed by the chi-square test and Fisher: a correlation is said to be significant if  $p$  was  $< 0.05$ . For comparison of quantitative variable, the ANOVA test was used with a significant correlation coefficient if  $p$  was  $< 0.05$ .

## Results

All patients in our series were operated by laparoscopy, and represent 48.8% of patients operated for WLH during the same study period. The decision of the laparoscopic approach has been advocated as the surgeon's preference and according to the patient's choice. The median age of patients was 52 years, with extremes ranging from 25 to 86 years. There were 27 men and 15 women for a sex ratio  $M / F = 1.8$ . Medical previous history was noted in 26 cases (61.9 % of patients) and was dominated by hypertension and chronic bronchitis. Sixteen patients had a history of abdominal laparoscopic surgery. The average body mass index was  $28.3 \text{ kg} / \text{m}^2$ , with a range of 22 to 39.5. Over a third of patients (40 %) in our series were fat ( $BMI > 30$ ). At least one factor of intra-abdominal hypertension was noted in 38 patients (90.5%) particularly the forced work and the notion of Carrying heavy loads were reported in 17 patients (40%). Umbilical hernias represented the most frequent seat of WLH in our series and represents 61.9 % of cases (26 patients), while there were epigastric hernias in 15 cases and sub umbilical hernia in one case. The average size of the hernia was 4.3 cm (range from

2 to 6 cm. The average diameter of the neck was 1.5 cm (range between 1 and 3 cm).

All patients were operated by laparoscopic approach. The fixation of the prosthetic mesh was made by two techniques: Tackers in 19 patients (Tackers group) and non absorbable suture tied to the cutaneous surface after being externalized through a Reverdin needle in 23 cases (Reverdin group). The mean duration of surgery was 40.4 minutes, with a range of 20 to 60 minutes. Operative time was significantly longer in the group Reverdin (average of 48 minutes) than the Tackers group (average of 29 min) ( $p = 0.001$ ). No case of conversion has been achieved in our series.

In immediate post-operative courses, all patients had intravenous analgesic drugs during the first 24 hours (association Paracetamol 3g / day and Tramadol 150mg / day). Pain, at the first postoperative day, was evaluated with a number average (EN) of  $8.4 / 10$  (range from 7 to 9). There is no difference in terms of pain between the technique using the non absorbable suture and tackers ( $p = 0.056$ ). The average of the post operative restoration of transit was 1.5 days, with extremes ranging from 1 to 3 days. The average postoperative hospital stay was 2.9 days (range from 2 to 6 days).

Early surgical post operative complications were noted in 6 cases (14.3 %): Two cases of wound hematoma and 4 cases of seroma objectified by computed tomography. No significant difference between the two groups in term of post operative surgical morbidity ( $p = 0.41$ ). The average recovery time of habitual physical activity or work was 20 days, with a range from 10 to 45 days.

All patients were followed for consultation in the first postoperative month. More than half of patients (57.1%) have described persistent parietal pain, while two patients reported significant interference with daily activities due to pain in the right flank and the level of the umbilicus, respectively. Moreover, in other patients (38%), the outcome was favorable with disappearance of pain and return to usual work and daily activities.

At the second consultation on the 6th month of follow-up, more than two thirds of the cases operated showed good evolution, while 12 patients have kept parietal pain. After 12 months of intervention, 2 female patients have kept umbilical parietal pain. No cause explaining the pain has been found. Abdominal computed tomography was performed and has removed the possibility of recurrence of hernia. While one another patient has presented an incisional hernia in the seat of the trocar at the level of the left iliac fossa. No recurrence was noted in all cases of our series.

## Discussion

The incidence of WLH is difficult to assess. On a series of autopsied patients, its prevalence is estimated in the general population between 0.5 % and 10 %<sup>1</sup>.

It is almost exclusively adult disease, with a male predominance. In adults, it is an acquired hernia. The diagnosis is usually made between thirty and forty years. Most published studies have investigated the role of laparoscopy including hernia, recurrent hernias and incisional hernias of the white line in the same batch. Recently, «the European Hernia Society» (EHS) recommended separating two entities: a group of abdominal hernia and a group of incisional and recurrent hernia<sup>2</sup>. Similarly, new recommendations on these hernias of the anterior abdominal wall were made in 2009<sup>3</sup>, they divided them according to two criteria: the seat and size. For that, there is small, medium or large epigastric or umbilical hernia (depending on the measurements in centimeters above or below 2 and 4 cm). We note that this classification does not concerned supra-umbilical hernia and the size of the neck of the hernia.

A more recent meta-analysis<sup>4</sup> has studied all the publications from 1950 to 2009 has finally selected 8 randomized controlled studies of good quality, but including hernias and incisional white line hernias with a total of 526 patients. According to this meta-analysis, there is no significant difference in rates of "seroma" in six randomized controlled trials (laparoscopy versus laparotomy: 11.7% vs 15.5%, RR = 1.22;  $p = 0.74$ ), hemorrhagic complications in 5 randomized controlled trials (laparoscopy versus laparotomy: 1.5% versus 5.9%, RR 0.42 :  $p = 0.35$ ), intestinal accidental lesions (laparoscopy versus laparotomy: 2.6 versus 0.9%, RR = 1.95;  $p = 0.34$ ). Contrariwise, the risk of wound infection requiring removal of the prosthetic mesh is significantly lower in patients undergoing laparoscopic surgery, this result was found in 8 randomized controlled trials (1.5 % after laparoscopic versus 10.1 % after laparotomy result, RR = 0.22;  $p = 0.001$ ).

Pierce and al<sup>5</sup> studied 5340 patients undergoing surgery for hernias and incisional white line hernias reported in 45 studies. They found similar results with: less wound infections (1.3% against 10.4%,  $p < 0.001$ ), lower prosthetic infections (0.9% against 3.2%,  $p < 0.001$ ), lower hernia recurrence (4.3 against 12.1%,  $p < 0.001$ ), and shorter duration of hospitalization (2.4 against 4.3 days,  $p < 0.001$ ) in favor of laparoscopic surgery compared with conventional surgery.

Recently, some studies have been published, addressing only for the WHL and not for incisional and recurrent hernias. Cassie and al<sup>6</sup>, who reported a retrospective multicenter study of 14652 umbilical hernias operated with 13109 cases by conventional surgery (89.5 %) and 1543 by laparoscopic one (10.5 %). The overall complication rate was almost similar (1.16% and 1.36 laparoscopy laparotomy,  $p = 0.49$ ). Wound infections were significantly more frequent after laparotomy (1.55 % versus 0.65%,  $p = 0.005$ ). Cardiac and respiratory morbidities were against more frequent after laparoscopy (0.52 % and 0.26 % versus 0.10 % and 0.05 %, respectively,  $p = 0.001$  and  $p = 0.005$  respectively).

More recently, Helgstrand and al<sup>7</sup> reported a large multicenter prospective study of 6783 patients undergoing umbilical hernia and epigastric surgery: 5601 patients who underwent conventional surgery (82.6 %) and 1149 patients (16.9 %) underwent laparoscopic surgery. This study found no significant difference in rates of surgical or medical complications and in terms of risk factors for readmission after one month of the intervention ( $p \geq 0.229$ ).

Data on postoperative pain after laparoscopic WHL repair are limited. Only a few studies have reported that postoperative pain is more intensive after laparoscopic surgery of incisional WLH in contrast so we should expect<sup>8-10</sup>. No scientific explanation has been retained. Similarly, other studies including incisional hernias<sup>11-13</sup> found no significant difference in terms of chronic postoperative pain between the two techniques of fixation of the prosthetic mesh. Our series confirms the intensity of pain in the immediate postoperative courses and persistent chronic pain at 1 year of intervention in 4.7% of cases. Recently, some studies have focused on others methods for intra peritoneal fixation of the prosthetic mesh<sup>14,15</sup>. The purpose was to reduce the rate of post operative pain. No conclusion was retained. Like for inguinal hernias, in which the use of fibrin glue has proved its utility for reducing the intensity and the rate of post operative chronic pain [16], future studies should be focalized on the feasibility and results of fibrin glue as a method of fixation of the prosthetic mesh in WLH surgery.

The second problem raised in following up the operated WLH in the long term is represented by the recurrence. Thereof, studied with a follow-up in most studies not exceeding 5 years, is variable with often rates lesser than 10%. Heniford and al.<sup>14</sup> stressed the importance of the simultaneous fixation of the prosthetic mesh by both methods: non absorbable suture (using a Reverdin needle) and Tackers fixation. In a study of 60 patients, Riley and al<sup>12</sup> Found a rate of 8.3% of recurrence after a mean of 2.7 years. Jervild and al<sup>15</sup> Reported 11.4 % of cases of recurrence with a mean of 3 years of follow-up. According to Forbes and al<sup>4</sup>, there was no significant difference in risk of recurrence after laparoscopic or laparotomic surgery for hernias or incisional white line hernias (3.4% versus 3.6% respectively, RR = 1.02,  $p = 0.80$ ).

## Conclusion

In conclusion, according data in the literature and in our series, it appears that laparoscopic WLH surgery is feasible with almost equivalent or better results than laparotomy. In fact laparoscopic surgery represents the advantage of better esthetical results and lesser wound infection rates. More studies are required and which should exclude recurrent and incisional hernias. They should also evaluate other methods of fixation of prosthetic mesh, postoperative pain and its impact on qual-

ity of life. Meanwhile, we reserve the laparoscopic approach for large WLH that allows take advantage of the esthetical and infectious advantage.

### Riassunto

Viene riportato uno studio prospettico su 42 casi di ernia ombelicale ed epigastrica primitive e non complicate trattate per via laparoscopica e seguite in media da un follow up di un anno.

Lo scopo di questo studio è quello di valutare il contributo della laparoscopia nel trattamento in termini di risultato nel breve e nel medio periodo.

La morbidità chirurgica precoce è stata del 14,3%. A sei mesi dall'intervento il 28,5% dei pazienti ha lamentato dolori nell'area ombelicale. Ad un anno dall'intervento 2 pazienti hanno lamentato la cronicizzazione del dolore.

Non si è avuto nessun caso di recidiva.

In conclusione l'approccio laparoscopico risulta doversi riservare ai casi di ernia di maggiori dimensioni, ed in caso di recidiva o di laparocele.

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