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Double mesh "sandwich" technique to repair large hernias in the elderly: Case series report

Técnica de "sándwich" o doble malla para la reparación de grandes defectos herniarios en el adulto mayor: revisión de una serie de casos

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Keywords:
Incisional hernia, giant hernia, incisional hernial repair, double mesh technique, prosthetic mesh, complications.

Palabras clave:
Hernia incisional, hernias gigantes, hernioplastía incisional, técnica de "sándwich", material protésico, complicaciones.

ABSTRACT

Introduction: The double mesh technique is a great surgical resource for patients with large hernia defects. The objective of this study is to show our experience in the management of recurrent hernia defects larger than 10 cm in the elderly. **Material and methods:** A retrospective, descriptive study from March 2014 to March 2018 was conducted in patients ranging from 65 to 83 years old with recurrent hernia defects larger than 10 cm or multiple defects with previews failure of other attempts, operated with the double mesh surgical technique associated to anterior component separation in which the following variables were analyzed; Age, gender, defect size, comorbidities, surgical site occurrences, hospital stay, and recurrence. **Results:** Eight patients were selected, five females and three males ranging from 65 to 83 years old. The most common comorbidities associated were in the order of appearance Obesity (BMI > 30) in 80% of the cases, high blood pressure 62%, diabetes 50%, heart conditions 37.5%, chronic obstructive pulmonary disease 25% and ascites 12%. The most common complications found where seroma in four patients (50%), postoperative pain one patient (12.5%), and superficial surgical site infection in one patient (12.5%), pneumonia one patient (12.5%). The average hospital stay was two to four days and no recurrence has been documented to this date. **Conclusions:** Hernia repair with double mesh technique is a reproducible and effective therapeutic resource for patients with large recurrent hernia defects in patients with comorbidities susceptible to hernia recurrence.

RESUMEN

Introducción: *La técnica de doble malla es un recurso en pacientes con grandes defectos herniarios. El objetivo es describir nuestra experiencia en hernias recidivantes mayores de 10 cm o defectos múltiples en un grupo de pacientes mayores de 65 años.* ***Material y métodos:*** *Estudio retrospectivo y descriptivo, de marzo de 2014 a marzo de 2018, de pacientes entre 65 y 83 años, con hernias mayores de 10 cm o defectos múltiples en pared abdominal que han recurrido y que fueron operados con técnica de doble malla y separación de componentes. Se analizaron las siguientes variables: edad, género, tamaño del defecto, comorbilidades, complicaciones, estancia hospitalaria y recurrencia.* ***Resultados:*** *Se reunieron ocho pacientes, cinco mujeres y tres hombres de entre 65 y 83 años de edad, las comorbilidades asociadas fueron obesidad (IMC > 30) en 80% de los casos, hipertensión arterial 62%, diabetes 50%, enfermedad coronaria 37.5%, enfermedad pulmonar obstructiva crónica 25% y ascitis 12%. Las complicaciones que se presentaron fueron seroma en cuatro pacientes (50%), dolor postoperatorio en un sujeto (12.5%), infección de herida quirúrgica superficial en un paciente (12.5%) y neumonía en otro (12.5%) La estancia hospitalaria promedio fue de dos a cuatro días. No hay recurrencia en ningún paciente hasta el momento.* ***Conclusiones:*** *La hernioplastía con doble malla es un recurso terapéutico eficaz y reproducible para pacientes con grandes o múltiples defectos recurrentes y con comorbilidades que los hacen propensos a recidiva.*

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INTRODUCTION

The pathophysiological phenomena associated with the development of ventral hernia are increasingly studied and, it has been possible to individualize the risk factors related to the appearance of hernias after abdominal surgery, according to the age group. These risk factors must also be individualized according to the

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Table 1: Technique according to the location of the hernia, postoperative complications and recurrences in our series.

Type of defect	Technique	Complications	Recurrence (%)
M2, W3, R1	Rives/prefascial	1 Seroma 1 Infection	0
L1, W3, R1	IPOM/prefascial	1 Seroma 1 Postoperative pain	0
Multiple defect	IPOM/prefascial	1 Seroma	0

surgery that gave rise to the hernia, the type of technique used in the previous hernia repair, the comorbidities of each patient, and abnormalities in the metabolism of collagen.[1]

The double mesh technique has been a widely used resource in complex reconstructions of the abdominal wall in patients with a thin abdominal wall, with denervation, and in patients at high risk of recurrence due to associated comorbidities, such as older adults.[2,3]

The objective of this case series is to describe our experience in the management of recurrent, large or multiple hernias in a group of patients prone to recurrence due to their high rate of comorbidities that have been associated with failures of other surgical techniques.

MATERIAL AND METHODS

This retrospective, observational and descriptive study includes cases of recurrent ventral hernia operated by a single surgeon between March 2014 and March 2018 at Santa Ana Hospital, Country 2000 Hospital, and San Javier Hospital in Guadalajara, Mexico. Patients with defects greater than 10 cm or multiple defects of the anterior abdominal wall were selected by preoperative tomography or by direct measurement in the intraoperative period, who had at least one previous attempt at incisional hernia repair. The study did not include patients with incisional hernias without recurrence or defects smaller than 10 cm, as well as patients younger than 65 years. They were studied based on age, sex, size of the defect, comorbidities, intra- and post-operative complications, hospital stay, and recurrence.

The Jean-Paul Chevrel 2000 classification[4] was used to divide patients according to size, location of the hernia, and the number of recurrences.

Surgical technique

The technique used was always performed by the same surgeon as follows: elective surgery under general anesthesia *(Table 1)*.

The placement of a retro-muscular mesh with the Rives technique in midline defects was done as follows: resection of the previous surgical scar, dissection by planes surrounding the hernia defect until the identification of the aponeurosis, incision, and dissection of the retro-muscular space. At all costs, an attempt was made to preserve the hernial sac and the

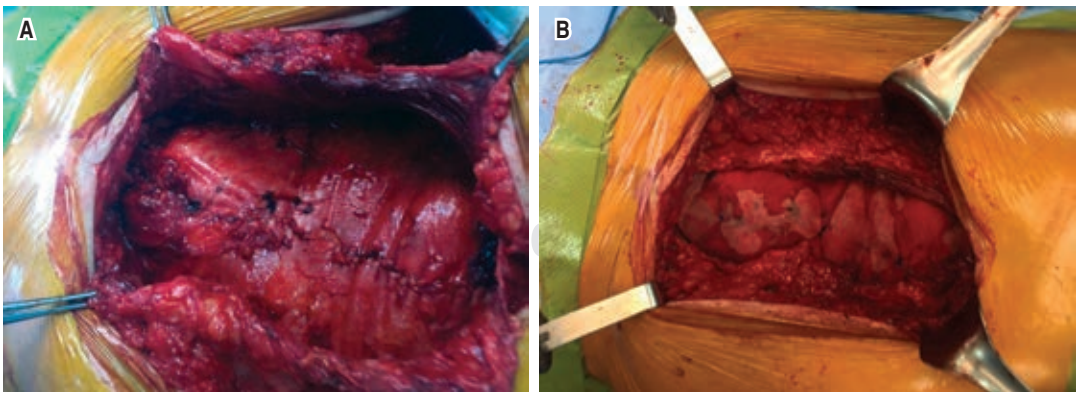

Figure 1: ***(A)*** *Dissection of the retromuscular space and midline closure with the posterior rectus sheath,* ***(B)*** *Retromuscular placement of heavy polypropylene mesh.*

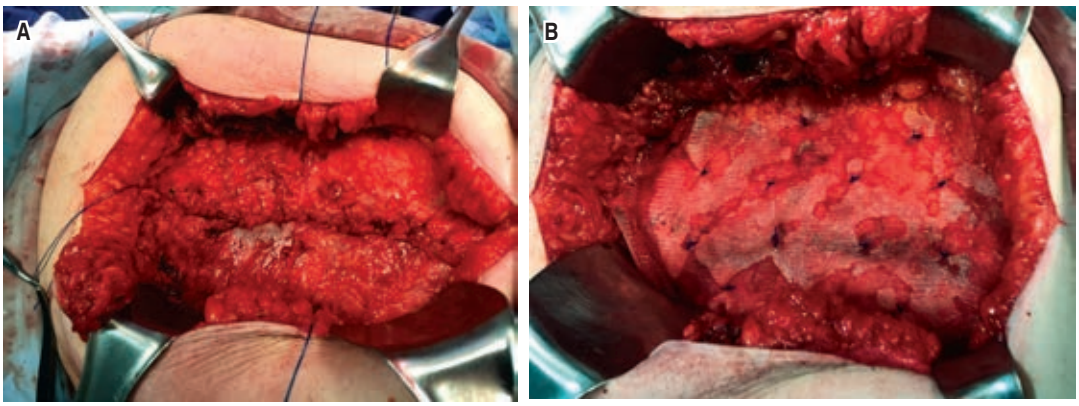

***Figure 2: (A)** Closure of the defect in the midline, **(B)** Placement of the prefascial mesh.*

midline was approached again using the level I component separation technique, by insertion of the external oblique muscle bilaterally, and level II, by inserting the posterior aponeurosis of the rectus abdominis, with further dissection of the retro-muscular space and placement of a heavy polypropylene mesh. Midline closure and subsequent placement of supra-aponeurotic light polypropylene mesh were then done. The light mesh was fixed to non-absorbable 0 monofilament "reins" placed trans-fascially *(Figures 1 and 2)*.

In cases where it was not possible to adequately enter the retro-muscular space, and intraperitoneal tissue separating mesh type IPOM (Intraperitoneal Onlay Mesh) was placed, up to where the defect allowed, then a preaponeurotic heavy polypropylene mesh was placed *(Figure 3)*. In all cases, two closed drains with active suction in the subcutaneous tissue were systematically placed.

RESULTS

From March 2014 to March 2018, a total of 27 incisional hernia repairs were performed using the double mesh "sandwich" technique. Nineteen patients under 65 years were excluded, as well as defects less than 10 cm and patients without at least one previous hernia repair. The study group thus consisted of eight patients, 5 females (62.5%) and 3 males (37.5%), with an average age of 74 years (range 65 to 83).

Of the 8 patients, 5 had defects in the midline (M2, W3, R1) *(Figure 4)*, 2 had defects in the right subcostal (L1, W3, R1) and one of them had multiple defects (M3-W1.R1, L1-W3-R2). In none of the cases, the type of previous surgical repair of the hernia was known. All patients had at least some risk factor inherent to their age, the most frequent comorbidity was obesity (BMI > 30), in 80%, hypertension in 62%, diabetes in 50%, coronary disease in 37%, COPD in 25%, and ascites secondary to liver cirrhosis 12%.

The average size of the defects was 14 cm, with ranges between 10 and 18 cm in those with single defects, and an average of 5 cm in those with multiple defects, with a range between 4 and 6 cm. In five of the eight patients, the heavy polypropylene sub-aponeurotic mesh was implanted in the retro-muscular space, and in three patients a collagen-covered heavy polypropylene tissue separating mesh was placed intra-peritoneally. In eight patients, a light supra-aponeurotic polypropylene surface mesh was placed. The average surgical time was 2.5 hours with (range 2 to 3). No patient had intraoperative complications.

The average stay of the patients was 2 to 4 days; however, one case was kept for 10 days due to exacerbation of his COPD. One patient with ascites was treated with a closed fenestrated intraperitoneal drainage with active Blake®-type suction, was withdrawn on the 10th postoperative day, and was treated with water restriction and combined diuretics to avoid tension ascites. Three patients (37.5%) presented a seroma, was drained through the surgical wound without complications, and only

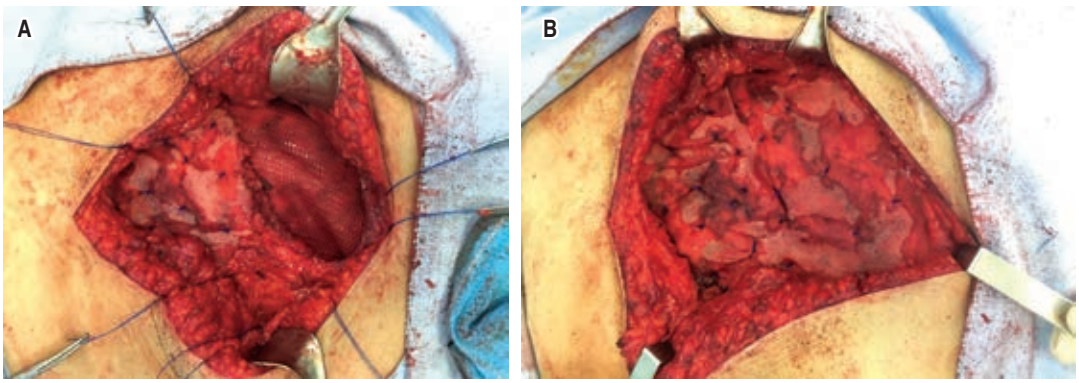

***Figure 3: (A)** Intraperitoneal mesh placement, **(B)** prefascial mesh placement after closure of the hernia defect.*

one patient (12.5%) had a superficial infection of the surgical wound, empirically managed with a third-generation cephalosporin per os for 10 days, and a PICO® negative suction dressing changed every four days for 12 days *(Figure 5)*.

In the late postoperative period, a patient with a subcostal hernia had to be re-admitted for severe abdominal pain in the right hypochondrium. The presence of intra-abdominal complications was ruled out and the patient was sent to the Pain Medicine Department for management of costochondritis, treated successfully with paracetamol/tramadol every 12 hours and pregabalin, 75 mg at night for 21 days.

One patient had to undergo reoperation six months after the hernia repair due to complete mechanical occlusion of the small intestine by adhesion to the promontory. After not responding to initial conservative treatment with a nasogastric tube, he was managed by liberation of adhesions, application Guardix® for prevention of future adhesions and closure of the abdominal wall with non-absorbable no. 1 monofilament suture, including the mesh suture line, which was already integrated to the abdominal wall.

***Figure 4:** Patient with M2, W3, R1 defect after colon cancer surgery.*

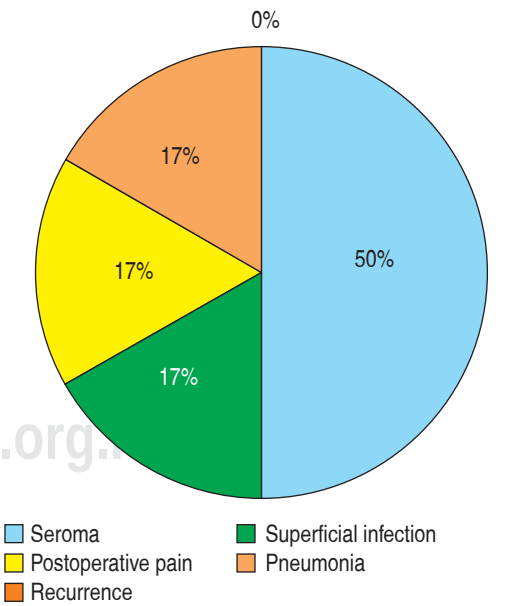

***Figure 5:** Percentages of postoperative complications in our series.*

The monitoring of the eight patients is still active. However, in two of them, a physical examination is not possible, since they changed their address and/or returned to their country of origin and communication is maintained by e-mail. Currently, there is a 3 to 4 month follow-up months, there are no reports of recurrence and all of them show a reincorporation to their previous style and quality of life.

DISCUSSION

The double mesh "sandwich" technique is considered by LeBlanc et al. as the one with the lowest percentage of recurrence, according to his 2005 meta-analysis.[5] This was compared with other techniques without tension for the repair of large hernia defects and showed a lower recurrence rate[6] of 1.9% *(Table 2)*.

Ventral hernia repair with double mesh technique using open surgery can be performed at different levels. Bendavid advises using the pre-peritoneal space to perform a simple repair, following the principles of an extended global mesh repair according to Stoppa.[5]

Caglià and Borzì[1] mention that the risk factors most commonly associated with the development of hernia in older adult patients are: hypertension, diabetes, obesity, anemia, smoking, COPD, corticosteroids, revascularized patients, renal patients, malnutrition, weight loss and immunosuppression, and we must separately consider medical conditions that raise intra-abdominal pressure, such as chronic constipation, ascites, benign prostatic hyperplasia and concomitant surgery on other parts of the body, mainly orthopedic.

Table 2: Percentage of recurrence according to meta-analysis of the different techniques without tension with mesh.

Surgical technique	Cases reported	Recurrence	Percentage
Double mesh	264	5	1.9
IPOM Lap	3,991	144	3.6
Rives/Stoppa	2,993	129	4.4
Mesh Onlay	637	32	5.0
Mesh Inlay	997	127	12.7

From: Awad, Puri, LeBlanc, Stoppa.[11]

In a series of 218 cases operated with the Rives technique, Mayagoitia mentions that when tension techniques are applied, recurrence is more frequent within the first 6 to 12 months after the intervention.[7] With the application of a mesh, we avoid recurrences in the majority of patients. In some others, recurrence is delayed, which can be verified by a follow-up of 10 to 20 years.[8]

Ibarra et al.[9] describe the application of botulinum toxin in complex reconstructions of the abdominal wall as another therapeutic resource, which can be associated with the double mesh technique when the primary closure of the hernia defect is considered difficult in advance.

A ventral hernia is frequent in elderly patients with comorbidities that condition tissue hypoxia, sudden or persistent increase in intra-abdominal pressure, and nutritional deficiencies.[10] Caglià considers that hernia surgery in this age group, in particular, represents a challenge for the hernia surgeon, since in many cases the integrity of the muscles of the abdominal wall and the aponeurotic layers are not preserved.[1]

The placement of a second supra-aponeurotic mesh has been proposed to achieve greater rigidity at two levels of the abdominal wall and to reduce possible recurrences (since a mesh in the pre-aponeurotic position has shown rapid and effective integration), at the intra-abdominal and pre-muscular level, as reported by Moreno-Egea.[11]

In recent articles Carbonell-Tatay suggests releasing the transverse plane and extending the placement of the retro-muscular prosthesis behind the transversus abdominis, fixing the supra-aponeurotic mesh behind the greater oblique, which at this time is the author's preferred action.[12]

CONCLUSIONS

The double mesh technique for the repair of large recurrent hernia defects of the abdominal wall in the elderly is effective and reproducible for patients with large or multiple recurrent

hernia defects and comorbidities which make them prone to recurrences, with an acceptable complication rate.

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