Cohort Study

Management of midline ventral hernias in a surgical department of sub-Saharan Africa: A retrospective cohort study

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ABSTRACT

Introduction: The linea alba is the second most frequent site of abdominal wall hernias after the inguinal region. Prosthetic approach, often recommended, comes up against the low socio-economic level and the availability of these materials in developing countries. Our objective is to evaluate the indications and results of midline ventral hernia surgery.

Methods: This was a retrospective cross-sectional study over 36 months including all adult patients (over 15 years old) treated for primary or recurrent midline ventral hernias. The parameters studied were: age, sex, risk factors, type of hernia according to the classification of the European Hernia Society (EHS), clinical presentation, hernial ring size, surgical technique and results (recurrence, chronic pain).

Results: We included 65 patients. The mean age was 40.5 years ± 16.4. There was a female predominance (56.3%, n = 36) with a sex ratio of 0.77. According to the EHS classification, type M3 (umbilical) was more common (67.2%), followed by type M2 (epigastric) in 25% and M4 (infra-umbilical) in 1.6%. According to the clinical presentation, 85.6% (n = 55) were uncomplicated, 10.9% (n = 7) were strangulated in and 3.1% (n = 2) incarcerated. A primary suture was performed in 93.8% (n = 61) and a mesh repair in 6.15% (n = 4). With a mean follow-up of 8.2 ± 11.9 months, we noted a recurrence in 6.1% (n = 4) and chronic pain in 6.1% (n = 4).

Conclusion: There is a need to individualize or contextualize the guidelines. In our context where meshes are not always available, pure tissue repairs keep their place in the treatment.

1. Introduction

The linea alba designates an aponeurotic structure extending from the xiphoid process to the pubis. It unites the two rectus muscles of the abdomen. It is an area of weakness in abdominal wall representing 30% of all hernias [1]. The specific location of these hernias is mainly in the umbilical and epigastric region [1–3]. They can be congenital in children, or acquired in adults [1,4,5]. In the latter case, the main causes are chronic cough, obesity, pregnancy, and work with physical effort [1,2,6]. This explain the need in the treatment, of optimization by eradicating the cause if it is identified, then strengthening the abdominal wall with sutures or mesh [1,2]. However, there is no consensus applicable to all patients and contexts in terms of surgical technique [1,2,4]. Our objective is to evaluate the surgical management of midline ventral hernias in Saint-Louis.

2. Methods

The methodology of this study is reported in line with the STROCSS guidelines for the reporting of cohort studies in surgery [7]. The study was registered in the Research Registry database (https://www.researchregistry.com/) with unique number: reviewregistry7675.

This was a retrospective cohort study over 36 months from January 1st, 2019 to December 31st 2021. We included all adult patients (over 15 years old) treated for midline ventral hernias in the general surgery department of Saint-Louis Hospital.

The studied parameters were: age, sex, risk factors (profession of force, obesity, chronic cough and pregnancy, chronic constipation),
duration of symptoms, type of hernia according to the classification of the European Hernia Society (EHS), clinical presentation (strangulated, incarcerated, uncomplicated), hernial ring size, surgical technique and results (length of hospital stay, recurrence, chronic pain).

We used the EHS classification as follows in Table 1 [8].

The outcomes were assessed during postoperative consultations up to 3 months after surgery. If necessary, the exploitation of patient files and telephone contact made it possible to evaluate the long-term results concerning chronic pain and recurrence. Patient records lacking sufficient data will be excluded. Qualitative variables were described in number with proportion, quantitative variables as mean with extremes and standard deviation. All statistical analyzes were performed using Microsoft Excel software.

3. Results

We obtained 65 patients operated for midline ventral hernias divided into 29 men (34.7%) and 36 women (56.3%), with a sex ratio of 0.77. The average age was 40.5 years ± 16.4 with extremes of 16 and 80 years. There were 12.5% (n = 8) of obesity, 7.8% (n = 5) of work with physical effort and 55.5% of women (n = 20) had at least one pregnancy. There was a chronic cough in 4.6% (n = 3) of cases and chronic constipation in 7.6% (n = 5) of cases. The average duration of symptoms was 4.4 ± 7 years. 2. The characteristics of the different patients are detailed in Table 2.

According to the clinical presentation, 85.6% (n = 55) were uncomplicated, 10.9% (n = 7) were strangulated and 3.1% (n = 2) incarcerated. The distribution according to the EHS classification showed that type M3 (umbilical) was more frequent in 67.2% (n = 43), followed by type M2 (epigastric) in 25% (n = 16) and M4 (infra-umbilical) in 1.6% (n = 1) of cases. In 6.3% (n = 4) of cases, there were multiple hernias and 10.8% (n = 7) cases of recurrent hernia. The distribution of types of hernias in patients is detailed in Fig. 1. Small hernial ring (<2 cm) were predominant (50%, n = 33), followed by medium (2-4 cm) in 31.3% (n = 20) and large ones (>4 cm) in 18.7% (n = 12).

The most used surgical technique was pure tissue repair in 93.8% (n = 61) followed by mesh repair in 6.1% (n = 4). Mesh repair was done only for recurrent hernia. The average length of hospital stay was 1.5 ± 2.4 days. The mean duration of follow-up was 18.2 ± 11.9 months. We had 6.1% (n = 4) rate of recurrence and the same rate of chronic pain (6.1%, n = 4).

4. Discussion

Abdominal wall hernias are common and it is estimated that around 20 million of hernia repairs are performed each year worldwide [1,9]. Besides, 30% of these surgeries are done for ventral midline hernias one [1]. This condition affects women more frequently as in our study where 56.3% of operated patients are women. This could be explained by the fact that two important risk factors (obesity, and pregnancy) are more frequent in women [10]. In terms of risk factors, we found in our series obesity, work related physical effort and pregnancies. These same factors are found in the other countries but with different proportions [10, 11].

The average age of our patients was 40.5 years, relatively young compared to developed countries studies with mainly advanced age attaining 88 years in some series [10,11].

In our study, we noted a significant proportion of complicated hernias (14%). This can be explained by the late consultation of patients at a stage of complication. The average time to consultation in Africa, is estimated between 3.4 and 4.3 years after the onset of symptoms [12, 13]. This was the case in our study where the average consultation time was 4.4 years. In addition, there is a real gap in the supply of surgical treatment in sub-Saharan Africa where it is estimated that only 25 hernia repairs are performed out of a need for 175 repairs for a population of 100,000 inhabitants [14]. This causes a high prevalence of emergency surgery associated with higher risk of complications.

Despite the widespread use of mesh in the treatment, primary suture has still its indications when the hernial ring is less than 1 cm without risk factors [2]. In sub-Saharan Africa, with the low economic level and the relative unavailability of mesh, pure tissue repairs are still used in abdominal wall surgery regardless the size [15,16].

The average length of hospital stay was 1.5 days in our study. This duration could be shortened with ambulatory surgery and technical progress in terms of anesthesia [17]. The proportion of recurrent hernias in our series was 10.8%. In addition, in the follow-up we had a

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Table 1

| EHS classification of midline ventral hernias [8]. |
|-----------------------------------------------|
| **Type** | **Description**                  |
| M1       | Sub xiphoidal (from the xiphoid till 3 cm caudally) |
| M2       | Epigastric (from 3 cm below the xiphoid till 3 cm above the umbilicus) |
| M3       | Umbilical (from 3 cm above till 3 cm below the umbilicus) |
| M4       | Infra umbilical (from 3 cm below the umbilicus till 3 cm above the pubis) |
| M5       | Supra pubic (from pubic bone till 3 cm cranially) |

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Table 2

| Characteristics of the patients with ventral midlines hernias (n = 65). |
|----------------------------------------------------------|
| **Patient characteristic** | **Number (%) Mean ± sd** |
| Age (years) | 40.5 ± 16.4 |
| Gender | | |
| Female | 36 (56.3) |
| Male | 29 (34.7) |
| Risk factors | | |
| Obesity | 8 (12.5) |
| Work with physical effort | 5 (7.8) |
| More than one pregnancy | 20 (55.5) |
| Chronic cough | 3 (4.6) |
| Constipation | 5 (7.6) |
| Duration of symptoms (years) | 4.4 ± 7.2 |
| Hernial ring size | | |
| Small <2 cm | 33 (50) |
| Medium 2-4 cm | 20 (31.3) |
| Large >4 cm | 12 (18.7) |
| Surgical technique | | |
| Primary suture | 93.8 (n = 61) |
| Mesh | 6.1 (n = 4) |
| Results | | |
| Length of hospital stay (days) | 1.5 ± 2.4 |
| Duration of follow-up (months) | 18.2 ± 11.9 |
| Death | 0 (0) |
| Recurrence | 4 (6.1) |
| Chronic pain | 4 (6.1) |

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Fig. 1. Distribution of types of hernias in patients (n = 65).
recurrence rate of 6.1%. This can be explained by the high proportion of use of pure tissue repair [1].

4.1. Limitations

The small size of our cohort \((n = 65)\) is the main limitation of our study. In addition, some post-operative outcomes were not assessed due to the retrospective nature of the study (infection, hematoma, seroma). Besides, this was a single center study and the results may not be comparable to other contexts.

5. Conclusion

Ventral midline hernias are common with several risk factors varying between individuals and populations. There is a need to individualize or contextualize the guidelines. In our context where meshes are not always available, pure tissue repairs keep their place in the treatment. Further studies with larger cohorts with a prospective design would allow specifying more the epidemiology and prognosis of ventral hernias in our context.

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Registration of research studies

We have registered our study with unique identifying number: researchregistry 7675.

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Author contribution

Study concept or design, data collection, data analysis or interpretation, writing the paper: A Ndong, J N Tendeng, G T Soh, A C Diallo, study concept or design, data collection ML Diao, N Sarr, MT Ba, I Diarra, Correction: PM Ma Nyemb, I Konaté.

Ethical approval

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Registration of research studies

Researchregistry7675.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Guarantor

A Ndong.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jamsu.2022.103801.

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