Comparison of intraperitoneal ventralex ST patch versus onlay mesh repair in small and medium primary umbilical hernia

Birol Agca, Yalin Iscan

Abstract:

PURPOSE: Although the size of the hernia plays an active role in the use of the mesh, the counter-view is that the use of the mesh should be preferred regardless of the size of the hernia. In our study, the clinical results of two different mesh types applied under elective conditions to small-and medium-sized umbilical hernia cases were examined.

PATIENTS AND METHODS: Between January 2015 and May 2018, intraperitoneal Ventralex ST repair and onlay prolene mesh repair were performed in 88 primary small and medium umbilical hernia cases. Demographic data, duration of surgery, length of hospital stay postoperative complications, and recurrence were recorded.

RESULTS: Eighty-eight patients were analyzed including 54 males and 34 females – a mean age of 50.3 years. The duration of the surgery in Ventralex ST group was 35.9 ± 4.1 min. (P < 0.05). Comparing to the visual analog scale (VAS) values of the 1st day, the decrease in VAS values in both groups on the 7th day was statistically significant (P < 0.05). The rates of early and late postoperative complications, such as seroma, hematoma, wound infection, and recurrence, were similar between the procedures. The mean follow-up period was 23 months (with range 7–46 months), and no recurrence was observed in both groups.

CONCLUSION: We think that the Ventralex ST mesh performed with open surgical technique under elective conditions for primitive umbilical hernias can be safely used because of its quick applicability and low rates of complication and recurrence.

Keywords: Mesh, open repair, umbilical hernia, ventralex ST

Introduction

Umbilical hernias are responsible for 6%–14% of all abdominal wall defects.[1] They are often symptomatic and also increase the likelihood of incarceration due to the adhesion of omentum to the hernial sac. For this reason, most umbilical hernias require surgical repair.[2] Various techniques have been described for surgical repair. Open, laparoscopic, and robotic techniques all have a role in the umbilical hernia repair and their use should be determined according to clinical necessity.[3] There is still no consensus on “what is the best surgical technique?” for repairing umbilical hernia.[4–6] Various surgical techniques have been described. The first of these is the technique of approximating the fasciae with intermittent sutures. In the second and most commonly used Mayo technique, the fascia is folded in two layers in a double-breasted manner, and layers are closed with a 2–3 cm overlap.[7] The recurrence rates of 25%–55% have been reported for both

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Patients and methods

Between January 2015 and May 2018, 88 50 consecutive patients underwent elective repair of umbilical hernia diagnosed in our institution. They were randomized and assigned to two groups: The VT ST (n = 43) and onlay repair with mesh (n = 45). Those patients with strangulated umbilical hernia, recurrent umbilical hernia, and omphalitis or periumbilical fistulas were excluded. Patients below the age of 18 years, those whose hernia diameter was larger than 4 cm, and which did not require emergency intervention. Two different meshes were used in hernioplasty. The results of both methods were retrospectively examined together with a literature review.

Statistical analysis

The Statistical Package for Social Science, version 22.0 (SPSS, Chicago, IL, USA) program was used for statistical analysis while assessing the results obtained in this study. To assess the study data, suitability of the parameters for normal distribution were evaluated by the Shapiro–Wilk test. While evaluating the study data, in addition to the descriptive statistical methods (mean, standard deviation, and frequency), the Student’s t-test was used for the two-group comparisons of the normally distributed quantitative parameters and the Mann–Whitney U test was used for the two-group comparisons of the quantitative parameters without normal distribution. The Wilcoxon Signed-Ranks test was used for intra-group comparison of nonnormally distributed variables. Chi-square test and Yates’s correction for continuity were used to compare qualitative data. The significance was evaluated at the P < 0.05 level.
The duration of the surgery in the Ventralex ST group was 35.9 ± 4.1 (range 20–45) min; the duration of the surgery in the onlay mesh repair group was 42.7 ± 5.8 (range 20–60) min and it is statistically significant ($P<0.05$).

There are no significant differences in hernia size, length of hospital stay, analgesic intake, and return to work. The VAS values of the 1st and 7th day of the onlay mesh repair group were 42.7 ± 5.8 (range 20–60) min and it is statistically significant ($P<0.05$).

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The follow-up period was 23 months (with range 7–46 months), and no recurrence was observed in both groups.

**Discussion**

It is believed that more than 90% of umbilical hernia cases in adults are acquired diseases. Therefore, factors that contribute to the increase of the abdominal pressure (pregnancy, ascites and etc.), contractions of the abdominal muscles and deterioration of the connective tissue prepare the ground for this condition. Due to the risk of incarceration and strangulation in adults with umbilical hernias, the elective surgical repair is recommended. There are two main repair options: suture and braid. Simple primary suturing can be used for small defects, especially the diameters of which are <2–3 cm. High rates of recurrence (25%–55%) have been reported in cases, for which nonmesh repair methods (from using simple suturing to Mayo technique) were applied. Although these techniques have been popular for years and have been used by some surgeons today, they underwent some modifications.

In a prospective, randomized study conducted by Arroyo et al., the recurrence rate was seen as 11% in patients who underwent primary suturing whereas in the polypropylene mesh repair group, the recurrence rate was reported as 1%, and it was concluded that meshes should be used especially in the repairs of the umbilical hernias.
A new operation was reported by Wang and Berney, in which 100 patients with umbilical hernias were operated and 116 patients operated on by Berrevoet. They reported that good recurrence rates have led to the direction toward the repairs using a mesh rather than repairs with simple suture techniques. On the other hand, Aslani and Brown argue that although there is a consensus that there is a need for tension-free repairing, regardless of the used method, the issue of whether or not to use a mesh in the repair of umbilical hernias is still controversial. We think that this debate has arisen due to the defect size in umbilical hernias. In the current literature, although there is no complete objective data between umbilical hernia size and treatment to be applied, a mesh repair is recommended, especially for the high-risk and obese patients with defects, the diameter of which is <3 cm. The main question here is to question the approach that should be applied for the defects with the diameters <3 cm. The common view at this point is that repairs should be done with meshes due to high risk of incarceration and strangulation in these types of hernias. No recurrence was observed during the mean follow-up period of 37.9 months in the study conducted by Wang and Berney on 100 patients with a ventral/umbilical hernia (diameter is <3 cm), to whom the Ventralex mesh repair was applied. In addition to that, there were no recurrences in the studies of 88 cases conducted by Martin et al. The lack of recurrence during the 17-month follow-up in our study suggests that it is important to recognize the advantage of mesh repair and to contribute to the literature in this regard. In our study, the diameter of the defect was <4 cm; however, there was no statistically significant difference between the groups regarding the hernia size. In the cases of the onlay mesh repair group, the 6-cm in diameter oval prolene mesh was used and in the cases of the Ventralex group, the medium-sized mesh of 6.4 cm was used. In our study, the diameter of the defect was measured during the operation, and the patch size was chosen so that it could be applied with the safe limit. The purpose of this procedure is to place the defect at least 2–3 cm in length without any tension in the defect area. It is emphasized in the literature that the mesh to be placed should be placed in such way, so as to surpass at least ≥2.5 cm from the defected edges.

According to the long-term results of the study conducted by Tollens et al., the recurrence rate during the 55-month follow-up was reported as 8.9% for 135 ventral hernia cases, for which Ventralex mesh had been applied and the high rate of recurrence was attributed to the technical application, the necessity for alternative fixation techniques, and to the differences in the fixation of the polypropylene side of the mesh to the fascia. When this study was examined, it was noticed that the medium-sized (6.4 cm × 6.4 cm) mesh was used in all patients. In our opinion, another reason for the high recurrence rate was the use of the same size of mesh for all cases regardless of the defect size. On the other hand, Berrevoet et al. operated 116 patients with an umbilical hernia (the size is <3 cm) using the open surgery technique and they reported the recurrences for 5 cases, to which intraperitoneal mesh was applied, and for 2 cases, to which retromuscular mesh was applied. When the onlay mesh repair group is compared with the Ventralex mesh repair group, the operative time, postoperative pain and analgesic requirement were significantly higher. The difference between the length of hospital stay and return to work was statistically insignificant. Porrero et al. used a composite patch (Ventrelaxor Ventralex ST®) to perform umbilical hernia repair in 1538 patients. Only 2.1% of the patients developed complications during follow-up and 1.8% of the patients required a new operation. They reported that good recurrence of long-term results after umbilical hernia repair with composite prosthesis was low. Martin et al. reported

### Table 2: Data of the groups

|                          | Onlay repair with mesh | Ventralex ST | P       |
|--------------------------|------------------------|-------------|---------|
| Operating time (min)     | 42.7±5.8 (20-60)       | 35.9±4.1 (20-45) | 0.000<sup>a</sup> |
| Hernia size (cm)         | 1-2                    | 16          | 18      | 0.698<sup>a</sup> |
|                          | 2-4                    | 29          | 25      |               |
| Length of hospital stay  | 2.3±1.1 (2-5)          | 2±1.3 (2-4) | 0.449<sup>a</sup> |
| (days)                   |                        |             |         |               |
| VAS                      |                        |             |         |               |
| First day                | 7.2±0.6 (7-10)         | 5.9±0.7 (5-10) | 0.000<sup>b</sup> |
| Seventh day              | 6.1±1.1 (6-8)          | 3.1±1 (3-8) | 0.000<sup>c</sup> |
| Differences              | 1.1±1.2                | 2.8±1.2     | 0.000<sup>d</sup> |
| 1<sup>st</sup>-7<sup>th</sup> day P<sup>c</sup> | 8.2±1.9 (8-12) | 5.2±1.8 (5-8) | 0.356<sup>e</sup> |
| Analgesic intake (tablet) | 9.2±1.2 (7-15)         | 9.1±1.4 (7-15) | 0.449<sup>e</sup> |
| Return to work (days)    | 9.2±1.2 (7-15)         | 9.1±1.4 (7-15) | 0.449<sup>e</sup> |

<sup>a</sup>Student t-Test, <sup>b</sup>Continuity (Yates) Correction, <sup>c</sup>Mann–Whitney U-Test, <sup>d</sup>Wilcoxon Sign Test, *P<0.05. Data given as mean±SD (range). There are no significant differences in hernia size, length of hospital stay, analgesic intake and return to work. VAS: Visual Analogue Pain Scale, SD: Standard deviation.

![Figure 2: Variation in visual analog pain scale values for 1<sup>st</sup> and 7<sup>th</sup> day](image-url)
that the composite patch (Ventralex) was effective for preventing hernia recurrence in umbilical, epigastric and small ventral hernia repairs and with a low complication rate.

The study of the MORPHEUS study group comparing two different meshes applied in small epigastric, and umbilical hernia is a randomized trial with the largest series in the literature. In this study, prolene mesh and proceed mesh with the diameter of 6.4 cm have been used, and it has been reported that proceed mesh was applied more quickly and the operative time was shorter, whereas there was no significant change in the length of hospital stay. The results of this study also support us. The results of this study also support us.

The postoperative pain score of the onlay mesh repair group was statistically higher on both the 1st and 7th days compared to that of the ventralex group. Polat et al. have attributed the cause of this to the excessive dissection of the soft tissue and to the sutures made to fixate the mesh in onlay mesh repair. The same results were also obtained in our study. Ventralex mesh causes less dissection, the requirement of suturing is suggestive of being effective in pain. Considering the complications after umbilical hernia repair in the literature, we encounter different results as in recurrences. Patients with recurrence of hernia can be treated with laparoscopic repair. During the operation, the old patch can be removed and a new patch with appropriate size can be repaired.

The complication rates range between 2% and 11.8%, the most common complications are wound infections, seroma, and hematoma. In our study, superficial wound infection was observed in 2 cases and seroma was observed in two cases and these complications were taken under control with conservative follow-up and antibiotics.

**Conclusion**

This study emphasizes that Ventralex ST mesh, which can be rapidly and easily applied in umbilical, paraumbilical and trocar-site herniae when performed using the correct technique with the tension-free open surgical method, can be safely used thanks to its low complication and recurrence rates. Moreover, it has been concluded that the comparison of this study with long-term randomized controlled trials and different meshes will contribute more to both efficacy and the literature.

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**Conflicts of interest**

There are no conflicts of interest.

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