

CLINICAL STUDY

The experience with Mini- or Less-open Sublay operation

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INTRODUCTION: The MILOS concept binds the benefit of the sublay mesh augmentation in the way of functional and morphological reconstruction of the abdominal wall without the need to use penetrating fixation elements and with the benefits of minimal surgical access. The transhernial approach is carried out at low cost with standard laparoscopic instruments.

MATERIAL AND METHOD: The authors carried out retrospective analysis of the years 2018–2022. Included are all patients operated by the MILOS concept. The patients have suffered of the midline hernias type M according to European Hernia society, eventually combined with rectus diastasis. Authors present their own experience of this new treatment method. The evaluation of complications was performed.

RESULT: In the observed time we have operated 61 patients. In the years 2018 and 2019 together 35 patients were treated, none in the year of 2020. Because of the COVID plaque was the 2020 "Year of restrictions". In the year 2021 and first quarter of 2022 we have already cured 26 patients. In this time 2 major complications and 3 minor complications were observed.

Since the 2nd quarter of 2022 we have already upgraded to eMILOS.

CONCLUSION: Our experience with this new hernia repair shows that this treatment possibility is feasible for general use also in small district departments without the need to use of robotic technology. This skill will be necessary for future F.E.B.S AWS (Tab. 2, Fig. 3, Ref. 15). Text in PDF www.elis.sk

KEY WORDS: incisional hernia, epigastric hernia, MILOS, Mini- or Less-open sublay operation, rectus diastasis, sublay mesh, uniport, abdominal wall surgery.

Introduction

Surgery these days is flooded with many new techniques and approaches. The situation in the field of hernia surgery is not different, there are also plenty of changes, e.g., change in the mesh position or mesh quality. (1, 10, 11). Most of new procedures consist of robotic components separation. Few years ago has Reinpold with his breakthrough improved extraperitoneal approach (12). He has affiliated the Rives Stoppa procedure with a single incision surgery. That means the sublay mesh positioning does not result in the huge skin injury. The Reinpold's surgical intervention has been named MILOS – Mini or less open sublay operation.

In 1993 the era of laparoscopic hernia surgery began with the work of LeBlanc (14). Intraperitoneally he bridged the defect of abdominal wall with a mesh without reconstruction of the abdominal wall. The benefits of this method are low morbidity, no anatomical but functional reconstruction without the defect closure. Lower invasiveness reduces the postoperative pain and decreases the operating time as well the recurrence rate at the time were comparable to the other conventional approaches. Because of these

benefits IPOM became a gold standard in the hernia surgery with reported outcomes equivalent to those of open hernia repair. Rising amount of performed procedures unfortunately exponentially increases the volume of adverse events like seroma, bulging, bowel adhesion with an eventual obstruction, infection, fistula, chronic pain, mesh migration or recurrence. This contributed to the development of IPOM plus. The upgrade consists only in closure of the fascial defect leading to the reduced rate of seroma formation and some other adverse hernia-site events (13). Many new mesh types and fixation possibilities were developed over the time but the reservations about the complications due to a foreign body or chronic pain as the result of the mesh fixation are still remaining. For the good outcome it is necessary to restore the anatomy of abdominal wall to get the optimal function. Schroeder had tried to eliminate these disadvantages through the laparoscopic transperitoneal sub lay mesh repair (12). His effort was good enough just for small hernias placed in the linea alba. The setup is the same as in the case of IPOM, just the dissection takes place in the retromuscular space. There are few handicaps to this method. Long operation time because of laborious dissection was incomparably long to IPOM. Dissection difficulties occurred due to the rigidity of standard laparoscopic instruments. Renaissance and consecutive spreading of transperitoneal dissection with components separation and the sublay mesh augmentation was just recently brought with onset of the robotic surgery. Huge advantages of robotic surgery are articulated instruments and 3D view without need to carry specs.

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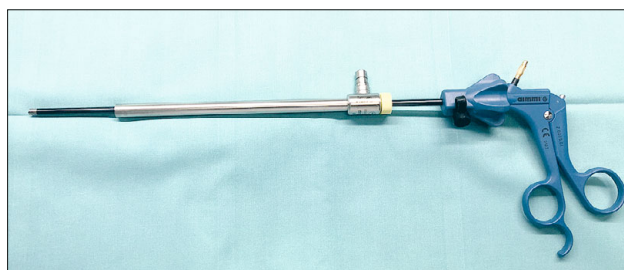


Fig. 1. Endotorch. Forceps inside the endotorch.

Reinhold developed a new alternative for midline hernias (9) – the endoscopically assisted minimally or less open sublay repair. This technique merges all 5 main criteria of abdominal wall reconstruction: functional and morphological reconstruction, extra peritoneal mesh augmentation, abandonment of the penetrating fixation elements, minimal surgical access trauma of the abdominal wall and minimized intra peritoneal dissection that jeopardizes adherence of intestinal structures (3). Last but not least benefit is a low cost.

Method

The operation takes place in the supine position. Procedure begins with a small skin incision through the hernia. Hernia sac is released and place with diameter ca 8 cm is made by standard instruments. After is placed Endotorch (Fig. 1) and remaining part runs like gasless laparoscopy with direct view. The next step is to create preperitoneal space and after pierce through the posterior rectus sheet. By M1 and M2 hernias is ‘fatty triangle’ the proximal landmark (2). Mesh is placed in this ‘sublay’ space without suture of posterior sheet. We use tri-elastic polivinylidene fluoride mesh – PVDF. Unexpected peritoneal defects are consistently closed with absorbable suture to prevent contact between mesh and intestines. If there are additional hernia defects they are also to be closed. In case of rectus diastasis, it is sutured trough-and-through with the barbed suture. The hernia ring is closed above the mesh applying low tension; if this is not possible the hernia border is fixated to the mesh. For both alternatives we use absorbable suture. We do not use any drain possibilities. The umbilicus is either reconstructed or we create a new one – neoumbilicus.

Patients

In years 2018 and 2019 we have operated 35 patients by the MILOS concept. Year 2020 was a year of restrictions, and our elective surgery was decimated to zero. In 2021 between two COVID waves 19 patients were treated and in the first quarter of 2022 already 7 patients. 8 of these patients (13.1 %) have history

Tab. 1. EHS classification (Muysoms et al, 2009).

| EHS classification | W 1 | W 2 | W 3 |
|---|-----|------|------|
| Incisional hernia width in cm | < 4 | 4–10 | > 10 |
| Primary abdominal wall hernia width in cm | < 2 | 2–4 | > 4 |

of previous IPOM operation and it was necessary to remove the mesh. The patients’ pool consists of 22 female patients (36.1 %) and 39 males (63.9%). For indication we use the EHS classification (7). Distribution was: W1 – 9 patients (14.8 %), W2 – 28 patients (45.9 %), and W3 – 24 patients (39.3 %). In the year of 2019, we operated 3 patients with rectus diastasis (4.9 %) accompanied by the above mentioned W1 primary hernia. After COVID era 7 patients (11.5 %) were already operated with the same problem. Together there are 10 patients (16.4 %) suffering from rectus diastasis. CAVE – in classification between primary hernia of abdominal wall and incisional hernia exists size factor difference in the same label (Tab. 1). ASA distribution in our material: ASA I 8 probands (13.1 %), ASA II 42 (68.9 %), ASA III 11 (18 %). BMI varies from 19 to 48, with an average value of 27.75. The patients’ age ranges from 28 to 77 years, the average age being 59 years. The incision length ranges from 3 to 10 cm. In the year of 2018 from 5 to 8 cm with average length of 6.6 cm and already in the year of 2019 according to the learning curve we performed the majority through a 4 cm incision, the average being 5.5 cm and in the next two years we decrease the average to 5.3 cm. The time of the operations in the first few cases exceeded 4 hours. With the ascend of learning curve we did some changes in the procedure. We introduced the rigid arm to elevate and hold of the abdominal wall instead of using an assistant, we stopped changing place between the surgeon and the first assistant and finally we do not more fixate the mesh



Fig. 2. Hematoma after radical weaning. Arrow shows neoumbilicus ripped out.



Fig. 3. Iatrogenic diastasis. The same patient from Figures 2, 6-month post op.

Tab. 2. Our results.

| | |
|--------------------|--|
| Patients total | 61 |
| Male | 39 |
| Female | 22 |
| Age | 59.3 y (28–77 y) |
| BMI | 27.75 kg/m ² (19–48 kg/m ²) |
| Incisional hernia | 47 |
| Primary hernia | 14 |
| Rectus diastasis | 10 |
| Operation time | 115 min (90–250 min) |
| Incision length | 5.3 cm (10–3 cm) |
| Previous IPOM | 8 |
| SSI | 3 |
| Major complication | 2 (1 recurrence) |

neither with stitches nor with glue. The average operations time for the entire pool is 114 minutes. The patients were followed up to 1 year after the surgery and we observed 2 major complications (3.3 %). 1 patient has developed hernia recurrence (1.6 %). New hernia arose suprapubically. This patient underwent open sublay repair with second mesh bridging the defect. In the next patient a radical wake up resulted in clonic seizure with a rupture of neoumbilicus and diffuse hematoma (Fig. 2). In the latter follow up the patient presented with huge rectus diastasis M2/W3 (Reinbold et al, 2019) without hernia recurrence (Fig. 3). The patient does not wish any other intervention. SSI were observed in 3 cases (4.9 %). All wound infections were treated as outpatients with topical disinfection or oral antibiotic and all healed ad integrum. We do not have observed seroma or chronic pain in our study.

Since the second quarter of 2022 we have upgraded to enhanced view MILOS (eMILOS) for hernias where transhernial access is required. For simple W1 and W2 hernias in combination with rectus diastasis we have started with enhanced TEP (eTEP).

Discussion

The above presented group of patients is relatively small, and we have 3.3 % of major complications in our trial – what is comparable with the published data (Köckerling et al, 2016; Reinbold 2019; Tandon et al, 2016). The reason of our hernia recurrence was probably implantation of ‘short mesh’, because at the beginning we did not dissect symphysis and space of Retzius as routine for all the patients with the history of previous infraumbilical incision. Our policy used to be that the mesh must overlap the defect by at least 5 cm (5). This was enhanced during 2018 and so far we have not observed another case of recurrence. The second case of major complication was caused by a “third party”. The prevention subsists in slowly weaning from narcosis as the “time saving anaesthesia” could damage a well conducted operation.

The disadvantages of the Reinbold’s procedure are that it is time demanding with a relatively long learning curve. Yet, the MILOS concept is suitable for patients suffering from incisional hernia, primary epigastric or umbilical mesh requiring hernia with or without rectus diastasis. BMI does not play an important role. Comparing to all other hernia repairs the MILOS does not require any expensive one-way instruments and is an affordable procedure.

Conclusion

In accordance with up to date literature (4, 8, 12) new extraperitoneal minimally invasive techniques MILOS or enhanced view techniques like mini open sublay eMILOS or totally extraperitoneal eTEP should be used for primary and also for incisional midline abdominal wall hernias. But there are still lateral abdominal wall hernias or combined defects requiring another procedure.

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