

Umbilical hernia: factors indicative of recurrence

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Key words: umbilical hernia; recurrence rate; mesh repair; suture repair.

Summary. Umbilical hernia has gained little attention from surgeons in comparison with other types of abdominal wall hernias (inguinal, postoperative); however, the primary suture for umbilical hernia is associated with a recurrence rate of 19–54%.

The aim of this study was to analyze the results of the umbilical hernia repair and to assess the independent risk factors influencing umbilical hernia recurrence.

Materials and methods. A retrospective analysis of patients who underwent surgery for umbilical hernia in the Hospital of Kaunas University of Medicine in 2001–2006 was performed. Age, sex, hospital stay, hernia size, patient's body mass index, and postoperative complications were analyzed. Postoperative evaluation included pain and discomfort in the abdomen and hernia recurrence rate. The questionnaire, which involved all these previously mentioned topics, was sent to all patients by mail. Hernia recurrence was diagnosed during the patients' visit to a surgeon. Two surgical methods were used to repair umbilical hernia: open suture repair technique (keel technique) and open mesh repair technique (onlay technique). Every operation was chosen individually by a surgeon.

Results. Ninety-seven patients (31 males and 66 females) with umbilical hernia were examined. The mean age of the patients was 57.1 ± 15.4 years, hernia anamnesis – 7.6 ± 8.6 years, hospital stay – 5.38 ± 3.8 days. Ninety-two patients (94.8%) were operated on using open suture repair technique and 5 (5.2%) patients – open mesh repair technique. Only 7% of patients whose BMI was $>30 \text{ kg/m}^2$ and hernia size $>2 \text{ cm}$ and 4.3% of patients whose BMI was $<30 \text{ kg/m}^2$ and hernia size $<2 \text{ cm}$ were operated on using onlay technique ($P > 0.05$). The rate of postoperative complications was 5.2%. Sixty-seven patients (69%) answered the questionnaire. The complete patient's recovery time after surgery was 2.4 ± 3.4 months. Fourteen patients (20.9%) complained of pain or discomfort in the abdomen, and 7 patients (10.4%) had ligature fistula after the surgery. Forty-five patients (67.2%) did not have any complaints after surgery. The recurrence rate after umbilical hernia repair was 8.9%. The recurrence rate was higher when hernia size was $>2 \text{ cm}$ (9% for $<2 \text{ cm}$ vs 10.5% for $>2 \text{ cm}$) and patient's BMI was $>30 \text{ kg/m}^2$ (8.6% for <30 vs 10.7% for >30). There were 5 recurrence cases after open suture repair and one case after onlay technique. Fifty-six patients (83.6%) assessed their general condition after surgery as good, 9 patients (13.4%) as satisfactory, and only 2 patients (3%) as poor.

Conclusions. We did not find any significant independent risk factors for umbilical hernia recurrence. However, based on reviewed literature, higher patient's body mass index and hernia size of $>2 \text{ cm}$ could be the risk factors for umbilical hernia recurrence.

Introduction

Umbilical hernia has gained little attention from surgeons in comparison with other types of abdominal wall hernias (inguinal, postoperative). The primary suture for umbilical hernia resulted in recurrence rates of 19–54% (1–3). The use of different kind of meshes for hernia repair can reduce this rate. On the other hand, there are some risk factors, which can increase the risk of the umbilical hernia recurrence.

The aim of this study was to analyze the results of the umbilical hernia repair and to assess the independent risk factors, influencing umbilical hernia recurrence.

Materials and methods

A retrospective analysis of patients who underwent for surgery for umbilical hernia in the Hospital of Kaunas University of Medicine in 2001–2006 was per-

formed. Age, sex, hospital stay, hernia size, patient's body mass index (BMI), and postoperative complications were analyzed. Postoperative evaluation included pain and discomfort in the abdomen and hernia recurrence rate. The questionnaire, which involved all these previously mentioned topics, was sent to all patients by mail. Hernia recurrence was diagnosed during the patients' visit to a surgeon. The summary patients' median follow-up period was 4.5 years after the operation.

Two surgical methods were used to repair umbilical hernia: open suture repair technique (keel technique) and open mesh repair technique (onlay technique). Operation method was chosen individually by a surgeon.

Statistical evaluation was conducted using descriptive analysis: the unpaired Student *t* test was used to compare parametric values between two study groups, Mann-Whitney *U* test – to compare the unpaired non-parametric values between two study groups, and χ^2 test – to compare nonparametric values between these groups. Logistic regression analysis was used to estimate the independent risk factors for hernia recurrence. Data were expressed as mean and standard deviation. $P < 0.05$ was considered statistically significant.

Results

Ninety-seven patients (31 males and 66 females) with umbilical hernia were examined. The mean age of patients was 57.1 ± 15.4 years, hernia anamnesis – 7.6 ± 8.6 years, hospital stay – 5.38 ± 3.8 days. Ninety-two patients (94.8%) were operated on using open suture (keel) repair technique and 5 (5.2%) patients

using open mesh (onlay) repair technique. Only 7% of patients whose BMI was $>30 \text{ kg/m}^2$ and hernia size $>2 \text{ cm}$ and 4.3% of patients whose BMI was $<30 \text{ kg/m}^2$ and hernia size $<2 \text{ cm}$ were operated on using onlay technique ($P > 0.05$) (Fig. 1). Postoperative complications were reported in 5.2% of patients. Two patients (2.1%) had wound seroma, one patient (1%) had wound hematoma, and other two patients (2.1%) – wound suppuration.

Sixty-seven patients (69%) answered the questionnaire and were examined for hernia recurrence. The complete patient's recovery time after the surgery was 2.4 ± 3.4 months. Fourteen patients (20.9%) complained of pain or discomfort in the abdomen region, and 7 patients (10.4%) had ligature fistula after surgery. Forty-five patients (67.2%) did not have any complaints after surgery.

The recurrence rate after umbilical hernia repair was 8.9% (6 patients) in our study. The recurrence rate was higher when hernia size was $>2 \text{ cm}$ and patient's BMI was $>30 \text{ kg/m}^2$, but this difference was not significant (Figs. 2 and 3). There were 5 recurrence cases after open suture repair and one case after open mesh repair in our study.

Fifty-six patients (83.6%) assessed their general condition after surgery as good, 9 patients (13.4%) as satisfactory, and only 2 patients (3%) as poor.

Discussion

The umbilical hernia is a common surgical problem mainly encountered in the 5th and 6th decades of life (1–3). The umbilical defect is observed in more than

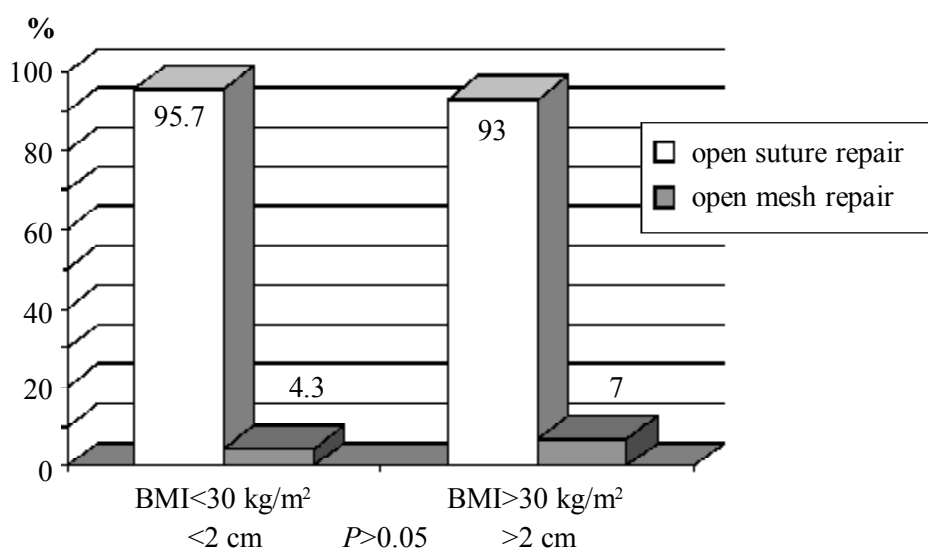


Fig. 1. The distribution of patients to different repair groups by hernia size and patients' body mass index

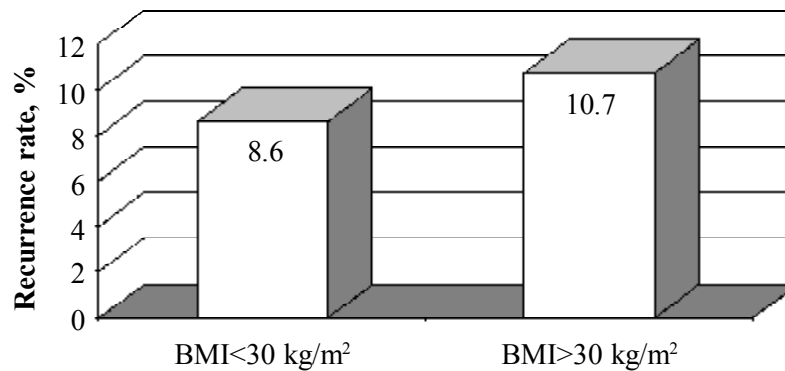


Fig. 2. The dependence of recurrence rate on patients' body mass index (BMI)

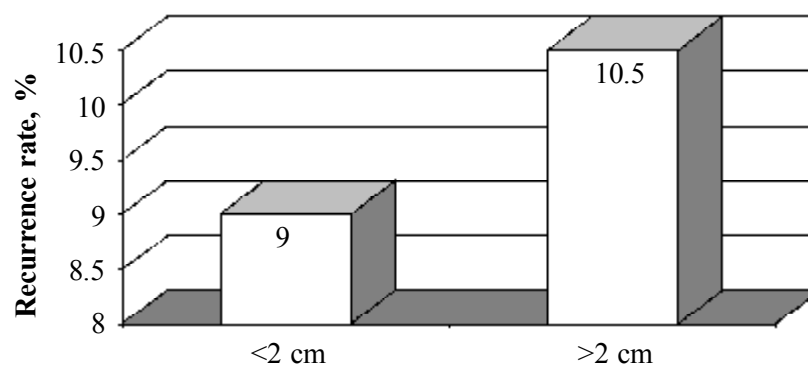


Fig. 3. The dependence of recurrence rate on hernia size

90% of elderly patients. It is seen mainly in obese patients, especially in women, in patients with liver cirrhosis (1, 4, 5). In our retrospective study, the mean age of the patients was 57.1 years, and 68% of all patients with umbilical hernia were women.

Many surgical techniques of umbilical hernia repair have been described. The first operative techniques included simple suture herniorrhaphy, Mayo or keel repair techniques. The suture repair techniques increased the recurrence rate up to 19–54% (3, 6–8). The use of prosthetic materials reduces the recurrence rate to 15–20% (6). Arroyo et al. in their retrospective study showed that using meshes for umbilical hernia repair, the recurrence rate could be reduced to 0.95% (2). In our retrospective study, the recurrence rate was 8.9% in both surgery groups (open suture repair and open mesh repair), and such recurrence rate is rather low. We did not analyze and compare recurrence cases in different surgery groups, because there were only 5 cases operated on using prosthetic mesh repair technique. If we had more patients undergoing open mesh repair surgery, we believe, that recurrence rate would have been significantly higher in this group of patients.

However, which risk factors could influence the umbilical hernia recurrence? Many retrospective stu-

dies have analyzed and assessed independent risk factors for umbilical hernia recurrence. However, there are only a few randomized clinical trials, which proved risk factors for recurrence. Arroyo et al. in their randomized prospective trial of 200 patients compared two different surgery techniques: suture and mesh repair techniques. The recurrence rate was significantly higher in the suture repair group than in mesh repair group (11% vs 1%, $P=0.0015$). Nevertheless, they did not find any significant relationship between recurrence rate and hernia size. The recurrence rates were similar for defects greater or smaller than 3 cm. The patient's BMI of >30 kg/m² was a risk factor for umbilical hernia recurrence (1). In our retrospective study, the recurrence rate was higher in patients whose hernia size was >2 cm and patient's BMI was >30 kg/m² comparing with hernia size of <2 cm and BMI of <30 kg/m² (10.5% vs 9% for defect size and 10.7% vs 8.6% for BMI). There were no significant differences comparing these values. Obese patients have a higher risk of recurrence when their BMI is >30 kg/m²; therefore, they need to be operated on using meshes – tension-free technique (5).

Halm et al. included 131 patients in their prospective study. They recurrence rate was 13%. No relation-

ship between wound infection, obesity and umbilical hernia recurrence was found (3).

Lau and Patil analyzed 102 cases of umbilical hernia in their retrospective study. They analyzed and compared different surgery techniques of umbilical hernia repair: Mayo repair, laparoscopic hernioplasty, suture herniorrhaphy, and mesh hernioplasty. The recurrence rate after surgery was 8.3%. All these patients underwent suture herniorrhaphy, and the recurrence rate of umbilical hernia increased when hernia size was >2 cm (7).

Postoperative complications such as wound seroma and hematoma occur in 5.6% to 42% of cases using the meshes for umbilical hernia repair (2, 9). It can be the reason of postoperative wound infection, suppuration, and hernia recurrence (2). A prospective randomized study by Abdel-Baki et al. did not show relationship between postoperative wound suppuration using meshes and recurrence rate. The patients were randomized in the prosthetic repair group and the suture repair group. Twenty-one patients were in each group. The emergency surgery for incarcerated umbilical hernia was performed. The higher risk of postoperative wound suppuration was in these cases, especially using mesh repair technique. However, the recurrence rate was 19% in the suture repair group, and no recurrences in the prosthetic repair group were reported ($P<0.05$). Using the mesh repair technique for emergency surgery of incarcerated umbilical hernia is a safe method and leads to superior results, in terms of recurrence, compared with conventional suture repair (10).

In our retrospective study, the rate of postoperative complications was 5.2%. These results are comparable with those reported by above-mentioned authors. The rate of postoperative wound seroma or wound suppuration could be significant higher if we had more surgery cases with prosthetic meshes.

Some authors recommend drainage using meshes for umbilical hernia repair. It prevents wound seroma or hematoma and wound suppuration (2, 6, 7). Some references suggest not leaving drains after surgery because it can be a potential risk factor for prosthetic infection (6, 11).

Not every umbilical hernia needs mesh repair. The

defect of <2 cm can be repaired successfully with suture herniorrhaphy or hernioplasty (3, 7).

The suture repair technique for umbilical hernia is under tissue tension. This surgery technique increases the risk of recurrence and even increases the intraabdominal pressure after surgery (9). An increase in intraabdominal pressure is associated with postoperative respiratory complications such as pneumonia and respiratory insufficiency. These complications can be one of the risk factors for hernia recurrence in long-term period. The mesh repair technique is a tension-free surgery, which reduces postoperative respiratory complications and recurrence rate (9).

Liver cirrhosis is a risk factor for umbilical hernia. Mesh repair surgery is preferred in patients with cirrhosis. The recurrence rate is up to 13.6% after umbilical hernia repair in cirrhotic patients (4).

The complete patient's recovery time after surgery is prolonged using open suture repair technique. Nearly 20% of patients undergoing suture repair surgery experience pain or discomfort in the abdomen region 12 months after surgery. Tension-free surgery technique allows the patients to recover faster to normal physical activity after operation (9). In our retrospective study, 83.6% of patients assessed their condition after surgery as good, 16.4% as satisfactory or poor. These results were in both open suture and open mesh repair technique groups.

A lower incidence of postoperative seromas, hematomas, infections, and other related complications is observed after laparoscopic umbilical hernia repair as compared with open repair surgery. The recurrence rate accounts for 8–10% in this patient group (12, 13). However, not all umbilical hernias need laparoscopic repair. Laparoscopic hernia repair is an expensive procedure, and umbilical hernias, which defect size is <2 cm, can be successfully repaired in open way (13).

Conclusions

We did not find any significant independent risk factors for umbilical hernia recurrence. However, based on reviewed literature, higher patient's body mass index and hernia size of >2 cm could be the risk factors for umbilical hernia recurrence.

Bambos išvarža: veiksniai, lemiantys išvaržos atkrytį

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Raktažodžiai: bambos išvarža, išvaržos atkrytis, „onlay“ metodika, „intraverzijos metodika“.

Santrauka. Bambos išvaržoms skiriama mažiau dėmesio palyginus su kitomis pilvo sienos išvaržomis (kirkšnies, pooperacinėmis), tačiau bambos išvaržų atkryčių dažnis – 19–54 proc. pacientų po paprastos išvaržos

susiuvimu operacijos.

Darbo tikslas. Išnagrinėti bambos išvaržos gydymo rezultatus ir rasti nepriklausomus rizikos veiksnius, sąlygojančius bambos išvaržos atkrytį.

Tyrimo medžiaga ir metodai. Atlikta retrospektyvioji 97 pacientų, operuotų 2001–2006 m. Kauno medicinos universiteto klinkose dėl bambos išvaržos, ligos istorijų analizė. Analizuota: pacientų amžius, lytis, hospitalizavimo trukmė, išvaržos dydis, kūno masės indeksas (KMI), pooperacinės komplikacijos. Po operacijos įvertintas skausmas, diskomfortas pilve bei atkryčių dažnis. Išvaržos atkrytis buvo vertinamas pacientui apsilankius pas chirurgą. Bambos išvaržų gydymui taikyti du chirurginiai metodai: intraverzijos siūlė ir išvaržos plastika nesirezorbuojančiu tinkleliu („onlay“ metodas). Kiekviena operacija buvo pasirenkama individualiai chirurgo.

Rezultatai. Bambos išvarža operuota 97 pacientams (31 vyrui, 66 moterims). Vidutinis pacientų amžius – $57,1 \pm 15,4$ metų, ligos trukmė – $7,6 \pm 8,6$ metų, hospitalizavimo trukmė – $5,38 \pm 3,8$ dienų. 92 (94,8 proc.) pacientai operuoti taikant intraverzijos siūlę ir 5 (5,2 proc.) pacientai – naudojant „onlay“ metodą. 7 proc. pacientų, kurių KMI buvo $>30 \text{ kg/m}^2$, išvaržos dydis buvo $>2 \text{ cm}$, 4,3 proc. pacientų, kurių KMI $<30 \text{ kg/m}^2$ ir išvaržos dydis buvo $<2 \text{ cm}$, operuoti naudojant tinklelį ($p>0,05$). Pooperacinių komplikacijų dažnis – iki 5,2 proc. Visiško pacientų pasveikimo po operacijos trukmė – $2,4 \pm 3,4$ mėnesio. 14 pacientų (20,9 proc.) skundėsi skausmu ar diskomfortu pilve, 7 pacientams (10,4 proc.) po operacijos susiformavo ligatūrinė fistulė. 45 pacientai (67,2 proc.) po operacijos neturėjo jokių skundų. Išvaržos atkryčių dažnis buvo 8,9 proc. Išvaržos atkryčių dažnis buvo didesnis tiems pacientams, kurių išvaržos dydis buvo $>2 \text{ cm}$ (9 proc. – $<2 \text{ cm}$, 10,5 proc. – $>2 \text{ cm}$) ir KMI $>30 \text{ kg/m}^2$ (8,6 proc. – <30 , 10,7 proc. – >30). Penki išvaržos atkryčių atvejai buvo taikant intraverzijos metodą, vienas atkrytis naudojant „onlay“ metodą. 56 pacientai (83,6 proc.) po operacijos jautėsi gerai, 9 pacientai (13,4 proc.) patenkinamai, 2 pacientai (3 proc.) blogai.

Išvados. Nerasta jokių nepriklausomų veiksnių, galinčių turėti įtakos bambos išvaržos atkryčių dažniui. Tačiau, remiantis apžvelgta literatūra, bambos išvaržos atkryčių rizikos veiksniais galėtų būti didelis pacientų KMI ir išvaržos dydis daugiau kaip 2 centimetrai.

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