

# Umbilical hernia management during liver transplantation

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## ABSTRACT

*Purpose:* Patients with liver cirrhosis scheduled for liver transplantation often present with a concurrent umbilical hernia. Optimal management of these patients is not clear. The objective of this study was to compare the outcomes of patients who underwent umbilical hernia correction during liver transplantation through a separate infra-umbilical incision with those who underwent correction through the same incision used to perform the liver transplantation.

*Methods:* In the period between 1990 and 2011, all 27 patients with umbilical hernia and liver cirrhosis who underwent hernia correction during liver transplantation were identified in our hospital database. In 17 cases, umbilical hernia repair was performed through a separate infra-umbilical incision (separate incision group) and 10 were corrected from within the abdominal cavity without a separate incision (same incision group). Six patients died during follow-up; no deaths were attributable to intra-operative umbilical hernia repair. All 21 patients who were alive visited the outpatient clinic to detect recurrent umbilical hernia.

*Results:* One recurrent umbilical hernia was diagnosed in the separate incision group (6%) and four (40%) in the same incision group ( $p = 0.047$ ). Two patients in the same incision group required repair of the recurrent umbilical hernia; one of whom underwent emergency surgery for bowel incarceration. The one recurrent hernia in the separate incision group was corrected electively.

*Conclusion:* In the event of liver transplantation, umbilical hernia repair through a separate infra-umbilical incision is preferred over correction through the same incision used to perform the transplantation.

## INTRODUCTION

Patients with liver cirrhosis complicated with ascites have a 20% risk of developing an umbilical hernia in the course of their disease.<sup>1</sup> Possible factors that contribute to the development of umbilical hernia in these patients include increased intra-abdominal pressure due to ascites, weakening of the abdominal fascia and muscle wasting as a result of poor nutritional status, and dilatation of the umbilical vein that enlarges the pre-existent supra-umbilical fascial opening in patients with portal hypertension.<sup>2</sup>

Optimal treatment of an umbilical hernia in patients with liver cirrhosis remains controversial. It is often advised that surgical correction of an umbilical hernia before liver transplantation (LT) in patients with ascites should not be performed. In those patients a “wait-and-see” approach is recommended, because of the presumed high surgical risks and high recurrence rates after elective repair.<sup>3-5</sup> Conservative management, however, can be complicated by incarceration or spontaneous rupture and evisceration following necrosis of the overlying skin. This requires an emergency repair which puts patients at greater risk of complications – greater than after an elective correction.<sup>6-8</sup> If a patient is a candidate for LT and repair has not been performed prior to LT, umbilical hernia correction should be performed during transplantation, because of the reported risk of postoperative strangulation of the bowel in an uncorrected umbilical hernia resulting in serious morbidity or death.<sup>8</sup>

Two techniques for hernia repair during LT are most commonly used, either through a separate infra-umbilical incision or from within the abdominal cavity through the same incision used to perform the liver transplantation. The decision, however, of which technique for umbilical hernia repair during LT should be used, is based on the surgeon’s personal preference; no studies on this matter have been published as yet. The objective of this study is to evaluate which of the two techniques to repair an umbilical hernia during LT is to be preferred.

## METHODS

Patient records between the period 1990 and 2011 at Erasmus University Medical Center were screened for the combined search terms liver cirrhosis, umbilical hernia and liver transplantation. Patients were included in the analysis when the following inclusion criteria were met: End-stage liver disease, scheduled for liver transplantation and an umbilical hernia confirmed by physical examination which was repaired during LT.

According to the hernia correction technique chosen during LT, two patient groups were identified: patients who underwent umbilical hernia repair through a separate infra-umbilical incision (separate incision group) and patients who underwent umbilical hernia correction from within the abdominal cavity without a separate incision (same incision group). The choice of technique for umbilical hernia repair was made at the surgeon's discretion. All fascia defects were closed using interrupted PDS sutures. The two techniques to correct the umbilical hernia during LT were not standardized. Surgical records were reviewed to identify the type of incision used to correct the umbilical hernia and to identify the type of hernia repair, either primary suture or mesh repair. The occurrence of local wound complications related to the umbilical hernia repair and the presence of ascites during LT were also retrieved from the records.

Patients identified in this search were followed at our institution; they all underwent a physical examination and if necessary an additional ultrasonography of the umbilical region to detect hernia recurrence.

This retrospective cohort study used SPSS 17.0 (SPSS Inc., Chicago, IL, USA) for statistical analysis. Chi-square test and Mann-Whitney U- test were used for categorical and continuous variables. Mean follow-up (defined as time from LT to death, hernia correction or date of physical examination or ultrasound), age, sex, and labMELD score were compared between the two groups. The values are expressed as mean  $\pm$  standard deviation (SD) or percentages. The Chi-squared test was used to assess the difference in proportions of hernia recurrences between the two groups. A p-value of less than 0.05 was considered significant.

## RESULTS

### Study population

Between January 1990 and December 2011 a total of 717 liver transplantations was performed; 27 of these patients underwent umbilical hernia repair simultaneously (4%). The mean labMELD score of these 27 patients was 16.8 (SD 4.6). At the time of LT, 19 of them had at least mild-to-moderate ascites. Seventeen patients were included in the separate incision group and 10 in the same incision group. Age and sex did not differ significantly between the two groups. A total of six patients (22%) died during follow-up due to causes not related to the umbilical hernia or its repair. In Table 1, the demography of the studied population is shown.

**Table 1.** Demography of the patient groups.

	Separate incision group	Same incision group
N	17	10
Male (%)	12 (71%)	5 (50%)
Mean age (SD)	51.6 (11.3)	47.2 (14.5)
Mean labMELD score (SD)	16.5 (4.7)	17.3 (4.8)
Follow up in months (SD)	31.1 (29.2)	25.7 (33.1)

Duration of follow-up did not differ between both groups: 25.7 (months; SD 33.1, same incision group) versus 31.1 (SD 29.2, separate incision group),  $P = 0.659$ . Overall complication rate did not differ significantly between the same incision group and the separate incision group (50% vs 24%;  $P = 0.219$ ). Recurrence rate in the separate incision group and same incision group (6% vs 40%, respectively) differed significantly,  $P = 0.047$ , whereas labMELD scores were comparable between the 2 groups. The outcomes are compared in Table 2.

**Table 2.** Complications reported after initial management.

Hernia management	Recurrence rate	Overall complications rate	Nature of complications
<b>Separate incision group</b> (n = 17)	1 (6%)	4 (24%)	Seroma (n = 2) Wound infection (n = 1) Recurrence (n = 1)
<b>Same incision group</b> (n = 10)	4 (40%)	5 (50%)	Relaparotomy for postoperative hemorrhage (n = 1) Recurrence (n = 4); including 1 incarcerated hernia followed by emergency surgery.

The recurrence rate (6% versus 40%) differed significantly between the two groups ( $P = 0.047$ ).

### Separate incision group

In 10 out of 17 patients (59%), the presence of ascites was confirmed during LT. The mean (SD) labMELD score for the separate incision group was 16.5 (4.7). Umbilical hernia repair was performed with primary suturing in 15 out of 17 patients (88%); in 2 patients, abdominal wall reconstruction consisted of preperitoneal polypropylene onlay mesh repair. The skin of the separate incision was closed using intracutaneous running absorbable monofilament sutures (Monocryl 4.0, Ethicon). Local wound complications occurred in 3 of 17 patients (18%); 2 patients had a seroma and 1 who underwent mesh repair suffered a wound infection, which was treated locally without negative sequelae. Four out of 17 (24%) patients died during follow-up. Hernia correction-related mortality was not observed in this group. One of 17 patients in the

separate incision group suffered a hernia recurrence (6%) 19 months after primary repair, which was operated upon electively. The two patients who underwent hernia repair using mesh prosthesis did not suffer recurrence.

### **Same incision group**

In 9 out of 10 patients (90%), the presence of ascites was confirmed during LT. The mean (SD) labMELD score for the separate incision group was 17.3 (4.8). In all cases umbilical hernia repair was performed with primary suturing. Two deaths (20%) were recorded during follow-up, which were not related to the hernia correction. In four out of ten patients (40%), a recurrent umbilical hernia was diagnosed at follow-up. Two recurrent hernias (50%) were corrected; one patient was operated on electively and one patient (25%) presented with an incarcerated hernia necessitating emergency surgery. One patient in the same incision group suffered postoperative hemorrhage at the site of the hernia correction. The patient had to undergo a re-laparotomy through the same incision used for LT to control the bleeding.

## **DISCUSSION**

Umbilical hernia correction during LT results in high rates of hernia recurrence. This retrospective cohort study suggests that correction of the umbilical hernia during LT through a separate infra-umbilical incision is to be preferred over correction from within the abdominal cavity without a separate incision.

Management of an umbilical hernia in patients with liver cirrhosis is subject of debate.<sup>8-10</sup> Historically, elective hernia repair was deemed hazardous for patients with an umbilical hernia, because of the presumed high surgical risks and the high recurrence rates after repair. Instead, a wait-and-see approach was commonly advised, particularly in asymptomatic patients.<sup>3,4</sup>

More recent publications, however, have shown that patients treated conservatively are at risk of developing complications of the hernia due to incarceration, rupture of the overlying skin or recurrent infections of ascites.<sup>6-8</sup> This awareness has changed the management of these patients to a more aggressive approach of correcting umbilical hernias electively, even for patients awaiting LT if the expected waiting time exceeds three to six months.<sup>6-8</sup>

Despite this growing awareness of potential hazards of umbilical hernias in patients with liver cirrhosis and a more aggressive approach to elective repair, most patients

with an asymptomatic umbilical hernia are still treated conservatively, particularly those with more advanced liver disease.<sup>10,11</sup> This results in patients presenting with a concurrent umbilical hernia in up to 20% of liver transplantations. If left uncorrected, these hernias can lead to serious postoperative morbidity and even mortality after LT.<sup>6-8</sup>

One specific group of patients still warrants conservative treatment of umbilical hernia or repair only during LT: patients with a patent umbilical vein. A reopened umbilical vein can be an important route of outflow for the portal circulation in patients with severe portal hypertension. In these patients, elective repair without LT has been reported to result in acute portal vein thrombosis and subsequent liver failure necessitating emergency LT, because of ligation of the umbilical vein during hernia repair.<sup>2,7,12</sup>

The present study has several limitations. The first limitation is the relatively small sample size. Due to this, adjusting or stratifying for possible confounders that could explain the difference in recurrences between the two groups was not possible. Despite this small sample size, the difference in recurrence between the two types of surgical correction was found to be significant. Secondly, it could be argued that the choice of a surgeon to use a certain technique was biased by patient characteristics that could influence recurrence rate. Patients in the two groups, however, were shown to be comparable with respect to severity of liver disease as labMELD was comparable in both groups. In addition, due to the retrospective nature of the study and the fact that no strict protocols were used to correct the hernias, the conclusion should be interpreted with further caution.

Intraoperative ascites is a known risk factor for postoperative hernia recurrence.<sup>6,10,13</sup> Although preoperative ascites was observed more frequently in the same incision group, this difference was not statically significant. Furthermore, neither technique was standardized, which restricts the comparability between the groups. The hernia sac was not resected in all patients in the same incision group and only two of the patients in the separate incision group underwent mesh-repair.

The use of mesh under these conditions is controversial. However, routine use of mesh repair in patients undergoing concomitant LT and umbilical hernia repair has never been studied. It is often believed that under those circumstances, the use of mesh could potentially lead to higher incidences of infection of the wound, infection of the mesh, and postoperative leakage of ascites through the mesh.<sup>8,14,15</sup> In 2010, however, a randomized controlled trial conducted by Ammar et al. showed that mesh repair was superior to suture repair with respect to recurrence (2.7% vs 14.2%,  $P < 0.05$ )

in patients with liver cirrhosis who underwent umbilical hernia repair outside the LT setting.<sup>16</sup> However, in that study, mesh repairs were more likely to become infected (16.2% vs. 8.5%), but this result was not statistically significant.<sup>16</sup> In the current study, one of the two patients who underwent mesh repair suffered wound infection, which was treated locally; neither patient suffered hernia recurrence.

In conclusion, this study shows high recurrence rates of umbilical hernia repairs during LT and it suggests that correction during LT using a separate infra-umbilical incision leads to fewer recurrences of umbilical hernias during follow-up compared to correction of the umbilical hernia from within the abdominal cavity without a separate incision. Future studies, preferably randomized multicenter studies with standardized operation techniques using non-absorbable sutures and more liberal use of prosthesis in the absence of septic complications, are warranted to provide more robust evidence for the difference in recurrence and allow for adjusting for possible confounders.

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