Surgical repair of umbilical hernia in cirrhotic patients with ascites: is it safe?

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Background
Umbilical herniorrhaphy in cirrhotic patients with ascites is not usually done due to high postoperative morbidity and mortality rates. However, recent reports recommending elective surgery in these patients with perioperative preparation will result in good and safe outcome to avoid emergent repair later on. The aim of this study was to evaluate the outcome of umbilical herniorrhaphy in patients with liver cirrhosis and ascites regarding postoperative morbidity and mortality.
Patients and methods
A retrospective study was done on 102 patients with umbilical hernia and ascites in the period between March 2014 and April 2017 who had undergone surgical repair either electively or emergently at Tanta University Hospital. Patient characteristics, morbidity, and mortality are recorded.
Results
Seventy-two men and 30 women with a mean age of 51.3 years were analyzed. Eighteen (17.6%) patients were of Child–Pugh–Turcotte (CPT) class A, 54 (53%) patients were of class B, and 30 (29.4%) patients were of class C. The patients had a model for end-stage liver disease score of 16.23. Fifty-seven patients underwent elective operations while 45 patients underwent emergency surgery of whom 24 patients had incarceration, 12 cases had rupture of the hernia sac, and nine cases had skin ulceration or necrosis. Primary repair was done in 60 (58.8%) patients and meshes were used in 42 (41.2%) patients. The morbidity and mortality rates were 37.2% (n=38) and 3.9% (n=4), respectively.
Conclusion
Elective repair of umbilical hernia can be performed easily and safely in cirrhotic patients with ascites with good perioperative preparation with better results than emergent repair.

Keywords:
ascites, surgical repair, umbilical hernia

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Introduction

Umbilical hernia is a common surgical problem. Its incidence is 20% in cirrhotic patients with ascites. The umbilical hernia may enlarge and become symptomatic in a significant number of those patients [1].

Umbilical hernia in cirrhotic and ascitic patients is mostly due to chronic, increased intra-abdominal pressure, muscle wasting and fascial weakening from nutritional deficiencies [2], in addition to portal hypertension that induce umbilical vein dilatation with widening of the preexistent supra-umbilical fascial opening [3].

Umbilical herniorrhaphy in cirrhotic patients is not usually done electively, especially in patients with tense ascites who are most commonly treated conservatively (wait and see policy). This is generally due to the concept of high perioperative morbidity and mortality rates in that group of patients. However, this strategy leads to a high risk of life-threatening complications such as incarceration and skin rupture [4,5].

Although many reports recommend early elective umbilical herniorrhaphy in cirrhotic patients with ascites, there is a lack of universal guidelines or randomized, controlled studies that suggest treatment protocols for those patients [6,7].

The goal of this study was to evaluate the outcome of umbilical herniorrhaphy in patients with liver cirrhosis and ascites regarding postoperative morbidity and mortality.

Patients and methods

This prospective study was conducted in the Department of General Surgery, Tanta University Hospitals during the period from March 2014 till April 2017. It included 102 patients with umbilical

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hernia, cirrhosis, and ascites. Liver cirrhosis and ascites were diagnosed by clinical, laboratory, and ultrasonographic findings. Umbilical hernia was also diagnosed by physical examination and ultrasound. All patients underwent elective or emergent umbilical herniorrhaphy after written informed consents and acceptance of the local ethics committee.

The emergency surgical hernia repair in those cirrhotic patients was done within 12 h after the diagnosis of ruptured umbilical hernia, incarceration with refractory pain, or skin necrosis and ulceration (Fig. 1).

Elective hernia correction was done after proper management of ascites and coagulopathy in cirrhotic patients during the preoperative period, if indicated, using one or several from the following therapeutic options: diuretics (spironolactone±furosemide), nutritional support, intravenous albumin to increase patients' serum albumin to greater than 3 g/l, and correction of coagulation disorders with fresh frozen plasma and cryoprecipitate. Administration of intravenous third-generation cephalosporins (1–2 g) was done 1 h before the surgery. The antibiotics were continued according to the operative sequelae.

The excluded patients included those with noncirrhotic ascites especially those with congestive heart failure or renal failure.

The following data were collected for all patients: age, sex, Child–Pugh–Turcotte (CPT) and model for end-stage liver disease (MELD) scores (to evaluate liver disease severity), presence of hernia complications prior to surgery (skin rupture, incarceration, necrosis, ulceration, etc.), use of mesh in hernia repair, perioperative complications, and duration of hospital stay.

Figure 1

(A) Reducible umbilical hernia with ascites

(B) Umbilical hernia with tense ascites and chronic irreducibility

© Incarcerated hernia

(D) Skin ulceration

(E) Skin ulceration and necrosis with previous rupture of sac and treated with simple suture

Representation of cirrhotic patients with umbilical hernia and ascites. (a) Reducible umbilical hernia with ascites. (b) Umbilical hernia with tense ascites and chronic irreducibility. (c) Incarcerated hernia. (d) Skin ulceration. Skin ulceration and necrosis with previous rupture of sac and treated with simple sutures.

Hernia repair was done by primary musculofascial closure of hernia opening followed by insertion of prosthetic material (Prolene mesh) in selected cases.

The anesthetic options were left to the anesthetist in charge. All patients were followed up for a minimum of 6 months to detect postoperative complications. If hernia recurrence was detected or suspected clinically during the follow-up, it was confirmed by abdominal ultrasound or computed tomography.

Postoperative 30-day mortality was recorded in the follow-up period. After 30 days, mortality was considered to be due to hepatic decompensation rather than complications of surgery.

Statistical analysis was done by SPSS statistical software package v21 (SPSS Inc., Chicago, Illinois, USA). The *t*-test, χ^2-test, Fischer's exact test, and Monte Carlo exact test were used. Values were considered statistically significant when the *P* value was less than 0.05.

Results

The patients had a mean age of 51.3 years. Seventy-two patients were men and 30 patients were women. Eighteen (17.6%) patients were of CTP class A, 54 (53%) patients were of class B, and 30 (29.4%) patients were of class C. The mean MELD score of patients were 16.23±8.2.

Fifty-seven patients underwent elective operations while 45 patients underwent emergency surgery of whom 24 patients had incarceration (50% of them required resection of the gangrenous bowel), 12 cases had rupture of the hernia sac, and nine cases had skin ulceration or necrosis (Table 1).

Primary repair was done in 60 (58.8%) patients and mesh was used in 42 (41.2%) patients.

The morbidity and mortality rates were 37.2% (*n*=38) and 3.9% (*n*=4), respectively.

The postoperative complications included ascitic fluid discharge from the wound in six cases, seroma/hematoma at the surgical sites in 11 cases, variable grades of hepatic encephalopathy in 14 cases, and surgical site infection (SSI) in 10 cases. Postoperative peritonitis occurred in one case due to anastomotic fistula and postoperative variceal bleeding occurred in four cases (Table 1).

Table 1 Characteristics of studied patients

Characteristics	Mean±SD Range
Age (years)	51.3±6.8 (39–65)
MELD	16.23±8.2 (5–37)
Hospital stay (days)	5.1±3.3 (2–17)
Characteristics [*n* (%)]	
Operation	
Elective	57 (55.9)
Emergency	45 (44.1)
Cause of emergency [*n* (%)]	
Incarceration (strangulation)	24 (44.7)
Rupture	12 (33.3)
Skin ulcer	9 (18)
Management [*n* (%)]	
Primary	60 (58.8)
Mesh	42 (41.2)
Child–Pugh	
Class A	18 (17.6)
Class B	54 (52.9)
Class C	30 (29.5)
Mortality	4 (3.9)
Postoperative complication	
Transient ascitic fluid leakage	6 (5.8)
Surgical site infection	10 (9.8)
Seroma/hematoma	11 (10.7)
Encephalopathy	14 (13.7)
Variceal bleeding	4 (3.9)
Peritonitis	1 (0.9)
Recurrence	10 (9.8)

Table 2 Rate of morbidity and mortality in patients according to Child classification

Morbidity and mortality according to Child classification	Class A (*n*=18) [*n* (%)]	Class B (*n*=54) [*n* (%)]	Class C (*n*=30) [*n* (%)]	χ^2-test *P* value
Patients with morbidity	6 (33.3)	12 (22.2)	20 (66.7)	16.4 0.0002*
Transient ascitic fluid leakage	0 (0.0)	3 (5.6)	3 (10.0)	
Surgical site infection	3 (16.7)	3 (5.6)	4 (13.3)	
Seroma/hematoma	3 (16.7)	3 (5.6)	5 (16.7)	
Encephalopathy	0 (0.0)	4 (7.4)	10 (33.3)	
Variceal bleeding	0 (0.0)	2 (3.7)	2 (6.7)	
Recurrence	0 (0.0)	3 (5.6)	7 (23.3)	
Peritonitis	0 (0.0)	0 (0.0)	1 (3.3)	
Mortality	0 (0.0)	1 (1.9)	3 (10.0)	

*P value <0.05.

Recurrence of umbilical hernia was shown in 10 cases 3–13 months after surgical repair and was attributed in most cases to poor control of ascites. The recurrence was more in musculofacial (primary) repair in eight (12.9%) cases with no significant difference between it and mesh repair.

The complications were significantly high in the emergency group (27 cases, 60%), with most of the cases having more than one complication.

According to CPT, the postoperative complications were the least in class A (six patients), moderate in class B (12 patients), and the most in class C (20 patients) (Table 2).

Only patients in Child B group who underwent emergency operation showed a significant higher morbidity rate than the elective group (Table 3).

A single patient in the elective surgical repair group died from liver decompensation (was CPT class C and developed postoperative hepatorenal syndrome and progressive hepatic coma). Patients died in the emergency surgical repair group were three (the first patient was CPT class B and developed massive postoperative variceal bleeding). The second patient had CTP class C and developed sepsis secondary to bacterial peritonitis from intestinal fistula postresection. The third patient was also CPT class C and died from hepatorenal syndrome.

The average hospital stay was 2–17 days (5.1±3.3 days).

Patients with emergency operations in both classes B and C significantly had longer hospital stay than those who underwent elective operation (Table 4).

In comparison to patients who did elective surgical repair, the emergency surgery groups were significantly younger in age, had higher MELD (most postoperative complications and mortality in our study group occurred in patients who had a MELD score >16) and CPT (class C) scores, had more postoperative complications (morbidity), recurrence, and mortality with significantly longer duration of hospital stay (Table 5).

Discussion

Umbilical hernia is a common sequelae in cirrhotic and ascitic patients. Umbilical herniorrhaphy for those patients remains controversial. However, most studies

Table 3 Postoperative morbidity and mortality according to Child classification

Postoperative morbidity	Child A		Child B		Child C	
	Elective (*n*=9)	Emergency (*n*=9)	Elective (*n*=42)	Emergency (*n*=12)	Elective (*n*=6)	Emergency (*n*=24)
Transient ascitic fluid leakage	0	0	0	3	0	3
Surgical site infection	2	1	0	3	0	4
Seroma/hematoma	1	2	1	2	2	3
Encephalopathy	0	0	1	3	2	8
Variceal bleeding	0	0	0	2	0	2
Peritonitis	0	0	0	0	0	1
Recurrence	0	0	0	3	2	5
Patients with morbidity [*n* (%)]	3 (33.3)	3 (33.3)	2 (4.7)	10 (83.3)	6 (100)	14 (58.3)
Patients with no morbidity [*n* (%)]	6 (66.7)	6 (66.6)	40 (95.3)	2 (16.7)	0 (0)	10 (41.7)
Test of significance	χ^2=0		χ^2=33.3		Fisher's exact test	
P value	1		≤0.0001*		0.14	
Mortality [*n* (%)]	0	0	0	1 (8.3)	1 (16.7)	2 (8.4)

**P* value <0.05.

Table 4 Comparison between elective and emergency groups according to Child classification

Child classification	Class A (*n*=18)		Class B (*n*=54		Class C (*n*=30)	
Characteristics	Elective	Emergency	Elective	Emergency	Elective	Emergency
Age	49.2±4.5	47±4.8	53±2.3	50±3.2	55.6±3.2	52.2±2.5
t-test	1.001		3.6		2.8	
P value	0.3		0.0006*		0.008*	
Hospital stay	2.0±1.2	2.7±2.3	3.1±2.4	7.1±2.8	6.5±2.9	13.6±5
t-test	0.8		4.9		3.3	
P value	0.4		0.001*		0.002*	

**P* value <0.05.

had shown that conservative strategy for those patients had significant morbidity and mortality outcomes [4,8].

In this study, we assessed the safety of umbilical herniorrhaphy in 102 cirrhotic patients with ascites.

Most postoperative complications and mortality in the study group occurred in patients with a MELD score greater than 16. Most previous studies had shown that MELD score more than (8–14) predicts poor surgical outcomes [9,10]. Additionally, the gastrointestinal interventions had bad outcomes when the MELD score is more than 15 [11].

In the study, 44.1% of the patients had umbilical hernia complications such as incarceration, skin ulceration or necrosis and hernia rupture with leakage of ascites and required emergency surgical repair.

About 37% of our patients developed postoperative complications and this copes with the results of Yu *et al.* [6] (44.4%) and Wellington *et al.* [12] (42.6%).

The postoperative complications after elective repair in the study was 19.2%. This is similar to the outcomes of the literature [12,13]. On the contrary, complications after emergency operations were present in 60% of patients, this copes with the results of Wellington *et al.* [12] (64.7%).

In the series, we had a significantly higher morbidity and mortality rates in the emergency group due to a much higher MELD score in the emergency group (19) compared with the elective group (13.5) in addition to better patient preparation in the elective surgery group.

Our results are matched to those of series [8,14,15] who showed that postoperative complications and recurrence could be minimized by optimizing the cirrhotic patients before elective umbilical hernia repair. Optimization is directed toward reducing ascites as possible by low-salt intake, fluid restriction, use of diuretics and paracentesis, intravenous human albumin, transjugular intrahepatic portosystemic shunting, and a temporary insertion of peritoneal dialysis catheter to control ascites perioperatively.

This study focused on noninvasive methods by a hepatologist in the treatment of ascites in elective cases.

The rate of recurrence in the study was 9.8%, which matches with the results of other series which ranged from 0 to 40% [8,16–19].

The effect of the type of repair, by mesh or not, is still a matter of debate. In the study there is recurrence in eight out of 60 cases with primary repair (12.9%) and

Table 5 Comparison between elective and emergency operation patients in relation to their characteristics

Type of operation	Characteristics [*n* (%)]		Test of significance *P* value
	Elective (*n*=57)	Emergency (*n*=45)	
Age	53.2±6	49±7.1	*t*-test: 3.2 0.002*
MELD	13.5±6.3	19±9.2	*t*-test: 3.8 0.0001*
Hospital stay (mean±SD)	4.2±2.5	8.5±3.7	*t*-test: 6.9 <0.0001*
Gender			
Male	42 (73.7)	30 (66.7)	χ^2 test: 0.59
Female	15 (26.3)	15 (33.3)	0.4
Child–Pugh			
Class A	9 (15.8)	9 (20)	χ^2 test: 26.4
Class B	42 (73.7)	12 (26.7)	0.0002*
Class C	6 (10.5)	24 (53.3)	
Bowel resection			Fisher's exact test
No	57 (100)	33 (73.3)	
Yes	0 (0)	12 (26.7)	0.003*
Patients with morbidity	11 (19.7)	27 (60.0)	Fisher's exact test: <0.0001*
Postoperative morbidity			
Transient ascitic fluid leakage	0 (0.0)	6 (13.3)	
Surgical site infection	2 (3.5)	8 (17.8)	
Seroma/hematoma	4 (7.0)	7 (15.6)	
Encephalopathy	3 (5.3)	11 (24.4)	
Variceal bleeding	0 (0.0)	4 (8.9)	
Peritonitis	0 (0.0)	1 (2.2)	
Recurrence	2 (3.5)	8 (17.8)	
Mortality	1 (1.7)	3 (6.7)	

MELD, model for end-stage liver disease. **P* value <0.05.

two out of 42 cases in the mesh group (4.7%) with no significant difference between both groups. Ammar [19] and Han *et al.* [20] reported that mesh repair reduces the recurrence rate significantly. However, others [16,21] did not confirm those results. All studies suggested that control of postoperative ascites was an important issue to reduce recurrence.

SSI in the study was 9.8% and was more prevalent (17.8%) in the emergency group of patients. Farrow *et al.* [18] and Ammar [19] reported SSI rates ranging from 1.8 to 19% depending on the existence or absence of predisposing factors (cirrhosis itself is considered a risk factor for SSI).

Our mortality rate was 3.9% and was more prevalent (6.7%) in the emergency group of patients. This is comparable to the results of the series [12,13,22,23].

Despite our significant findings, our study had some limitations. The study had only a small number of CTP C treated electively as the patients or their relatives refused to be included in the study. Also, this prospective study was unable to denote if cirrhotic patients with MELD score greater than 16, refractory ascites are better managed with conservative or surgical hernia treatment. However, our main aim was to identify the possible outcomes of umbilical herniorrhaphy in cirrhotic and ascitic patients, and not to compare between elective and emergent repair of hernia.

Conclusion

Early umbilical herniorrhaphy in cirrhotic and ascitic patients is a safe and recommended option and significantly reduce high morbidity and mortality rates associated with emergency surgical repairs in the future.

Proper and adequate control of ascites is critical for successful perioperative outcomes. Thus, the multidisciplinary approach of preoperative and postoperative care significantly improves the surgical outcomes.

We recommend elective hernia repair over emergent repair as it was successful in most patients with significantly lower recurrence, length of hospital stay, and did not lead to serious liver-related complications and mortality.

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Conflicts of interest
There are no conflicts of interest.

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