Elective and emergency repair of umbilical hernia in cirrhotic patients with ascites

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Background Umbilical hernia is a common finding in cirrhotic patients with ascites. The incidence of umbilical hernia is 20–40% in cirrhotic patients, and emergency repair is indicated in critical cases if there is ascites leakage, irreducibility, and infection, with high rate of morbidity and mortality than elective cases.

Aim To evaluate the effectiveness of elective hernioplasty rather than emergent one.

Patients and methods A total of 50 patients were included in this study between December 2017 and December 2018 at Al Zahraa University Hospital. They were divided into two groups: (a) elective group included 25 patients with moderate to severe ascites, and (b) emergent group included 25 patients with moderate to severe ascites, of them 10 (40%) cases presented with spontaneous eruption of umbilical hernia, whereas 15 (60%) patients presented with irreducible umbilical hernia. There were 30 (60%) males and 20 (40%) females. Their age ranged between 40 and 65 years, with an average age of 45 years. Umbilical hernioplasty was done for all patients in both groups by using polypropylene mesh after preparation.

Results In this study, one operative procedure was done for all patients. Using polypropylene mesh with peritoneal dialysis, a catheter was placed in all cases of both groups. There is difference between elective and emergency groups in operative time, postoperative hospital stay, and also early postoperative complication.
Long-term follow-up was done in both groups and revealed death owing to liver failure as a complication of cirrhosis in three (12%) patients in the emergent group and in only one (4%) patient in the elective group.

Conclusion Higher morbidity and mortality are associated with the emergency surgery in advanced cirrhotic patients. The prognosis is favorable for patients with good hepatic reserve.

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Introduction

Umbilical hernia is a common finding in cirrhotic patients with ascites. It develops in 20% of patients owing to increased intra-abdominal pressure [1]. If spontaneous rupture occurs with discharge of ascetic fluid, it is associated with overall mortality rate of nearly 30% [2].

Umbilical hernia in general population with no comorbidities is managed surgically by hernioplasty in elective setting, but in patients with cirrhotic ascites, the management has to take special consideration owing to accompanying liver disease [3].

Complications of umbilical hernia in cirrhotic patients include leakage, ulceration, rupture, and incarceration. Some of the signs of impending rupture are discoloration of skin, ulceration, or rapid increase in size of the hernia [4].

Complications occur when the protruding abdominal tissue becomes trapped (incarcerated) and can no longer be pushed back into the abdominal cavity, and this reduces the blood supply to the section of the trapped intestine and ends in tissue damage [5].

Ascetic fluid provides buoyancy to the bowel loop, so it is unlikely to get obstructed or strangulated. However, where the volume of ascites reduces owing to administration of diuretics or large-volume paracentesis, there is narrowing of the facial defect owing to decrease in intra-abdominal pressure, leading to strangulation or obstruction, culminating into rupture, sepsis, and end result of death [6].

Patients and methods

This study was conducted in the Internal Medicine Department and General Surgery Department of Al Zahraa University Hospital (as some patients referred from internal medicine to surgery department) from December 2017 to December 2018. A total of 50 patients were included in this study and divided into two groups.

Group A: included 25 patients with mild, moderate, or sever ascites as the elective group.
Group B: included 25 patients with moderate to severe ascites as the emergent group. This group is divided into 10 cases that presented with spontaneous rupture with leakage of ascetic fluid and 15 cases that presented with irreducible umbilical hernia (Fig. 1).

There were 30 (60%) males and 20 (40%) females, with age ranging between 40 and 65 years.

All patients were subjected to the following:

(1) Full history taking regarding onset, course, duration, and manifestation of liver disease.
(2) Clinical examination.
(3) Full preoperative investigation, which included the following:
    (a) Complete blood count.
    (b) Liver function test.
    (c) Kidney function test.
    (d) Coagulation profile.
    (e) Blood glucose level.
    (f) Serum electrolyte.
    (g) Analysis of ascetic fluid.
    (h) Hepatitis marker.
    (i) Abdominal ultrasound.
    (j) Plain radiographs in erect and supine positions.
    (k) Scoring system to assess the prognosis of the patients as either elective or emergent cases.

All patients had accompanying liver disease with ascites. All of the following data were recorded for every patient.

(1) Operative time.
(2) Need for blood and plasma transfusion.
(3) Preoperative control of ascites in elective group.
(4) Diuretics are used to reduce the ascitic volume, and this helps in reducing the local pressure and for easy reduction of hernia during surgery in both groups.

Preoperative preparation was done with diuretics and fresh frozen plasma coagulant drug in the elective group, whereas in the emergent cases, as there was no time for preparation of the patient, urgent transfusion of fresh frozen plasma, correction of coagulopathy, and parenteral vitamin K administration was done. Third-generation cephalosporin was given for all patients in both groups. The operation was done under spinal anesthesia in all cases of elective group, but in emergency cases, 18 cases were done by spinal anesthesia and the remaining seven cases were done under local anesthesia. Operative procedure in the emergent cases with ruptured umbilical hernia was done in the following steps: a sterile dressing was placed over the umbilical hernia and elliptical incision was done around the hernia with dissection of hernia sac after elevation of upper and lower flap (Fig. 2). Opening of the sac with reduction of content was done, and the edge of hernia defect was elevated to prevent leakage of ascetic fluid. This ascetic fluid was sent for culture and sensitivity (Fig. 3).

A catheter for dialysis was placed intraperitoneally in all cases. Paracentesis was done under cover of intravenous administration of albumin to maintain circulatory volume (Fig. 4). The defect was closed using polypropylene sutures. The polypropylene mesh was fixed from periphery with polypropylene 2/0 (Fig. 5).

Figure 1

Ruptured umbilical hernia with leakage of ascitic fluid.

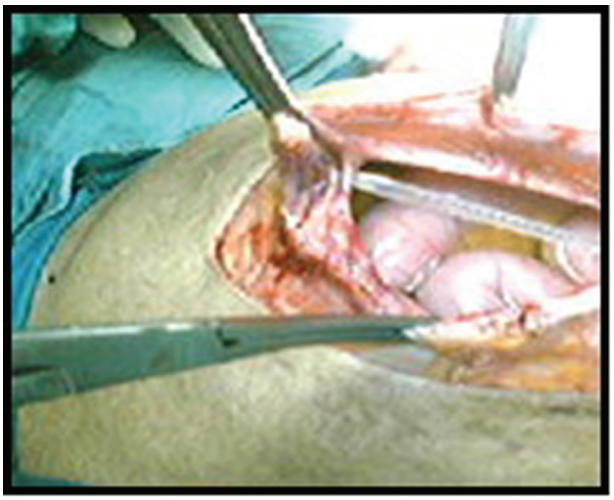
Figure 2

The ellipse of the skin together with the hernial sac.

Figure 3

The fascial edges of the hernial defect were elevated.

Figure 4



The internal portion of the peritoneal dialysis catheter.

Suction drain was placed and wound was closed. All patients were followed up in early postoperative period for the following.

(1) Length of hospital stay.
(2) Hemorrhage and wound infection.
(3) Ileus.
(4) Deep venous thrombosis (DVT) and pulmonary embolism
(5) Burst abdomen.
(6) Leakage of ascetic fluid.
(7) Postoperative pain.

Result

Preoperative characteristics of our patients are included in Table 1. Group A included 25 elective cases, and group B included 25 emergent cases. Men represented 30 (60%) cases and women represented 20 (40%) cases.

Figure 5

Polypropylene mesh was fixed as an overlay graft.

Table 1 Laboratory finding of patients with umbilical hernia in elective and emergent cases with liver cirrhosis and ascites

	Elective group		Emergent group	
Group designative	Finding	Mean	Finding	Mean
Bilirubin (mg/dl)	1.2–2.3	1.5	1.6–3.2	2.2
Albumin (mg/dl)	2.6–3.6	3.1	2.2–3.2	2.6
Prothrombin concentration (%)	63–75	72	60–73	69
Prothrombin time (s)	14–16	15	14–17	16
AST	45–63	54	51–67	62
ALT	45–59	53	46–63	54

ALT, alanine transaminase; AST, aspartate transaminase.

Table 2 Operative and postoperative time

Hernia repair in cirrhotic patients	Operative timer (min)	Mean (min)	Postoperative hospital stay (days)	Mean (days)
Elective repair	40–50	45	3–5	4
Emergent repair	40–75	60	6–9	7

Most of the patients in both groups ranged in age from 40 to 65 years.

Between December 2017 and December 2018, 50 patients underwent umbilical hernioplasty in cirrhotic patients with ascites, who were divided into two groups: elective and emergency. There is a significant difference between both groups in operative time, postoperative hospital stay, and presenting complications of hernia (Table 2). There is no significant difference between both groups regarding age, sex, associated comorbidities, Child classification, and presence of ascites, as shown in Table 3.

Table 3 Characteristics of the patient population

Characteristic	Elective group (n=25)	Emergent group (n=25)	P value
Age (mean±SD) (years)	48.4±9.5	47.5±12.5	> 0.05
BMI (mean±SD)	27.4±6.8	31.3±8.3	> 0.05
Hematocrit (mean ±SD)	36.5±6.7	40.8±3.6	> 0.05
WBC (mean±SD) (/μl)	7.0±3.7	7.5±2.7	> 0.05
Platelets (mean±SD) ($\times 10^3$/μl)	90±20	95±10	> 0.05
Sodium (mean±SD) (mEq/l)	135±5	139±3	> 0.05
Creatinine (mean ±SD) (mg/dl)	1.2±0.6	1.0±0.5	> 0.05
Total bilirubin (mean ±SD) (mg/dl)	2.0±1.8	2.3±0.6	> 0.05
Albumin (mean±SD) (g/dl)	3.5±0.7	3.1±0.5	> 0.05
INR (mean±SD)	1.3±0.5	1.5±0.3	>0.05

INR, international normalization ratio; WBC, white blood cell.
P>0.05, not significant.

There is a significant difference regarding type of anesthesia and content of the sac. No resection anastomosis occurred in any case of emergent group.

There is a significant difference between both groups regarding postoperative complications such as seroma, hematoma, and wound dehiscence. In the elective group, three (12%) patients developed complications: one (4%) patient developed seroma, who was treated by evacuation with drainage; another one (4%) patient developed hematoma and was treated by coagulant drugs and FFP; and another one (4%) patients developed superficial wound infection who was treated by antibiotic and dressing. In addition, one (4%) patient died owing to complication of cirrhosis in the elective group.

In the emergent group, six (24%) patients developed complications: one (4%) patient developed hematoma and was treated with coagulant drugs and fresh frozen plasma, another two (8%) cases developed hematemesis with hepatic coma and were treated by fresh blood transfusion and vasopressin, another three (12%) cases died from hepatic coma with spontaneous bacterial peritonitis, as shown in Table 4.

Subcutaneous drain was placed for all patients and removed when the amount of drainage was less than 50 ml/24 h. Peritoneal dialysis catheter was removed after 3 weeks, depending on healing of wound and presence of fluid collection or not and also depends on if there is ascetic fluid leak or not. All patients were followed up from 6 to 15 months.

Table 4 Postoperative complications of the patients

Complications	Elective group number of patients [n (%)]	Emergent group number of patients [n (%)]
Wound hematoma	1 (4)	1 (4)
Wound seroma	1 (4)	
Spontaneous bacterial peritonitis	–	3 (12)
Hepatic coma	–	2 (8)
Hematemesis	–	2 (8)
Death	1 (4)	3 (12)
Total	3 (12)	6 (24)

Follow-up was done first every week in the first 3 months and then monthly. This postoperative follow-up revealed one (4%) patient died owing to complications of cirrhosis in the elective group and three (12%) patients died in the emergent group owing to complications of cirrhosis, hematemesis, and spontaneous bacterial peritonitis. There was no other mesh-related complication, no recurrence, no migration, or sinus formation.

Discussion

Umbilical hernia repair in the presence of advanced liver cirrhosis and ascites has resulted in high rate of morbidity and mortality, prompting many surgeons to avoid elective repair and to operate only when complications develop [7].

Expectant treatment of cirrhotic patients with abdominal wall hernia and ascites is associated with increased rate of complication such as maceration, ascites drainage, and peritonitis, and these complications require emergency surgical treatment which carries increased risk of morbidity and mortality; conversely, elective hernia correction might be performed with fewer complications [8].

Refractory ascites represents a direct cause of complicated hernia, that is, increased in abdominal pressure, skin ulceration necrosis, skin perforation, and ascites leak [9].

In this study, administration of diuretics to limit accumulation of ascites, fresh frozen plasma, and parenteral vitamin K was done before beginning of surgery, as Slakey *et al*. [10], reported that malnutrition and ascites with severe liver disease lead to stretching and weakness of fascia surrounding the hernia defect.

In this study, the operation was done using spinal anesthesia in all cases of elective and emergent

treatment, except in seven (28%) cases of emergent ones, which were done under local anesthesia to avoid the hazards of anesthesia in terms of hepatotoxic effect of the drugs used in general anesthesia. Prosthetic mesh repair was done for strengthening of the weak fascia. After which, the amount of ascetic fluid increased and led to increased intra-abdominal pressure, which was the main cause of failure of hernia repair accompanied by leakage of ascites through incision, so an intraperitoneal catheter for tapping was placed to decrease this intra-abdominal pressure, and tapping occurred under the cover of intravenous albumin infusion, as these patients require control of ascites in the postoperative period. Intraperitoneal catheter was placed for all patients, and paracentesis of 2–3 l of ascetic fluid at interval of 3 days was done with administration of 6–8 g of albumin for each liter of ascitic fluid for fear of liver failure, encephalopathy, and renal failure [11].

In 1960, Baron [12] reported mortality rate of 31% in patients who underwent umbilical hernia repair and who had liver cirrhosis with ascites.

In thisr study, mortality rate was 16% of cases across both groups, which is in agreement with the result of O'Hara *et al*. [13] who reported morbidity rate of 22% and mortality rate of 16%. The risk of treating complicated hernia conservatively heavily outweighs the risk of surgical repair. Nonoperative management of complicated hernia with antibiotics and dressing results in mortality rate in range of 60–80%, so complicated umbilical hernia in cirrhotic patients should be repaired emergently [14].

Our study showed that emergently treated patients have a significantly higher morbidity and mortality in contrast to elective surgery, which was not only successful in most of the patients but this strategy had almost no associated mortality. Eker *et al*. [15] demonstrated successful elective repair of umbilical hernia with ascites and liver cirrhosis after follow-up period of 25 months, where one (4%) patient died of 25 patients. In this study, one patient died in elective group and three (12%) patients in emergent group.

Maniatis and Chistin [16] reported 2 in elective group, 14 in emergent group.

Umbilical hernia is considered a problem of patients with advanced liver disease. Investigation and carful application of new surgical technique to control ascites and hernia repair may improve the condition [17].

In this study, one operation was done for all patients. There was significant difference in operative time and postoperative hospital stay in elective group compared with emergent group, which is similar to that reported by Stephen *et al*. (2008) where complication reported in early postoperative period was 12% in elective group compared with 20% in emergent group, which was higher than reported by Marsma *et al*. [18] who reported 4.8% in elective group and 24% in emergency group, which is lower than reported by our study. The long-term follow-up reported three (12%) cases died from complication in emergent group, whereas one (4%) patients died in elective group, which is equal to that reported by Dauglas *et al*. [19] in both group. The most common complication of emergent group was irreducibility in ~70%, followed by obstruction but not strangulation, as no resection anastomosis occurred in remaining 30%.

Ragab and Abdel Aal [20] reported that strangulation was the most common complication that occurred in 50%, followed by irreducibility which was seen in 27.3%. Another study by Andraus and colleagues reported that ruptured umbilical hernia was the primary complication (38.2%) followed by irreducibility (29.4%).

Adults with umbilical hernias are more likely to have occurrence of incarceration or strangulation, especially in cirrhotic patients with ascites, and surgery is typically required to treat these complications [21].

Conclusion

Elective repair of uncomplicated umbilical hernia in cirrhotic patients is recommended owing to higher rate of morbidity and death associated with emergency surgery.

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Conflicts of interest

There are no conflicts of interest.

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