The perioperative challenge of umbilical hernias management in chronic liver disease: a multicentric comparative study

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Background
Umbilical hernias are likely to develop in liver cirrhosis patients with ascites as the disease progresses. It is debatable how to handle cirrhotic patients who have an umbilical hernia. Our goal was to examine the perioperative outcome, safety, and efficacy of surgical management of umbilical hernia in ascitic patients using anatomical repair and intraperitoneal mesh repair.

Methods
180 patients who reported to between June 2017 and September 2022 with umbilical hernias complaints related to chronic liver disease were included in the study and divided into three groups: – Group A (56 cases) 4 instances were lost to followup, Group B (60 cases), and Group C (60 cases).

Results
There was a little difference between cases treated surgically and ones treated conservatively. Typically, child B was involved. In group A, 34 patients (60.7%) experienced solitary or combined problems in total. Of these, 14 candidates (25%) involved strangling, eight (14.3%) involved blockage, and twelve (21.4%) involved leaking hernias. Four instances (6.7%) of seroma, four cases (6.7%) of hematoma, twelve cases (20%) of ascitic leak, 32 cases (53.3%) of recurrence, and four cases (5.6%) of encephalopathy were in group B cases. In group C, there were 16 instances (13.3%) of ascetic leak, 12 cases (20%) of wound infection, 12 cases (20%) of seroma, ten cases (16.7%) of recurrence, and four cases (6.7%) of encephalopathy.

Conclusion
It is advised to do elective treatment for umbilical hernias. mesh reinforcement of abdominal wall hernias is more common as it has a lower risk of hernia recurrence.

Keywords:
chronic liver disease, perioperative outcome, Umbilical hernia

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Introduction

It is not recommended to treat umbilical hernias without surgery in CLD because it increases the risk of complications. An umbilical hernia that has predominantly been aggravated by peritonitis in ascitic patients [1–4].

Because of its simple implantation and lower incidence of hernia recurrence, prosthetic mesh reinforcement of abdominal wall hernias has gained recognition. In some non-complicated cirrhotic patients with ascites, elective umbilical hernia mesh repair is a practical method, adding more support to the use of this tactic [5–7].

The study's objective was to assess the perioperative outcome, safety, and efficacy of surgical management of umbilical hernia in ascitic patients.

Materials and methods

180 candidates with umbilical hernias and ascites who attended from June 2017 to September 2022

participated in this randomized controlled research after obtaining written informed consent. The following inclusion criteria were met by all patients who were subsequently recruited: – 1- Ascitic patients who were presented with an umbilical hernia. 2- Simple sutures were used in an emergency to fix an umbilical hernia that was leaking 3-nonstrangulated irreducible umbilical hernia. The patients with exclusion criteria included Patients with advanced coagulopathy, recurring cases, hepatic encephalopathy, strangulated hernias with gangrenous content, and infected hernias .

All patients were carefully subjected to Full history taking, Clinical examination either general or Abdominal examination, and Full preoperative investigations. Every patient was categorized using the Child-Pugh-Turcotte score [8]. Patients are allocated into three groups at random: 1- Conservative group (group A of 56 cases) as 4 cases were lost to followup, 2- Anatomical repair one (group B of 60 cases), and 3- Intraperitoneal mesh repair group (group C of 60 cases).

The patient was optimized as regards the coagulation profile and ascites. The GI team can best control ascites prior to surgery by using diuretics, early nutritional assistance, intravenous albumin, and/or paracentesis. In all cases, preoperative prescriptions for intravenous antibiotics (3rd generation cephalosporin, for example) were made. For the treatment of preexisting Coagulopathy, fresh frozen plasma and cryoprecipitate were employed. After patient optimization, the mode of anesthesia was selected. Depending on the patient's health and the anesthetist's preference, local, general, or regional anesthesia was employed. To make access easier, the patient was positioned supinely on the operating table with their arms by their sides. In patients of group B using non-absorbable suture material, the primary umbilical hernial repair was carried out using a traditional interrupted approach. In group C, after the hernia sac's contents have been reduced, an intraperitoneal repair using double face mesh is performed. The mesh is made to extend beyond the flaw by at least 5 cm. After that, the mesh was positioned intraperitoneally and secured with cut prepositioned polypropylene sutures.

The primary endpoints were investigated. Operative time and intraoperative complications (Bowel compromisation, hematemesis) were monitored throughout the procedure. Ascites postoperative management with plasma, albumin, diuretics, and, if necessary, paracentesis. Patients are followed up to a month after surgery to evaluate seroma formation, hemorrhage, dehiscence of wounds, ileus, surgical site infection (SSI), temporary ascites leak, coma, hematemesis, and deteriorated liver function tests.

For secondary endpoints of late complications, recurrence was monitored by clinical examination, ultrasonography, and an abdominal CT scan every three months for at least six months. Conservative group: Patients are examined for the presence of strangulation, obstruction, infection, and leaking ascites every three months for at least six months. Appropriate ethical approval was secured from our local ethical committee.

Data interpretation and statistical analysis with the aid of the IBM SPSS software package version 26.0, data were fed into the computer and evaluated. The terms used to describe qualitative data were number and percentage. After determining the normality of the quantitative data using the Kolmogrov-Smirnov test and Shapiro-Wilk test, the median (minimum and maximum) & interquartile range for non-parametric data and mean and standard deviation for parametric data were used to describe the data. *P* value less than 0.05 was regarded as significant. χ^2 test for two or more group comparisons. If necessary, the χ^2 test was corrected using the Fischer Exact test.

Results

The present study population included 180 patients who were presented with ascites and complained of umbilical hernia. They were divided into three groups: 1- Conservative group (group A of 56 cases) as 4 cases were lost to followup, 2- Anatomical repair one (group B of 60 cases), and 3- Intraperitoneal mesh repair group (group C of 60 cases). Regarding patient characteristics, most cases involve men, and there is little difference between cases treated surgically and those treated conservatively. The mean age in group B is 56.4±5.1 years, in group c is 55.24±8 years, and 54.3 ±5.3 years in group A as shown in Table 1.

The perioperative demographic and scoring criteria of the recruited candidates. As regards the preoperative clinical data in Table 1, most cases were child B. They represent 36 (64.3%) patients, 46 (76.7%), and 42 (70%) respectively for group A, group B, and group C. While child C represents 20(35.7%) patients, 14 (23.3%), 18 (30%) respectively in those groups. The laboratory and sonographic results in the three groups do not significantly differ from one another. The

Table 1 Demographic and child-pugh-turcotte scores of the groups of the study

variable	Group A	Group B	Group C	Test of Significance
Age yr (mean± SD)	54.3±5.3	56.4±5.1	55.24±8	F=0.5 *P*=0.77
Male *n* (%)	40 (71.4%)	46 (76.7%)	48(80%)	χ^2 *P*=0.9
Female	16(28.6%)	14(23.3%)	12 (20%)	
Child-Pugh-Turcotte score *n* (%)				
B	36(64.3%)	46 (76.7%)	42(70%)	χ2 *P*=0.67
C	20 (35.7%)	14 (23.3%)	18 (30%)	
sonographic data *n* (%)				
Mild	18(32.1%)	18 (30%)	26(43.3%)	2 χ *P*=0.26
Moderate	20(35.8%)	18 (30%)	24(40%)	
Marked	18(32.1%)	24(40%)	10(16.7%)	
Laboratory data (mean± SD)				
INR	1.6±0.61	1.3±0.24	1.5±0.30	F=1.1 *P*=0.18
s.albumin	2.3±0.35	2. 46±0.46	2.38±0.48	F=0.15 *P*=0.75
s.bilirubin	2.3±0.81	1.5±0.7 1	1.87±0.87	F=0.28 *P*=0.56

χ^2 : chi square for categorical data F: one way annova test for continuous data.

laboratory data, serum Albumin was 2.3±0.35 g/dl, 2. 46±0.46 g/dl, and 2.38±0.48 g/dl for group A, group B, and group C respectively. Serum Bilirubin was 2.3 ±0.81 mg/dl, 1.5±0.7 1 mg/dl, 1.87±0.87and mg/dl, for group A, group B, and group C respectively. INR was 1.6±0.61,1.3±0.24, and 1.5±0.30 for group A, group B, and group C respectively.

For group A, the sonographic data in Table 1 demonstrate that 20 patients (35.8%) have moderate ascites, 18 patients (32.1%) have significant ascites, and 18 patients (32.1%) have minimum to mild ascites. For group B, there are 18 patients (30%) with moderate ascites, 24 patients (40%) with significant ascites, and 24 patients (40%) with minimal to mild ascites. In group C, 10 patients (16.7%) have marked ascites, 24 patients (40%) have moderate ascites, and 26 patients (43.3%) have minimal to mild ascites. The laboratory and sonographic results in the three groups do not significantly differ from one another.

In group A primary endpoints, there were 34 patients who experienced complications (60.7%), either isolated or in combination. Of these, 14 cases (25%) involved strangulation, 8 (14.3%) involved obstruction, 8 (14.3%) involved infection, 6 (10.7%) involved hepatic encephalopathy, and 12 (21.4%) involved rupture and leaking hernias (Table 2). Complications in the cases required surgical intervention, either anatomical or mesh repair.

The mean operating time for group B in the operated groups in Table 3 was 67.823.41 min, compared to 849.41 min for group C. Group A's stay lasted 3.9 2.34 days, whereas Group C's did so for 4.362.79 days. In the current series, six (ten percent) patients from group B and six (10 percent) from group C were transferred from child B to child C after six months, respectively.

Table 2 Follow up monitoring primary endpoints of cases of group A

variable	*N* (%)
SSI	8 (14.4)
Encephalopathy	6 (10.6)
Rupture	12 (21.4)
Strangulation	14 (25)
Acute incarceration	8 (14.4)
Case fatality	10 (17.8)

Table 3 The postoperative primary outcome of operated cases

variables	Group B *N* (%)	Group C *N* (%)	Test of Significance
Infection	6 (10%)	12 (20%)	*P*=0.03*
Seroma	4 (6.7%)	12 (20%)	*P*=0.04*
Hematoma	4 (6.7%)	10 (16.7%)	*P*=0.02*
Leak	12 (20%)	8(13.3%)	*P*=0.5
Recurrence	32 (53.3%)	10(16.7%)	<0.001*
Encephalopathy	4(6.7%)	6(10%)	*P*=0.07
Mortality	6 (10%)	8 (13.3%)	*P*=0.76
Shifted from child B to child C	6 (10%)	6 (10%)	*P*=0.07
Length of stay	3.9±2.34	4.36±2.79	T=0.9 *P*=0.5
Operative time	67.8 ±23.41	84±9.41	T= 5.9 *P*<0.002

As regards postoperative complications, in group B six cases (10%) were complicated with wound infection, four cases (6.7%) with seroma, four cases (6.7%) hematoma, twelve cases (20%) ascitic leak, 32 cases (53.3%) show recurrence and four cases (5.6%) hepatic encephalopathy. In group C, there were four cases (6.7%) of hepatic encephalopathy, twelve cases

(20%) of wound infection, twelve cases (20%) of seroma, ten cases (16.7%) of hematoma, sixteen cases (13.3%) of ascetic leak. Cases involving wound infections are treated with antibiotics based on culture and sensitivity. No cases required mesh removal. In group A, there were 5 patients who died (17.9%). Six instances (8.3%) and eight patients (13.3%) made up group C in group B. Aspiration is used to treat cases complicated with seroma, as shown in Table 3.

Discussion

Due to the pathophysiology of cirrhosis, the best way to address umbilical hernia in patients with liver cirrhosis and ascites is still up for debate and presents particular and unusual management issues. Patients with cirrhosis who have abdominal wall abnormalities may become huge and develop life-threatening consequences if untreated, necessitating immediate surgical intervention [9].

Umbilical hernias in cirrhotic patients increase the risk of complications after surgical correction. These consequences consist of hernial recurrence, approaching liver cell failure, and wound infection associated with ascitic fluid leaking. Cirrhotic individuals undergoing surgery under general anesthesia are anticipated to have higher rates of morbidity and mortality. The severity of the underlying liver illness is positively linked with these rates. Some research that suggested cirrhotic patients undergo elective umbilical hernial repair experienced some improved results [10–12].

However, there is still debate over the choice of patient, the best time for surgery, and the repair method. Due to its lower recurrence rates, prosthetic mesh surgery for hernial repair has grown in popularity among hernial surgeons. The use of prosthetic materials in hernial repair in the past was undesirable since they were linked to wound infections that could eventually necessitate the removal of the mesh. However, some surgeons discovered that complex hernias in non-cirrhotic patients who underwent hernial surgery utilizing non-absorbable mesh resulted in a lower recurrence rate [6,13,14].

The management and results following umbilical hernia management in patients with cirrhosis are presented in the current article as our experience. 180 cases with an umbilical hernia and hepatic cirrhosis were included. A total of 120 patients (60 anatomical repairs and 60 intraperitoneal mesh repairs) were managed surgically, while 56 instances were treated conservatively, and the outcomes were compared. The bulk of the cases in the current study are male, and there was no discernible difference between those managed conservatively and those addressed surgically. Males make up 80.6% of group B and 80% of group C, compared to 71.4% of group A, and group B's mean age is 57.56.1 years, group C's mean age is 56.359 years, and group A's mean age is 55.46.02 years. These outcomes are like those in the previous report [13].

The work of the operative and conservative groups did not significantly differ. In the current study, group A experienced a marked rise in complications; 14 instances (or 25%) involved strangulation and required urgent surgical intervention. Twelve (21.4%) patients had rupture hernia, eight (14.3%) patients had incarceration, and eight (14.3%) patients had SSI. (i.e., during the followup period, around 60.7% of conservative cases experienced problems). These findings are consistent with earlier retrospective studies that showed significant morbidity and mortality are related to conservative management of umbilical hernia in cirrhotic individuals [12]. As a result, elective surgery was advised to avoid any potential negative effects of emergency surgeries. Due to the high rates of recurrence and risk of postoperative complications, surgery is still deferred in many situations [4].

On the other hand, numerous recent studies indicated lower rates of morbidity and mortality. The reason for this decline is the significant advancement in perioperative care and surgical methods. Patients' mortality rates were reported to have dramatically decreased after elective hernial repair, compared to emergency hernial repair due to complications, which had noticeably higher morbidity and mortality rates. There were 11 cases (11.7%) of deaths in this study, which is in line with data from other series like Habib *et al.* (11.9%) [4,15,16].

In group A, eleven patients (17.9%) died. Six instances (10%) were in group B, while eight patients (13.3%) were in group C. The difference is not statistically significant, but it is higher in group A than in the surgery groups. This outcome is comparable to that which Marsman *et al.* reported, who discovered 15.4% mortality in the conservative group [4]. In addition, a 2.7% death rate was reported by Mckay and his coworkers based on a study of the material released in 1980 [15]. As a result, it is clear that the conservative management of umbilical hernia in patients with liver cirrhosis is significantly related with morbidity and mortality.

In the current series, six (10%) patients from the anatomical repair group, six (10%) from group C, and four (7.1%) patients from group A switched from child B to child C after six months. This can be described by group A's hernia problems, which worsen the patient's overall state, while group B's surgical stress, group C's anesthetic exposure, and group D's postoperative ascites leaks can also be used to explain it. After anatomical restoration, Park *et al.* noted a 3.7% shift from child B to child C in the first three postoperative days [17].

The mean operating time in the surgical groups is 67.823.41 min for group B and 849.41 min for group C. Because the mesh insertion method is more complicated in group C, the operation takes longer. These findings are comparable to those of Hassan *et al.*, who used sub-lay mesh and had a mean operating time of 67.45 min [7] The lengthier operation duration (100 min) in Yu. *et al.* is attributable to the longer laparoscopic technique, which was done on 12 of 18 patients [18].

The average length of stay in the hospital is 4.36 days for group C and 3.9 days for group B. Due to a slightly higher frequency of wound problems following mesh insertion in group C, it is somewhat longer, although this difference is not statistically significant. Six cases (10%) of wound infections were reported in the anatomical repair group against 12 occurrences (20%) in the mesh repair group. There was never a need to remove the mesh because all instances were handled cautiously. The lengthier hospital stay in the hernioplasty group may be explained by the fact that prosthetic mesh repair was linked to a 2-fold higher risk for infection when compared to suture repair. The surgical site infection incidence in Ammar's study was reported to be 8.5% and 16.2% in traditional fascial repair and mesh repair, respectively, however, he did not include kid C patients in his research, which may account for the greater infection rate in our study [19]. Gurita *et al.* study's found that 16.6% of ascetic patients with intraperitoneal mesh had wound infections, however, he only performed surgery on minimally ascetic individuals without any other co-morbidities [20]. According to Hassan *et al.* study's, 3% of wound infections occurred following the placement of sub-lay mesh, however, he eliminated any patients in which complex hernias were present [7]. SSI after umbilical hernia repair has ranged from 1.8 to 19% depending on whether risk factors are present or absent. Due to the existence of complex hernias and liver cirrhosis, cirrhosis is regarded as a risk factor for the infection that, in our study, is comparable to or possibly more than in other reports [21].

Considering the overall health of our patients and the presentation of some cases with complications, the results we obtained regarding the intraperitoneal mesh insertion in ventral hernias in ascetics were extremely favorable. Six patients in group A (8.3%) and twelve in group C (20%), respectively, experienced postoperative seroma complications. Even though in 67% of his cases, he conducted the laparoscopic repair, these results are consistent with those of Yu *et al* [18]. The extensive dissection required for mesh insertion may account for the greater prevalence of seroma with mesh repair despite being intraperitoneal.

In our study, recurrence was experienced by 32 patients (53,3%) in the anatomical repair group and by 10 instances (16.7%) in the mesh repair group. The anatomical repair group's recurrence matches reports from other datasets, like those by Habib *et al.* (11.9%). The rate of recurrence following umbilical herniorrhaphy was predicted to be 20 to 40% [4,16,19]. Mesh could be used to treat complex hernias in cirrhotic individuals, according to a prior randomized trial, with a 16.2% incidence of wound-related morbidity and a substantially reduced recurrence rate (2.7%). Mesh insertion significantly reduces the high rate of hernia recurrence in the anatomical repair group throughout a 2-year followup, as shown in numerous trials [22–24]. The rate of recurrence in the mesh repair group is comparable to the study by Yu *et al.*, which found a 22.2% rate of recurrence in 18 patients treated for an umbilical hernia, of whom 15 patients underwent intraperitoneal mesh [18].

Twelve patients (or 20%) in group A experienced a postoperative ascetic leak, whereas eight cases (or 13.3%) in group C were complicated by an ascetic leak, which was minimized by intraperitoneal mesh repair. These results are comparable to those obtained by Ammar (14% transitory leak for anatomical repair and 11% for mesh repair) and Habib et al. (10.4% for anatomical repair and 13.2% for mesh repair) [16,19].

Conclusion

Early elective repair of umbilical hernias in patients with cirrhosis and ascites is advised to avoid serious consequences of conservative care. Because mesh reinforcement has a lower risk of hernia recurrence, it is more often used than anatomical repair techniques. The mesh is being positioned intraperitoneally, the

wound is guarded against ascitic leak and related postoperative consequences. Controlling ascites is essential for minimizing surgical complications and hernia recurrence.

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Conflicts of interest

There are no conflicts of interest.

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