
Umbilical hernia in ascites due to cirrhosis: A surgical challenge

Alister J. Victor^{*} and Ajitha M. B

Bangalore Medical College and Research Institute, Bangalore, Karnataka, India

***Correspondence Info:**

Dr. Alister J. Victor

Bangalore Medical College and Research Institute,
Bangalore, Karnataka, India

E-mail: alisterjvictor@yahoo.com

Abstract

Umbilical hernia develops in 20% of patients with cirrhotic ascites due to raised intra-abdominal pressure. Complications like obstruction and strangulation though rare, can pose a serious challenge. The management of these patients has been a subject of debate. Earlier, surgery was advocated only for those patients with complicated umbilical hernia. The rest were managed conservatively. This led to higher morbidity and mortality. At present, it is advocated to operate every case. For those eligible for liver transplantation, hernia repair is done at the time of transplantation and for those not eligible for liver transplantation, hernia repair is done after control of ascites. If ascitic fluid is not infected, mesh repair is increasingly being favoured under antibiotic cover. Laparoscopic repair is gaining popularity these days and has been done successfully in selected complicated cases as well.

Keywords: Umbilical hernia, ascites, cirrhosis

1.Introduction

Ascites is a common complication of cirrhosis. Nearly 20% of the patients with ascites have an associated umbilical hernia[1]. Ascites raises the intra-abdominal pressure, promoting the formation of umbilical hernia. It also hinders healing after surgery and leads to recurrence. So a decision has to be taken whether to operate or not. If the patient is being taken up for surgery, the timing and type of surgery also has to be planned.

Umbilical hernia in general population with no co-morbidities is managed surgically by performing hernioplasty in an elective setting. But in patients with cirrhotic ascites, the management has to also take into consideration the accompanying liver disease. The various risks include decompensation of liver disease, bleeding tendencies, hepatic encephalopathy, hepato-renal syndrome, hepato-pulmonary syndrome, infection, etc. Hence these patients have to be managed with the utmost precaution.

Since the management of these patients is a subject of debate, this review article has been

compiled to know the various trends being adopted by different professionals.

2. Etio-pathogenesis

Ascites increases the intra-abdominal pressure, leading to excessive stretching of the abdominal wall and causes enlargement of the umbilical defect. This causes the peritoneum and the abdominal contents to pass through the umbilical defect leading to an umbilical hernia[2]. Hypo-proteinemia due to cirrhosis[2] and re-canalisation of the umbilical vein due to porto-systemic shunting[3] contribute to hernia formation as it weakens the abdominal wall.

Ascitic fluid provides buoyancy to the bowel loops. So it is unlikely to get obstructed or strangulated. But when the volume of ascites reduces due to administration of diuretics[4,5], large volume paracentesis[5,6] or shunting procedures[5-8], there is narrowing of the fascial defect due to decrease in intra-abdominal pressure leading to obstruction or strangulation [2]. Strangulation might lead to rupture of intestinal bowel loops leading to peritonitis, sepsis,

multi-organ dysfunction and death. Sometimes the hernia can rupture when there is an acute increase in intra-abdominal pressure leading to evisceration of omentum and/or bowel [9-11].

3. Clinical features

3.1 Due to cirrhosis

Anorexia and chronic under-nutrition lead to weight loss and emaciation. They might also have easy fatigability, weakness, alopecia, jaundice, easy bruising, palmar erythema, spider angiomas, parotid and lacrimal glands enlargement, clubbing and pedal edema. Men might have decrease in body hair, testicular atrophy and gynecomastia due to decreased hepatic clearance of peripherally formed estrogens. Women might have virilisation and menstrual irregularities.

Signs of liver cell failure like progressive jaundice, ascites, hepatic encephalopathy and features of portal hypertension like bleeding esophageal varices might be evident.

3.2 Due to umbilical hernia

3.2.1 Uncomplicated

Patient presents with abdominal distension with a separate bulge in the umbilical region. Cough impulse will be present.

3.2.2 Complicated

In obstruction or strangulation, there will be severe abdominal pain and vomiting. Cough impulse will be absent. If bowel is the content, patient will not be able to pass feces or flatus.

Rupture of bowel leads to peritonitis causing guarding, rigidity, septic shock or death due to leakage of intestinal contents. Spontaneous bacterial peritonitis (SBP) must be ruled out in patients with abdominal pain. Rupture can occur if there is an acute increase in intra-abdominal pressure due to vomiting, coughing, straining during defecation or any other cause, leading to ascitic fluid leak and/or evisceration of intra-abdominal contents like bowel and omentum [9-11]. Discolouration, ulceration or rapid increase in size of hernia indicates impending perforation [11].

4. Investigations

4.1 Blood investigations

Complete blood counts with differential count: Anemia might be present due to chronic under-nutrition. Total leukocyte count (TLC) will be elevated in infection. TLC might be low in sepsis.

Liver function test: Bilirubin levels will be elevated. Hypo-proteinemia and hypo-albuminemia will be present. AST/ALT >3 is due to alcoholic cirrhosis. An elevated alkaline phosphate level is due to obstructive jaundice.

Renal function test: Might be deranged if there is hepato-renal syndrome.

Serum electrolytes: Dyselectrolytemia may be present due to hyper-aldosteronism.

Hepatitis B surface antigen (HBsAg) and Hepatitis C antigen: As they can cause cirrhosis.

Blood sugars: Might be elevated due to insulin resistance. Hyperglycemia increases the risk of infection and delays wound healing.

Prothrombin time (PT), International normalized ratio (INR) and Activated partial thromboplastin time (aPTT): In cirrhosis, the liver is unable to produce coagulation factors leading to increase in bleeding tendencies affecting PT and INR values.

Arterial blood gas (ABG): To check for any acid-base imbalance.

4.2 Radiological investigations

Ultrasonography (USG): It shows coarse echotexture of liver with portal venous hypertension. Size of the umbilical hernial defect, contents and complications can be visualized.

Computed tomography (CT): It is superior to USG to detect obstruction or strangulation.

4.3 Analysis of ascitic fluid

Cell count and type: To look for infection.

Protein level: Low in transudate and high in exudates

Glucose level: Lowered, if infected.

Gram stain, culture and sensitivity: To look for the causative organisms, if any.

5. Scoring systems

5.1 Child Turcotte Pugh [12,13] scoring is traditionally used to assess the prognosis of patients with cirrhosis. It also helps in stratifying the outcome after surgery for umbilical hernia.

Table 1: Child – Turcotte - Pugh Classification

Factor	Points		
	1	2	3
Bilirubin (mg/dl)	<2	2-3	>3
In PBC* or PSC** (mg/dl)	<4	4-10	>10
Albumin (g/dl)	>3.5	2.8-3.5	<2.8
Prothrombin time (seconds prolonged) or INR	1-3 or <1.7	4-6 or 1.7-2.3	>6 or >2.3
Ascites	None	Slight	Moderate or large
Encephalopathy	None	Grade 1-2	Grade 3-4

*PBC = Primary biliary cirrhosis **PSC = Primary sclerosing cholangitis

Class A: 5 - 6 points; Class B: 7 - 9 points; Class C: 10-15 points.

5.2 The Model for End-Stage Liver Disease (MELD) is a scoring system increasingly being used to assess the severity of chronic liver disease. It was initially developed to predict death within 3 months of surgery in patients who underwent a transjugularintrahepaticporto-systemic shunt (TIPS) procedure [14], and was subsequently found to be useful in determining prognosis and prioritizing for recipient of a liver transplant [15,16]. This score is now used by the United Network for Organ Sharing (UNOS) and Eurotransplant for prioritizing allocation of liver transplants instead of the older Child-Pugh score [16,17].

MELD = $3.78 \times \ln[\text{serum bilirubin (mg/dL)}] + 11.2 \times \ln[\text{INR}] + 9.57 \times \ln[\text{serum creatinine (mg/dL)}] + 6.43 \times \text{aetiology (0: cholestatic or alcoholic, 1-otherwise)}$

UNOS has made the following modifications to the score

- If the patient has been dialyzed twice within the last 7 days, then the value for serum creatinine used should be 4.0
- Any value of bilirubin less than one is given a value of 1 (i.e. if bilirubin is 0.8, a value of 1.0 is used) to prevent the occurrence of scores below 0.

6. Treatment

A multi-disciplinary approach comprising of both medical and surgical professionals is required for these patients.

6.1 Treatment of cirrhosis

It involves the administration of bile acid supplements, Vitamin K, transfusion of Fresh frozen plasma (FFP) to correct coagulopathy, correction of dyselectrolytemia and adequate nutritional support to correct hypo-albuminemia [18,19].

Antibiotics like Rifaximin and lactulose are given to sterilize the gut and prevent the formation and absorption of ammonia into the circulation respectively. This reduces the chances of development of hepatic encephalopathy.

6.2 Treatment of umbilical hernia

6.2.1 Timing of surgery

Previous dictum was to treat umbilical hernia conservatively and surgery was reserved only for complicated cases due to the fear of concomitant liver disease. This led to higher recurrence, morbidity and mortality. Hence it is advised to operate all uncomplicated patients on selective basis as early as possible [20-24]. In uncomplicated patients eligible for liver transplantation, it is prudent to perform umbilical hernia repair at the time of transplantation after correction of all the deranged parameters [21]. In those not eligible for liver transplantation, surgery

is done after control of ascites. Complicated cases have to be operated on emergency basis.

6.2.2 Pre-operative control of ascites

Diuretics are used to reduce the ascitic volume. In those refractory to diuretics, it should be controlled carefully by paracentesis, preferably under ultrasound guidance. This helps in reducing the local pressure and thus facilitating easy reduction of hernia during surgery [25] or shunt procedures like TIPS [24,26].

6.2.3 Type of anesthesia

A study conducted by Lasheen *et al* [19] has shown that after adequate correction of various deranged parameters, performing surgery under intercostal nerve block or local anaesthesia was safer in comparison to spinal or epidural anesthesia.

6.2.4 Herniorrhaphy or Hernioplasty

Youssef *et al* [27] showed that elective onlay mesh repair in uncomplicated cases is simple, safe and effective. Hassan *et al* [28] showed that sublay mesh repair is safe and effective in uncomplicated cases. Mesh repair has to be done when the ascitic fluid is not infected under adequate antibiotic coverage.. More studies have to be conducted to prove the advantages of hernioplasty before performing it as a routine in these patients.

6.2.5 Open or Laparoscopic surgery: Advantages of laparoscopic umbilical hernia repair in cirrhosis with ascites are [29,30]

- Minimally invasive – minimizes ascitic leak
- Tension free repair
- Less chances of damage to the large collateral veins
- Restricts electrolyte and protein loss due to non-exposure of viscera
- Reduced blood loss
- Decreased pain
- Early recovery

Laparoscopic hernia repair is better than open repair in uncomplicated cases [29,30]. SaritC *et al* [31] performed laparoscopic repair for a strangulated umbilical hernia with refractory ascites successfully by releasing the incarcerated bowel loops and placing a dual Gortex mesh.

6.2.6 Post-operative control of ascites

Closed peritoneal drainage post operatively promotes wound-healing, control of ascites and reduces recurrence. It is especially indicated if bowel resection and anastomosis is done, if serum albumin is low and/or if ascites is refractory [32]. Koscielny *et al* [33] proposed a method of placing 2 large bore Robinson drainage tubes for 10-14 days post-surgery, to facilitate adequate healing.

6.2.7 Management of rupture

Emergency laparotomy has to be done. The accompanying devitalized tissue that might include the umbilicus, omentum and/or bowel must be excised [11]. Melcher *et al* [34] managed conservatively a ruptured hernia without any devitalized tissue, by using a fibrin-based tissue adhesive.

7. Poor prognostic factors [35,36]

- Age older than 65 years
- ChildTurcotte Pugh Classes B and C
- MELD score more than 15
- Serum albumin less than 3.0 g/dl
- Sepsis at presentation

8. Conclusion

The management of these patients requires a multi-disciplinary approach. It is evident from various studies that the trend has changed from conservative management to elective surgery for uncomplicated cases as delay leads to higher recurrence, morbidity and mortality. Various techniques have been proposed. At present, elective mesh repair is increasingly being advocated. Complicated cases have to be operated on emergency basis. The trend has changed from open to laparoscopic repair even in selected complicated cases.

References

- [1] Baron HC. Umbilical hernia secondary to cirrhosis of the liver - Complications of surgical correction. *N Engl J Med*. 1960; 263:824–828.
- [2] Belghiti J, Durand F. Abdominal wall hernias in the setting of cirrhosis. *Seminars in Liver Disease*. 1997; 17(3):219.
- [3] Shlomovitz E, Quan D, Etemad-Rezai R and McAlister VC. Association of recanalization of the left umbilical vein with umbilical hernia in patients with liver disease. *Liver Transpl*. 2005; 11(10):1298–1299.
- [4] Lemmer JH, Strodel WE, Eckhauser FE. Umbilical hernia incarceration: a complication of medical therapy of ascites. *Am J Gastroenterol*. 1983; 78(5): 295–296.
- [5] Chu KM, McCaughan GW. Iatrogenic incarceration of umbilical hernia in cirrhotic patients with ascites. *Am J Gastroenterol*. 1995; 90(11):2058–2059.
- [6] Triantos CK, Kehagias I, Nikolopoulou V, Burroughs AK. Incarcerated umbilical hernia after large volume para-centesis for refractory ascites. *J Gastrointest Liver Dis*. 2010; 19(3): article 245.
- [7] Trotter JE, Suhocki PV. Incarceration of umbilical hernia following transjugularintrahepaticportosystemic shunt for the treatment of ascites. *Liver Transpl Surg* 1999;5(3):209–210.
- [8] Eisenstadt S. Symptomatic umbilical hernias after peritoneo - venous shunts. *Arch Surg*. 1979; 114(12): article 1443.
- [9] Ogu US, Valko J, Wilhelm J, Dy V. Spontaneous evisceration of bowel through an umbilical hernia in a patient with refractory ascites. *J Surg Case Rep*. 2013 Oct 4; 2013(10).
- [10] Buffone A, Costanzo M, Basilw G, Terranova L, Papa V, Catania A, Cannizzaro MA. Spontaneous rupture of an umbilical hernia in cirrhotic patient with ascites – A case report and review of the literature. *Ann Ital Chir*. 2012 Oct 29; 2012.
- [11] Good DW, Royds JE, Smith MJ, Neary PC, Eguare E. Umbilical hernia rupture with evisceration of omentum from massive ascites: a case report. *J Med Case Rep*. 2011 May 3; 5:170.
- [12] Child CG, Turcotte JG. Surgery and portal hypertension. In: The liver and portal hypertension. Edited by CG Child. Philadelphia: Saunders. 1964; 50-64.
- [13] Pugh RNH, Murray-Lyon IM, Dawson JL, Pietroni MC, Williams R. Transection of the esophagus in bleeding oesophageal varices. *Br J Surg*. 1973; 60:648-52.
- [14] Malinchoc M, Kamath PS, Gordon FD, Peine CJ, Rank J, ter Borg PC. A model to predict poor survival in patients undergoing transjugularintrahepaticportosystemic shunts. *Hepatology*. 2000; 31(4):864–71.
- [15] Kamath PS, Wiesner RH, Malinchoc M, Kremers W, Therneau TM, Kosberg CL, D'Amico G, Dickson ER, Kim WR. A model to predict survival in patients with end-stage liver disease. *Hepatology* 2001; 33(2):464–70.
- [16] Kamath PS, Kim WR. The model for end - stage liver disease (MELD). *Hepatology* 2007; 45(3):797–805.
- [17] Jung GE, Encke J, Schmidt J, Rahmel A. Model for end-stage liver disease. New basis of allocation for liver transplantations. *Chirurg*. 2000; 79(2):157–63.
- [18] Davidson CS, Yonemoto RH. Herniorrhaphy in cirrhosis of the liver with ascites. *N Engl J Med*. 1956; 255(16):733–739.
- [19] Lasheen A, Naser HM, Abohassan A. Umbilical hernia in cirrhotic patients: outcome of elective repair. *J Egypt Soc Parasitol*. 2013 Dec; 43(3):609-16.

- [20] O'Hara ET, Oliai A, Patek Jr. AJ, Nabseth DC. Management of umbilical hernias associated with hepatic cirrhosis and ascites. *Ann Surg.* 1975; 181(1):85–87.
- [21] Marsman HA, Heisterkamp J, Halm JA, Tilanus HW, Metselaar HJ, Kazemier G. Management in patients with liver cirrhosis and an umbilical hernia. *Surgery.* 2007; 142(3):372–375.
- [22] Eker HH, van Ramshorst GH, de Goede B, Tilanus HW, Metselaar HJ, de Man RA, Lange JF, Kazemier G. A prospective study on elective umbilical hernia repair in patients with liver cirrhosis and ascites. *Surgery.* 2011 Sep; 150(3):542–6.
- [23] Choi SB, Hong K, Dengue, Lee J, Skin, Han HJ, Kim WB, Song TJ, Suh SO, Kim YC, Choi SY. Management of umbilical hernia complicated with liver cirrhosis: an advocate of early and elective herniorrhaphy. *Dig Liver Dis* 2011 Dec; 43(12):991–5.
- [24] Triantos CK, Kehagias I, Nikolopoulou V, Burroughs AK. Surgical repair of umbilical hernias in cirrhosis with ascites. *Am J Med Sci.* 2011 Mar; 341(3):222–6.
- [25] Russell KW, Mone MC, Scaife CL. Umbilical paracentesis for acute hernia reduction in cirrhotic patients. *BMJ Case Rep.* 2013 Oct 16; 2013.
- [26] Telem DA, Schiano T, Divino CM. Complicated hernia presentation in patients with advanced cirrhosis and refractory ascites: management and outcome. *Surgery.* 2010; 148(3):538–543.
- [27] Youssef YF, El Ghannam M. Mesh repair of non-complicated umbilical hernia in ascitic patients with liver cirrhosis. *J Egypt Soc Parasitol.* 2007 Dec; 37(3 Suppl):1189–97.
- [28] Hassan AM, Salama AF, Hamdy H, Elsebae MM, Abdelaziz AM, Elzayat WA. Outcome of sublay mesh repair in non-complicated umbilical hernia with liver cirrhosis and ascites. *Int J Surg.* 2014; 12(2):181–5.
- [29] Dokmak S, Aussilhou B, Belghiti J. Umbilical hernias and cirrhose. *J Visc Surg.* 2012 Oct; 149(5 Suppl):e32–9.
- [30] Belli G, D'Agostino A, Fantini C, Cioffi L, Belli A, Russolillo N, Langella S. Laparoscopic incisional and umbilical hernia repair in cirrhotic patients. *Surg Laparosc Endosc Percutan Tech.* 2006 Oct; 16(5):330–3.
- [31] Sarit C, Eliezer A, Mizrahi S. Minimally invasive repair of recurrent strangulated umbilical hernia in cirrhotic patient with refractory ascites. *Liver Transpl.* 2003 Jun; 9(6):621–2.
- [32] Elsebae MM, Nafeh AI, Abbas M, Farouk Y, Seyam M, Raouf EA. New approach in surgical management of complicated umbilical hernia in the cirrhotic patient with ascites. *J Egypt Soc Parasitol.* 2006 Aug; 36(2 Suppl):11–20.
- [33] Koscieny A, Hirner A, Kaminski M. Complicated umbilical hernia in patients with decompensated liver cirrhosis. Concept for risk reduction of repair. *Chirurg.* 2010 Mar; 81(3):231–5.
- [34] Melcher ML, Lobato RL, Wren SM. Novel technique to treat ruptured umbilical hernias in patients with liver cirrhosis and severe ascites. *J Laparoendosc Adv Surg Tech A.* 2003 Oct; 13(5):331–2.
- [35] Cho SW, Bhayani N, Newell P, Cassera MA, Hammill CW, Wolf RF, Hansen PD. Umbilical hernia repair in patients with signs of portal hypertension: surgical outcome and predictors of mortality. *Arch Surg.* 2012 Sep; 147(9):864–9.
- [36] Saleh F, Okrainec A, Cleary SP, Jackson TD. Management of umbilical hernias in patients with ascites: development of a nomogram to predict mortality. *Am J Surg.* 2015 Feb; 209(2):302–7.