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# Umbilical and Incisional Hernias in Liver Cirrhosis Patients: A Potentially Life-Threatening Condition

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## Abstract

***Introduction:*** *Hernia surgery in cirrhotic patients can represent a life threatening condition. The aim of the study is to analyze the outcome of these patients in order to propose a modification of the MELD criteria for the liver transplantation waiting list.*

***Material and Methods:*** *Seventeen patients with cirrhosis (13 Child A and B, 4 Child C) and abdominal wall hernia (9 umbilical, 5 incisional, 3 inguinal hernias) that underwent elective (10 cases) or emergency (7 cases) surgery in our Institution, have been retrospectively studied. Hepatocellular carcinoma has been present in 7 cases.*

***Results:*** *Mortality have been null among Child A and B patients and it has been of the 100% among Child C patients with umbilical or incisional hernia ($p \leq 0.0004$). All the patients with hepatocellular carcinoma and Child C died (mortality 100%). (p value result of comparison with Child A and B stages patients has been: 0,0286).*

***Conclusion:*** *These data suggest us to propose a modification of the MELD exceptions criteria P1 to organ allocation model for Child C patients that underwent emergency umbilical or incisional hernia. Also patients with hepatocellular carcinoma, Child C cirrhosis that underwent elective surgery for umbilical and incisional hernia could obtain extra-points in the waiting list prioritization.*

**Keywords:** *umbilical hernia, liver cirrhosis, herniorrhaphy, hepatocellular carcinoma, liver transplant MELD.*

## Introduction

Umbilical hernia occurrence in general population is nearly 2% [1] and it raises up to 20% among liver cirrhosis patients [2, 3] with a peak at 40% among liver cirrhosis patients with ascites [2, 3]. Umbilical hernia treatment in cirrhotic patients has been controversial. In the past an expectant tendency was adopted for these patients, due to the elevated rate of complications [2, 3]. On the other hand, "wait and see" management could lead to hernia enlargement and severe complications such as rupture, incarceration, evisceration, ascites drainage and peritonitis [4, 5]. Moreover, emergency surgery mortality among these patients was 7 fold higher versus elective surgery [3, 6] while elective procedure in cirrhotic patients without ascites has a reported mortality and morbidity similar to those of general population [3, 7, 8, 9]. It still remains an argument about the different approaches in liver cirrhosis patients with complicated hernia, umbilical hernia in liver cirrhosis failure (ascites), hepatocellular carcinoma, and patients in waiting list for liver transplantation. The aim of the study is a retrospective analysis of a series of 17 patient with abdominal wall hernia and liver cirrhosis that underwent surgical treatment in a single institution from January 2013 to January 2017.

## Material and Methods

Seventeen patients ( gender: three women and fourteen male; age range: 52-81 years-old; mean age

64 years-old) with cirrhosis and abdominal wall hernia have been admitted in our institution, San Martino-IST University Hospital, Genoa, from January 2013 to January 2017. There have been five abdominal wall incisional hernias (29,4 %); three inguinal hernias (17,6%) (one bilateral and two left sided ) and nine umbilical hernias (53%). Cirrhosis etiology have been: alcohol related in seven cases (41%) ; C virus hepatitis in 7 cases (41,7%) ; C and B virus hepatitis in one case (5,8%); C and alcohol related in one case (5,8%) and one case of NASH related hepatitis (5,8%). Child-Pugh classes have been: six cases of Child A (35%); seven cases of Child B (41,7%); four cases of Child C (23,5%). Hepatocellular carcinoma have been present in seven cases (41%); four umbilical hernia (57%); two incisional hernia (28,6 %) and one inguinal hernia (14,3%). Hernia recurrence occurred in two cases of umbilical hernia (2/9; 22%). Comorbidities have been: esophageal varicose veins in six cases (35%) (two of them associated with gastric varicose veins); refractory ascites occurred in two cases (11,7%). Extra-hepatic comorbidities have been: arterial hypertension in 6 cases (35%); diabetes in 7 cases (41%); cardiac failure in two cases (11,7%); coronary artery insufficiency in three cases (17,6%); hypothyroidism in one case; atrial fibrillation in one case; mitral valve insufficiency in one case (5,8%). Hernia repair have been done elective ten times (58,8%) and in emergency seven times (41,2%). Umbilical hernia repair have been done without mesh in all the cases (9/9; 100%); inguinal hernia repair have been done with mesh in three cases over three (100%); incisional hernia repair have been done without mesh in four cases (4/5; 80%) and with mesh in one case (1/5; 20%). Statistical differences have been calculated by one-tailed Exact Fisher test. (see Tab. 1)

**Table1.** *Materials and Methods*

| PZ. | GEND | AGE | HERNIA | RECUR | ETIOL | CHILD | HCC | I.P. | EXTRA | REPAIR | MESH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | F | 81 | INCIS | NO | C-B | C | YES | NO | 1,2,3 | ELECT | NO |
| 2 | M | 66 | ING | NO | ES | A | NO | EV | 2,4 | ELECT | YES |
| 3 | M | 60 | ING | NO | C | A | NO | NO | 2,1,4 | ELECT | YES |
| 4 | M | 66 | ING | NO | ES | B | YES | NO | NO | ELECT | YES |
| 5 | M | 63 | UMB | NO | ES | B | NO | EV | NO | EMER | NO |
| 6 | F | 67 | UMB | YES | C | C | YES | EV/GV | 2 | EMER | NO |
| 7 | F | 64 | UMB | NO | ES | B | NO | EV/RA | NO | ELECT | NO |
| 8 | M | 57 | UMB | YES | C | B | NO | NO | 1 | EMER | NO |
| 9 | M | 55 | UMB | NO | C | B | NO | NO | NO | ELECT | NO |
| 10 | M | 53 | UMB | NO | ES | C | YES | EV | 2,5,6 | EMER | NO |
| 11 | M | 52 | UMB | NO | C | B | YES | NO | NO | ELECT | NO |
| 12 | M | 66 | UMB | NO | C-ES | C | NO | EV/ GV/ RA | NO | EMER | NO |
| 13 | M | 68 | INCIS | NO | ES | A | YES | NO | 1,2,4 | ELECT | NO |
| 14 | M | 67 | INCIS | NO | NASH | A | NO | NO | NO | EMER | YES |
| 15 | M | 68 | INCIS | NO | C | B | NO | NO | 1,7 | ELECT | NO |
| 16 | M | 72 | INCIS | NO | C | A | NO | NO | 1,2,6 | EMER | NO |
| 17 | M | 65 | UMB | NO | ES | A | YES | NO | NO | ELECT | NO |

1 – Arterial hypertension 2 – Diabetes 3 – Hypothyroidism 4 – Coronary artery insufficiency 5 – Mitral valve insufficiency 6 – Cardiac failure 7 – Atrial fibrillation EV – Esophageal varicose vein GV – Gastric varicose vein RA – Refractory ascites INCIS-incisional hernia UMB-umbilical hernia ING-inguinal hernia ELECT-elective surgery EMER-emergency surgery

## Results

Postoperative complications have been two recurrence among patients underwent treatment of umbilical hernia (2/9; 22%); no recurrence have been observed among patients underwent inguinal hernia or incisional hernia repair. 30-days mortality have been null (0/17). Among umbilical hernia patients group (9 patients), recurrence have been treated by herniorraphy. Among all patients, one patient died six months after operation because of liver failure complication with refractory ascites and hepato-renal syndrome (six months mortality 1/17; 5,8%). Two-years mortality have been of 4 cases (4/17; 23,5%) and it have been always related to liver failure, refractory ascites and hepato-renal syndrome. Mortality among Child A patients have been null, as among Child B patients; it has been of 4 cases over 4 among Child C patients (3 umbilical hernia treated in emergency and one incisional hernia in election) (100%) ($p \leq 0.0004$). Concomitant hepatocellular carcinoma have been treated contemporary to hernia repair in two cases of umbilical hernia (2/4; 50%) and they have been treated at a second operation in all the other cases. One patient that underwent umbilical hernia repair and thermo-ablation of the hepatocellular carcinoma at the same time died within six month (mortality 50%) and one patient that underwent liver resection of hepatocellular carcinoma after umbilical hernia repair died within two years. One patient with incisional hernia that underwent liver resection for hepatocellular carcinoma died within two years. All the patients with hepatocellular carcinoma and Child C died irrespective of timing of umbilical or incisional hernia repair (elective or in emergency) or hepatocellular carcinoma treatment (mortality 100%). (p value result of comparison with Child A and Child B stage patients has been: 0,0286). Hepatocellular carcinoma have been treated with thermo-ablation in one case; a multifocal hepatocellular carcinoma have been treated by trans-arterial-chemoembolization, liver resection and thermo-ablation; four hepatocellular carcinoma have been treated by liver resection and one underwent to liver transplant. These last four cases are still alive and have been classified as Child A (2 cases) and Child B (2 cases) (cumulative one year mortality for CHILD A , B and HCC: null) (cumulative mortality of Child C, HCC and incisional or umbilical hernia: 100%) (p: 0,0286). Elective umbilical or incisional hernia repair have been done in 6 cases of cirrhosis Child A or B (mortality: null) and in one case of cirrhosis C (mortality 1/1) (p: ns). Emergency umbilical or incisional hernia repair have been done in 4 Child A or B patients (mortality: null) and in three Child C patients (mortality 3/3; 100%) (p: 0,0286) (see Tab. 2).

**Table2.** *Results*

| PZ. | HERNIA | RECUR | RECUR TREATM | CHILD | MORTAL | CAUSE OF DEATH | HCC | HCC TREAT | HCC-HERNIA TREAT TIME |
|---|---|---|---|---|---|---|---|---|---|
| 1 | INCIS | NO | | C | 2 YEARS | LF/RA/ HRS | YES | RES | POST |
| 2 | ING | NO | | A | | | NO | | |
| 3 | ING | NO | | A | | | NO | | |
| 4 | ING | NO | | B | | | YES ++ | TACE/ RES/ TA | POST |
| 5 | UMB | NO | | B | | | NO | | |
| 6 | UMB | YES | HERNIORRAPHY | C | 6 MONTHS | LF/RA/ HRS | YES | TA | CONTEMP |
| 7 | UMB | NO | | B | | | NO | | |
| 8 | UMB | YES | HERNIORRAPHY | B | | | NO | | |
| 9 | UMB | NO | | B | | | NO | | |
| 10 | UMB | NO | | C | 2 YEARS | LF/RA/ HRS | YES | RES | POST |
| 11 | UMB | NO | | B | | | YES | LT | POST |
| 12 | UMB | NO | | C | 2 YEARS | LF/RA/ HRS | NO | | |
| 13 | INCIS | NO | | A | | | YES | RES | POST |
| 14 | INCIS | NO | | A | | | NO | | |
| 15 | INCIS | NO | | B | | | NO | | |
| 16 | INCIS | NO | | A | | | NO | | |
| 17 | UMB | NO | | A | | | YES | RES | CONTEMP |

LF – Liver failure RA – Refractory ascites HRS – Hepato renal syndrome TA – Thermo ablation RES – Resection TACE – Trans arterial chemoembolization LT – Liver transplantation ++ - Multifocal HCC RECURR-Recurrence TREAT- treatment POST-hernia operation performed after HCC treatment MORTAL-mortality

## Discussion

Umbilical hernia and cirrhosis are relatively frequent diseases among general population (2% [1] and 1-7% [10] respectively) and they can be contemporary present in the same patients (20% of patients with cirrhosis) [2, 3]. Incidence of hepatocellular carcinoma among liver cirrhosis patients has been of 3-4% [11]. Cumulative one-year survival has been of 95% in Child A patients, 80% in Child B patients and 45% in Child C patients [12]. Emergency abdominal surgery, among Child C patients, had a reported operative mortality that range from 30% to 80% [13, 14]. Irrespective of Child stage, emergency umbilical hernia repair has a reported mortality of 14% [15]. Emergency liver transplant has been proposed and successfully performed after early postoperative liver impairment for umbilical hernia repair [16, 17]. An improvement of the survival of these patients have been reported submitting earlier postoperatively (and sometimes during the same admission) patients with ruptured umbilical hernia and advanced-stage cirrhosis to liver transplantation [18]. Reported one-year mortality of liver resection versus radiofrequency ablation of very early and early hepatocellular carcinoma has been not different [19]; and so our HCC patients underwent one of these procedures before a possible inclusion in liver transplant waiting list. In Italy, indications for liver transplantation in liver cirrhosis have been reported by the national consensus conference promoted by the Italian College of Liver Transplant Surgeons for the Italian Society for Organ Transplantation and by the Italian Association for the Study of the Liver [20] in: super-urgent (nationwide allocation) (fulminant hepatic failure and early re-liver transplantation); urgent (macroarea allocation) as MELD > 30 and P1 exceptions (Rendu-Osler-Weber, hepatoblastoma, Kasabach-Merrit syndrome, late acute liver re-transplant); standard (regional allocation) as P2 exceptions (hepato-pulmonary syndrome, porto-pulmonary hypertension, late chronic re-transplant, refractory hydrothorax, hepato-renal syndrome, previous severe infections), MELD 15-29, hepatocellular carcinoma, P3 exceptions (refractory ascites, familial amyloidotic polyneuropathy, Wilson disease, NET metastases, hemangioendothelioma), P4 exceptions (complicated adenomatosis, polycystic disease, primary sclerosing cholangitis, and primary biliary cirrhosis). In our casuistry it has been demonstrated that patients with Child C cirrhosis and umbilical or incisional hernia that underwent emergency surgery have a significantly higher mortality respect to Child A and B patients ( 100% vs 0%) (p: 0.026). Moreover, patients with Child C cirrhosis and hepatocellular carcinoma that underwent elective or emergency surgery for umbilical and incisional hernia have a significantly higher mortality respect to the same patients at Child A or B stage (P: 0,0286). Other Authors [16, 17] proposed emergency liver transplantation for complicated umbilical hernia in end-stage liver cirrhosis patients. The high mortality rates (100%) found in our experience, despite the accurate medical treatment of ascites, paracentesis and TIPS, used as other Authors [21] are probably related to the long-term follow-up of two years and to the lack of priorization of the patients within the liver transplant waiting list. These data suggest us to propose a modification of the MELD exceptions criteria P1 to organ allocation model : Child C patients with or without hepatocellular carcinoma that underwent emergency umbilical or incisional hernia could be enclosed in emergency P1 MELD exceptions. In addition, also patients with hepatocellular carcinoma, Child C cirrhosis that underwent elective surgery for umbilical and incisional hernia could obtain extra-points in the waiting list prioritization.

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