

Comparison of J-Shaped Incision and Mercedes Incision for Liver Transplantation

Abstract

Wound-related and incision-related complications such as wound infections and incisional hernias are common after liver transplantation. Advances in surgical, anesthesiological, critical care, and immunological innovations have led to a dramatic reduction in postoperative morbidity and mortality. Orthotopic liver transplant (OLT) has been first described with traditionally Mercedes type incision. Less traumatic J shaped incision has been used more frequently. We analyzed retrospectively 110 consecutive patients submitted to OLT in our institution from November 2010 to December 2012. In our program, beginning on September 2011, orthotopic liver transplantation (OLT) was performed using J-shaped (J) incision routinely, switching from a previous Mercedes (M) incision. We compared the incidence for surgical site infection (SSI), incisional hernia, and overall satisfaction. Fifty patients submitted to OLT using J-shaped incision were compared to 60 patients with M incision. Age, sex distribution, indication for OLT, and MELD score were similar in both groups. Three patients in the J group developed SSI, 6%, while 13, 21.6%, patients in the M group developed SSI ($p=0.02$). Incisional hernia was observed in 9 patients in the J group, 18%, compared with 22 patients in M group, 36.6% ($p=0.03$). Regarding overall satisfaction with the results of the incision, 48 patients, 96%, in J group gave the highest score, while in the M group, 45 patients, 75%, attributed the highest score for the questionnaire. After we have decided to switch from Mercedes type incision to J-shaped incision, OLT was feasible in all patients. When refraining to incise rectus abdominis on both sides, we provide a less traumatic incision, which leads to fewer complications postoperatively. Our results suggest that a J-shaped incision is preferred to other incisions for OLT.

Introduction

Liver transplantation has become the treatment of choice for patients with end-stage liver disease. Advances in surgical, anesthesiological, critical care, and immunological innovations have led to a dramatic reduction in postoperative morbidity and mortality. Wound-related and incision-related complications such as wound infections and incisional hernias are common after liver transplantation and they imply considerable morbidity and also in mortality [1-6].

In recent years, liver transplantation increased exponentially in Brazil, and this is expected to continue the growth progressively [7]. The cost of liver transplantation with living donor is superior to deceased donor transplantation. The most expensive item in liver transplantation, both deceased donor and living donor, is the medications [8].

Even the best tests, drugs and treatments can't decrease complications even when a flawless surgical technique is performed [9]. Liver transplants have considerable rates of surgical site infection (20,7%). These patients are hospitalized on average 15 days, allowing greater colonization and increasing the risk of this complication [10].

The success of liver transplantation is when the patient is able to re-enter the job market as early as possible [11]. Nutritional therapy



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is also effective in improving the prognosis and quality of life of transplanted patients [12].

Also, patients undergoing orthotopic liver transplantation (OLT) show a high risk of developing an incisional hernia [13]. Several factors as length and type of wound incision, jaundice, wound infection, nutritional status of the patient (obesity or malnutrition), and steroid therapy have been involved in the development of incisional hernia after OLT [14].

In order to gain full access to the liver during OLT, an extensive incision is usually required. The incisions commonly used are Mercedes, J shaped and midline. The Mercedes incision is a transverse incision with median extension, both on the rectus abdominis muscle. The midline incision includes solution of continuity from the xiphoid process to the umbilicus, in the sagittal plane. Finally, J-shaped is performed by unilateral subcostal incision with extending median [15].

The Mercedes and all other incisions are significantly associated with incisional hernias in older patients with higher BMI (Body Mass Index), diabetes mellitus and longer admission in ICU (Intensive Care Unit) and hospital [16].

In this present report we compare the traditional Mercedes type with a J-shaped incision in adults patients submitted to OLT in our institution.

Material and Method

We retrospectively analyzed 110 consecutive patients, with more than six-month of follow-up, submitted to OLT between November 2010 and December 2012. In our program, beginning on September 2011, orthotopic liver transplantation (OLT) was performed using J-shaped (J) incision routinely, switching from a previous Mercedes (M) incision. The same team performed all procedures. The Mercedes incision includes bilateral subcostal transverse incision with a midline extension, incising both rectus abdominis muscles. The J-shaped incision consists of a midline incision with a right transverse incision, only compromising the right rectus abdominis muscle. In both types of incision, the same subcostal retractor was used. In all

patients the abdominal cavity was drained with two tubular drains. The abdominal wall was closed using #1 polydioxanone (PDS™ II) running suture, and the skin with a 3-0 nylon interrupted suture. Incidence of surgical site infection (SSI), incisional hernia, and degree of satisfaction was obtained. For the latter, phone call interview was made and the patient was required to give a grade of his/her overall satisfaction, from 1 (not happy) to 5 (pleased), with the incision. Chi-square test was used for statistical analyses.

Results

A total of 110 patients, fifty patients undergoing J-shaped incision (group J) and sixty on Mercedes incision (group M). There was no statistically significant difference between age, sex distribution, indication for OLT and MELD average (Group M = 17,07 vs Group J = 17,90). Regarding complications, there was a significant difference between the groups J and M, as shown in Tables 1 and 2.

Regarding overall satisfaction with the results of the incision, 48 patients, 96%, in J group gave the highest score, while in the M group, 45 patients, 75%, attributed the highest score for the questionnaire. When asked about daily activities, the Mercedes incision group had worse grades than J-shaped group (p = 0.018). Assessing the need for reoperation, there was no significant difference between the two groups. At the surgery, the M group needed more blood components than J group as show in the Table 3.

The average time of surgery was 4 hours and 54 minutes in group M and 4 hours and 39 minutes in group J. The average time of ischemia was 9 hours and 3 minutes and 8 hours and 42 minutes in group J.

Discussion

In our series the incidence for incisional hernia was 28.18%. Our data confirmed that eventration post liver transplantation is a surgical complication with an incidence of 8% among our cases compared with literature data that range from 4.6%–34% [13,17,18].

This complication was much lower when J shaped incision was used, 18% compared to 36.6% of Mercedes incision. The same reduction in incisional hernia following OLT was reported by others [17,19].

In an experimental review by Biondo-Simões et al., it was shown that the procedure of hepatectomy leads to a delay of the healing process, interfering with collagen synthesis and angiogenesis, which could explain the results of incisional hernia, but not addressing type of incision [20].

Incisional hernia repairs are common and costly. Although rarely fatal, this complication can has substantial clinical and cost implications. The prevalence of incisional hernia after laparotomy is reported to be between 11% and 20%. It causes pain and other problems, such as bowel obstruction, in carceration and strangulation. It’s known that the risk is different according to the procedure and the technique [21].

It is important to find out which technique causes less incisional hernia because this is a public health problem and many researchers are seeking new methods to prevent and treat the incisional hernia, as new compounds derived from polypropylene, polyurethane, and polydioxone [22-24].

In a recent review of 450 consecutive OLT, Piardi et al. reported risk factor influencing the development of post OLT incisional hernia [18]. No significant difference was observed for age, OLT indication, Child-Pugh score, albumin, comorbidities, operative time, transfusions, immunosuppressant regimen, and graft rejection episodes as well as for the incisional approach and hospital stay. Gender, body mass index (BMI), preoperative ascites, and pulmonary complications after OLT were risk factors associated with the incidence of incisional hernia [18].

We also have found a lower incidence for surgical site infection in patients with J shaped incision, 6% vs 21.6%. After we have decided to switch from Mercedes type incision to J-shaped incision, OLT was feasible in all patients with this incision. When refraining to

Table 1: Complications.

Complication	Group J	Group M	p
SSI	3 (6%)	13 (21.6%)	0.02
Incisional hernia	9 (18%)	22 (36.6%)	0.03

The basic cause of liver transplantation is described in the following table

Table 2: Primary disease.

M Group	%	J Group	%
Hepatitis C Cirrhosis	34%	Hepatocellular Carcinoma	29%
Alcohol Cirrhosis	16%	Hepatitis C Cirrhosis	24%
Hepatocellular Carcinoma	16%	Alcohol Cirrhosis	14%
Hepatitis B Cirrhosis	9%	Hepatitis B Cirrhosis	10%
Cryptogenic Cirrhosis	7%	Cryptogenic Cirrhosis	4%

Table 3: Average blood components need at surgery in units.

Group	Redcells	Plasma	Cryoprecipitate	Platelets	CellSaver
M	2.70	3.30	0.39	3.28	217.19
J	2.12	1.84	0.58	2.25	189.38

incise rectus muscularis on both sides, we provide a less traumatic incision, which leads to fewer complications postoperatively. Despite maintaining intact one side of the abdominal wall, we have not found any difficult performing OLT in the patients of the present series.

Also when the patient was asked about the overall satisfaction regarding the incision used for OLT, a higher number of patients with J-shaped incision reported to be pleased than those with Mercedes type incision, 96% vs 75%. Although a fully subjective evaluation of the patient, this reflects attending physician impression. No adaptation in the retractor or surgical technique was necessary in order to gain full access to the liver for OLT.

Recently, Demirbas et al. reported a series of 32 patients submitted to living donor right hepatectomy using upper midline incision [15]. Use of this type of incision has not yet been reported in OLT.

Our results suggest that a J-shaped incision is preferred to other incisions for OLT.

There is a need for more detailed studies on the influence of the incision on the hepatectomy procedure, partial or total, because there are few reviews that explain about this.

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