

## The ministransplant procedure in liver transplantation

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### Abstract

**In order to ameliorate early recovery after liver transplantation a reduction of invasiveness of the abdominal incision has been tested and compared with more extended incisions. This approach named "minitransplant procedure" resulted in better early and late outcome results irrespective of preoperative patients' risk factors as previous upper abdominal surgery, Body Mass Index and Model of End Stage Liver Disease score. (Acta gastroenterol. belg., 2010, 73, 367-369).**

### Introduction

A reduction of invasiveness without increasing operative risk and without affecting outcome is a target of surgery evolution.

As previously published (1), we demonstrated that right subcostal (S) incision is sufficient to safely perform liver transplantation (LT), it reduces incisional hernia (IH) incidence and is more comfortable compared to classical Mercedes (M) and J-Shaped (J) incisions.

We report our more extensive experience with a minimal abdominal incision prospectively applied in liver transplantation.

### Patients and methods

#### Study Group

Between December 2002 and October 2009, 120 consecutive adult LTs were performed in 117 patients. From April 2004 the subcostal incision was prospectively and consecutively used (103 LT) with rare exceptions. Patients were divided into two groups according to the abdominal incision: right subcostal incision (S = 87) and more invasive incisions (O = 33) all reaching or crossing the *linea alba*: right subcostal with upper midline incision and bilateral subcostal with or without upper midline incision.

Both groups of patients were analyzed for: disease severity at operation [Model of End Stage Liver Disease (MELD)], diabetes, previous upper abdominal surgery, body mass index (BMI) at the time of LT after removing ascites, operative time, perioperative packed cell units (PCU) transfusion, intensive care unit (ICU) stay, retransplantation, wound infection.

Patients with at least 3 months follow-up were analyzed for IH occurrence.

### Surgical Procedure

Surgical technique was the same in all series. Hepatectomy with recipient caval vein preservation and caval latero-lateral anastomosis without venous bypass was performed by the same experienced surgeon in all series. Closure of the abdominal incision was performed with a single layer running polyglactin suture for the peritoneum, a single layer running absorbable monofilament loop (PDS 0) for the fascia and musculature and a single layer interrupted monofilament suture was used to close the skin.

### Results

*Preoperative risk factors* as BMI, previous upper abdominal surgery and MELD at operation were similar in both groups (Table I).

*Operative data* showed better results in group S in term of operative time, intraoperative PCU transfusion and ICU stay without significant difference (Table II).

Three months mortality was 5.13%: four patients from S group and two from O group excluded from late outcome analysis. One hundred and nine patients with at least three months follow-up, 79 in S group and 30 in O group, were analyzed for wound-related morbidity.

From April 2004, when S incision became our incision of choice, 103 LT have been performed. We started LT with a more extensive incision in eleven cases, four patients with previous upper abdominal surgery through J-shaped and bisubcostal incisions, four patients with peritoneal adhesions, two retransplantations and in a piggy back implantation. A conversion from a subcostal incision to a more extended one was performed in five out of 92 patients (5.4%): three for bleeding control, two for left lobe hypertrophy.

*Outcome*: no patients developed wound hematoma. Wound infection occurred in 2 patients, both in O group. IH occurred in 13 out of 109 patients (11.9%) with at least three months follow-up: 5 of 79 patients (6.3%) in group S and 8 of 30 patients (26.6%) in group O (Table III): the difference resulted significant.

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Table I. — Preoperative Data

	All Incisions 120		Right Subcostal 87 (72.5%)		Other 33 (27.5%)	
BMI	24	(11.73-45.20)	24.22	(11.73-45.2)	23.35	(17.56-30.47)
MELD	15	(6-41)	16	(6-40)	14	(8-41)
Previous Upper Abdominal Surgery	22	18.33%	13	14.94%	9/33	27.27%

BMI : body mass index

MELD : Model of End Stage Liver Disease score

Table II. — Perioperative Outcome

	All Incisions	Right Subcostal	Other
Operative Time (min)	350 (220-705)	330 (220-705)	390 (240-595)
WIT	35 (19-65)	35 (19-65)	33 (19-50)
ICU Stay (hours)	23 (0-960)	9.5 (0-960)	24 (9-352)
Hospital Stay	14 (6-90)	13.5 (6-90)	16 (6-68)

WIT : warm ischemia time

ICU : intensive care unit

Table III. — Late Outcome (&gt; 3 months)

Follow-up	All Incisions 109 38 (3-84)		Right Subcostal 79 35 (3-68)		Other 30 67 (8-84)	
Persistent Ascites	6	5.50%	6	7.59%	0	
Wound infection	2	1.83%	0		2	6.67%
Incisional Hernia	13/109	11.93%	5/79	6.33%	8/30	26.67%

## Discussion

A reduction of invasiveness without increasing operative risk and without affecting outcome is a target of surgeons.

The type of incisions has an important influence on postoperative recovery and morbidity.

In a review of eleven randomized controlled trials (2) and seven retrospective studies, comparing transverse and vertical incisions in abdominal surgery, transverse incision is associated with fewer complications in the early postoperative period and with lower incidence of late IH.

Others important factors are materials of suture and the techniques for closure of abdominal incisions.

In a meta-analysis (3) of techniques for closure of midline incisions, the authors concluded that slowly absorbable continuous sutures are the optimal method of fascial closure, with a reduction of incidence of IH without increasing wound pain or suture sinus frequency.

Conversely, in a recent multicenter randomized surgical trial (4) including patients with a primary elective midline incisions no significant differences were found in three groups with different closure techniques : the incidence of IH and the frequency of wound infections was higher than expected in all groups. Midline incision appears to be a risk factor for IH occurrence irrespective of techniques of closure.

In liver transplantation recently a J-shaped incision has been compared favourably with M-incision (5), with a reported conversion rate of 15% from J-shaped to M-incision.

As previously published (1) we demonstrated the feasibility of LT through a subcostal incision and the advantages versus M and J incisions. Our conversion rate from subcostal (S) to more invasive incisions (O group) has been of 5.4%.

We believe that our surgical procedure with the graft completely allocated in the *fovea hepatis*, allows us to easily perform LT through a small subcostal incision (Fig. 1).



Fig. 1. — Right subcostal incision

Moreover, such miniminvasive procedure compared with more invasive incisions results in our experience in better perioperative and late outcome.

## Conclusions

In conclusion the minitransplant procedure in liver transplantation is possible without increasing morbidity and allowing an early mobilization and a fast recovery of the patients.

## References

1. DONATACCIO M., GENCO B., DONATACCIO D. Right subcostal incision in liver transplantation : prospective study of feasibility. *Transplant. Proc.*, 2006, **38** : 1109-10.
2. GRANTCHAROV T.P., ROSENBERG J. Vertical compared with transverse incisions in abdominal surgery. *Eur. J. Surg.*, 2001, **167** : 260-7.
3. VAN 'T RIET M., STEYERBERG E.W., NELLENSTEYN J., BONJER H.J., JEEKEL J. Meta-analysis of techniques for closure of midline abdominal incisions. *Br. J. Surg.*, 2002, **89** : 1350-6.
4. SEILER C.M., BRUCKNER T., DIENER M.K., PAPPAN A., GOLCHER H., SEIDLMEYER C., FRANCK A., KIESER M., BÜCHLER M.W., KNAEBEL H.P. Interrupted or continuous slowly absorbable sutures for closure of primary elective midline abdominal incisions : A multicenter randomized trial (INSECT : ISRCTN24023541). *Ann. Surg.*, 2009, **249** : 576-582.
5. HEISTERKAMP J., MARSMAN H.A., EKER H., METSELAAR H.J., TILANUS H.W., KAZEMIER G. A J-shaped subcostal incision reduces the incidence of abdominal wall complications in liver transplantation. *Liver Transpl.*, 2008, **14** : 1655-8.