

Transumbilical videolaparoscopic (single site) liver biopsy with laparoscopy equipment

Jorge Ricardo Góis e Cunha¹, Izabele Rabelo de Oliveira¹, Milena Passos Lima¹, Antônio Alves Júnior^{1,2}

¹Departments of Medicine, Federal University of Sergipe, ²Bariatric Surgery Service of the University Hospital of the Federal University of Sergipe, Aracaju, SE 49025-090, Brazil

Address for Correspondence: Dr. Antônio Alves Júnior, Avenida Pedro Valadares 940, Apt. 103, Bairro Jardins, Aracaju, SE 49025-090, Brazil. E-mail: aalves@infonet.com.br

Abstract

INTRODUCTION: Liver diseases have a high incidence in the whole world. In order to diagnose, stage and follow these diseases it is often necessary the execution of liver biopsy. There are many possible ways to perform the procedure and the rise of transumbilical endoscopic surgery (TUES) brings to the medical practice an additional good option. **MATERIALS AND METHODS:** The study is prospective, nonrandomised and cohort type. It involves 42 patients who underwent liver biopsy through TUES using conventional video laparoscopic material. **RESULTS:** Among the patients 18 (42.86%) underwent isolated liver biopsy and 24 (57.14%) to liver biopsy associated with umbilical hernia repair. Within those, 27 (64.28%) were male and 15 (35.71%) female. The average body mass index (BMI) was of 27.26 kg/m², 10 were in the normal BMI range, 24 (57.14%) were in the overweight range, 6 (14.28%) had class I obesity and 2 (4.76%) had class II obesity. In none of the cases the procedure was converted to regular video laparoscopy, all the patients were discharged in the day after the procedure and reported a satisfactory aesthetic result. **CONCLUSIONS:** The study shows that liver biopsy using TUES has applicability and good results, including in obese patients that would have a contraindication to other methods.

Key words: Laparoscopy, liver biopsy, surgery, transumbilical endoscopic surgery

INTRODUCTION

"Approximately 29 million people in the European Union suffer from a chronic liver condition".^[1] Those diseases include liver cirrhosis, primary liver cancer, infectious hepatitis, nonalcoholic hepatic steatosis, haemochromatosis, primary sclerosing cholangitis and hepatic disease secondary to alcohol and/or other drugs abuse.^[1]

Liver biopsy is one of the most specific exams to understand the nature and severity of hepatic diseases.^[2,3] This exam can be used in the diagnosis, prognosis and selection of treatment.^[2,3] Liver biopsy can be done by a variety of methods, and each one has specific indications, but there are general indications to the procedure [Table 1].^[2,3] The choice of the method used to perform the of liver biopsy is based on indications and contraindications of each one. The possible methods are: Percutaneous biopsy, transvenous (transjugular or transfemoral), plugged biopsy and laparoscopic.^[2,3]

Advances in video laparoscopic technics in the recent years and the concept of minimally invasive surgery made arise several possibilities of operative methods.^[4] The natural orifice transluminal endoscopic surgery (NOTES) emerged from this trend and seems to be another revolution in surgery.^[5] The term transumbilical endoscopic surgery (TUES) refers to one of the modalities of NOTES and it was first used in 2007 to perform a cholecystectomy using the umbilical scar, since then, new applications have been described for it.^[4,6,7]

The use of TUES has some advantages to the patient and to the professional performing the procedure and has a more acceptable immediate clinical applicability than other technics.^[8] The possibility of conversion to regular

Access this article online	
Quick Response Code:	Website: www.journalofmas.com
	DOI: 10.4103/0972-9941.158953

laparoscopic surgery is another advantage of TUES.^[9-12] Therefore, TUES and the other NOTES methods have common advantages, namely: Better final aesthetic result, less metabolic response to surgical stress and less postoperative complications.^[9,13,14] The formal indication to the use of minimally invasive surgery as NOTES or TUES motivates the use of this technic and the report of the experience in this service.^[3]

MATERIALS AND METHODS

The study is prospective, nonrandomised and cohort type. It involves 42 patients who underwent liver biopsy between November of 2008 and November of 2012. The research protocol was presented to and approved by the Ethics Committee for Research Involving Human Subjects of the Prof. João Cardoso Nascimento Jr. Health Campus of the Federal University of Sergipe (CAAE number: 0031.0.107.000-09).

The surgical procedure was done positioning the patient in dorsal decubitus, followed by general anaesthesia, lateralisation and reverse Trendelenburg position of the surgical table, placement of lower limbs in leg holders (French/European position), placement of the surgical monitors to the right of the patient (by the shoulders level) and surgeon assuming position between the patient legs with the assistant by the patient left.

The umbilicus was incised approximately 1.5 cm transversally; a puncture under direct vision was done with a Veress needle, manufactured by Kark Storz, and with that the pneumoperitoneum was established and maintained using carbon dioxide (CO₂) under 14 mmHg pressure. When an

umbilical hernia was present, the herniary sac was dissected, and the aponeurosis was punctured under direct vision.

With the establishment of the pneumoperitoneum, a 10 mm trocater was introduced in the umbilical scar and a 30° optic was attached. In the same incision, but passing through the rectus muscle sheaths aponeurosis on the left a 5 mm trocater was introduced and a hook, connected to an electrocautery, was attached [Figure 1]. After the visualisation of the liver and decision of biopsy site a TruCut® needle, manufactured by Carefusion, size 16 or 18f (according to patients size) was utilised to collect the sample, after that the hook was used to control any local bleeding.

After the biopsy realisation, the 5 mm trocater was removed, followed by the removal of the 10 mm trocater by direct vision of the optic. The umbilical aponeurosis was approximated (when an umbilical hernia was present it was corrected) and an intradermal suture was performed.

RESULTS AND DISCUSSION

Among the patients 18 (42.86%) underwent isolated liver biopsy and 24 (57.14%) liver biopsy associated with umbilical hernia repair. The average age was 43.9 years old, with ages between 18 and 72 years old. The procedures were performed on patients of both genders, of which 27 were male (64.28%), and 15 were female (35.71%). The average body mass index (BMI) was of 27.26 kg/m², 10 were in the normal BMI range, 24 (57.14%) were in the overweight range, 6 (14.28%) had class I obesity and 2 (4.76%) had class II obesity [Table 2].^[15] Only one skin incision was done on each patient and in none of the cases the procedure was converted from the single site technic to the conventional video laparoscopy. All the patients were discharged in the day after the procedure. None of them

Table 1: Liver biopsy indications

Diagnosis, grading, and staging of alcoholic liver disease, nonalcoholic steatohepatitis, or autoimmune hepatitis
Grading and staging of chronic hepatitis C or chronic hepatitis B
Diagnosis of haemochromatosis, with quantitative estimation of iron levels
Diagnosis of Wilson's disease, with quantitative estimation of copper levels
Evaluation of the cholestatic liver diseases primary biliary cirrhosis and primary sclerosing cholangitis
Evaluation of abnormal results of biochemical tests of the liver in association with a serologic workup that is negative or inconclusive
Evaluation of the efficacy or the adverse effects of treatment regimens (e.g., methotrexate therapy for psoriasis)
Diagnosis of a liver mass
Evaluation of the status of the liver after transplantation or of the donor liver before transplantation
Evaluation of fever of unknown origin, with a culture of tissue
Grading and staging of chronic hepatitis C or chronic hepatitis B

Adapted from Bravo *et al.*

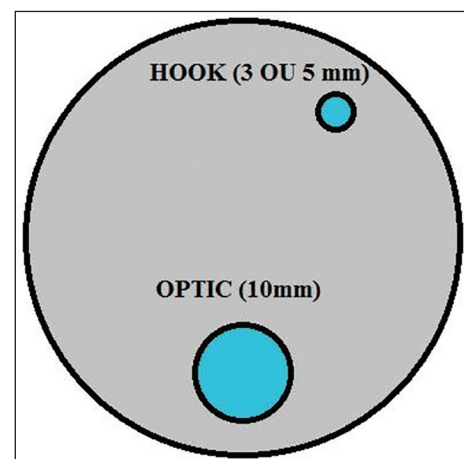


Figure 1: Schematic model for the positioning of trocaters in liver biopsy via transumbilical endoscopic surgery

reported any complication related to the surgical procedure or, specifically, to the kind of surgical access.

During outpatient treatment, the patients reported contentment regarding the final aesthetic aspect of the procedure, being compatible with study results showing that patients are willing to spend more money, change hospital and undergo the surgery via single incision laparoscopy even if the procedure risk increases from 1% to 10%.^[16]

The usefulness of performing a liver biopsy despite the development of image exams techniques demonstrates the necessity of having more than one-way to perform this procedure, giving another option that fits the patient and professional needs.^[2,3] The current laparoscopic surgery application in hepatobiliary pathologies^[17] allows to infer that smaller surgeries, as liver biopsy, might be performed via TUES; once larger procedures using this surgical access have been reported.^[18]

Surgery is in a time of the search for less and less invasive procedures. A NOTES seems to be one of those paths to the future of surgery. The momentary barrier due to the required development of the instruments and the prevention of related infections still prevents the wide and unrestricted use of this method.^[14] The development of TUES and its indication to specific procedures demonstrate this method as a step in the progress of the surgery. The possibility to use the same material of a conventional video laparoscopy, mainly in the case of liver biopsy, is one of the greatest factors that reinforce the utility of TUES, even in situations where the conditions could be considered limiting to other techniques.^[14,19-22]

A high BMI, despite the fact that any of the patients in the study have a BMI compatible with class III obesity (6 patients (14.28%) with class I obesity and 2 patients

(4.76%) with class II obesity), as shown in others studies, didn't demonstrated to be a limiting factor to execution of the procedure via TUES. On the contrary, respecting contraindications applicable to transcutaneous liver biopsy to obese patients NOTES techniques, such as TUES, get a highlight.^[23-25]

CONCLUSIONS

The utilisation of laparoscopic technic to perform a liver biopsy is important because it allows the visualisation of the peritoneum and proper direct control of any bleeding that may occur after the puncture.^[26] In all the cases evaluated, after the performance of the puncture, the cauterisation was effective and permitted the ending of the procedure after perception that the area had adequate haemostasis [Figure 2].

The performance of liver biopsy via TUES deserves attention and additional studies that keep on proving its benefits to the patients with proper indication of the procedure. To achieve this, both hospitals and surgeons must keep committed in researching the safety and applicability of this procedures that has already shown to be well accepted by patients introduced to it, but that still require studies to be definitely established in the medical practice.^[16]

It is important to point that the use of conventional video laparoscopic material has not brought any deleterious consequences to the patients who underwent the procedure.

The current study shows that with training and adequate indication, liver biopsy can be performed by a surgeon that has expertise in traditional video surgery with a minimal adaptation to TUES technic.

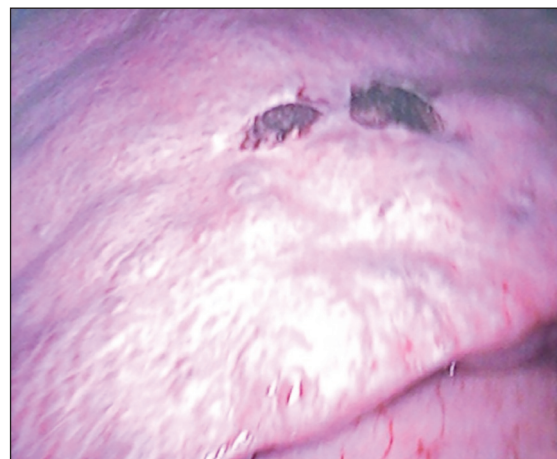


Figure 2: Surgical aspect of a liver after puncture followed by cauterisation with hook connected to electrocautery in procedure via transumbilical endoscopic surgery

Table 2: Procedures and patients characteristics

Variable	Results (%)
Performed procedure ^a	LB-18 (42.86) LB+UH-24 (57.14)
Average age	43.9 years old variation between 18 and 72 years old
Gender	Male-27 (64.28) Female-15 (35.71)
BMI ^b	Normal-10 (23.8) overweight-24 (57.14) obesity class I-6 (14.28) obesity class II-2 (4.76)

^aLB: Liver biopsy, UH: Umbilical hernioplasty, ^bBMI: Body mass index, calculated by: BMI: Weight (kilograms)/height squared (m). Classified according to the obtained value: Normal: 18.5 to 24.9 kg/m², overweight: 25 to 29.9 kg/m², obesity class I: 30 to 34.9 kg/m², obesity class II: 35 to 39.9 kg/m², obesity class III: >40 kg/m²^[15]

REFERENCES

- Blachier M, Leleu H, Peck-Radosavljevic M, Valla DC, Roudot-Thoraval F. The burden of liver disease in Europe: A review of available epidemiological data. *J Hepatol* 2013;58:593-608.
- Bravo AA, Sheth SG, Chopra S. Liver biopsy. *N Engl J Med* 2001;344:495-500.
- Rockey DC, Caldwell SH, Goodman ZD, Nelson RC, Smith AD. American Association for the Study of Liver Diseases. Liver biopsy. *Hepatology* 2009;49:1017-44.
- Zhu JF. Transumbilical endoscopic surgery: History, present situation and perspectives. *World J Gastrointest Endosc* 2011;3:107-9.
- Alves Júnior A, de Oliveira IR, Lima MP, Freitas A, Barros V. Transumbilical (Single Site) Videolaparoscopic Cholecystectomy with Conventional Laparoscopic Equipment. *J Port Gastroenterol* 2011;18:118-22.
- Zhu JF. Transumbilical laparoscopic surgery: Current status and controversies. *Bosn Herzegovina Surg* 2011;1:21-5.
- Zhu JF. Scarless endoscopic surgery: NOTES or TUES. *Surg Endosc* 2007;21:1898-9.
- Galvao Neto M, Ramos A, Campos J. Single port laparoscopic access surgery. *Tech Gastrointest Endosc* 2009;11:84-93.
- Alves Júnior A, Oliveira IR, Lima MP, Oliveira Filho JJ, Sobral HA. Transumbilical laparoscopic surgery: An option without scars. *Braz J Videoendoscopic Surg* 2011;4:9-14.
- Hong TH, You YK, Lee KH. Transumbilical single-port laparoscopic cholecystectomy: Scarless cholecystectomy. *Surg Endosc* 2009; 23:1393-7.
- Tacchino R, Greco F, Matera D. Single-incision laparoscopic cholecystectomy: Surgery without a visible scar. *Surg Endosc* 2009;23:896-9.
- Chamberlain RS, Sakpal SV. A comprehensive review of single-incision laparoscopic surgery (SILS) and natural orifice transluminal endoscopic surgery (NOTES) techniques for cholecystectomy. *J Gastrointest Surg* 2009;13:1733-40.
- Rosenberg J, Kehlet H. Surgical physiopathology. New results of importance for optimization of the postoperative course. *Ugeskr Laeger* 2001;163:908-12.
- Seid VE, Araujo SE, Caravatto PP. NOTES: Present and future – A brief review. *Einstein* 2008;6:99-101.
- World Health Organization, Obesity: Preventing and Managing the Global Epidemic. Geneva, Switzerland: WHO Consultation on Obesity; 1999.
- Fransen SA, Broeders E, Stassen L, Bouvy N. The voice of Holland: Dutch public and patient's opinion favours single-port laparoscopy. *J Minim Access Surg* 2014;10:119-25.
- Gkegkes ID, Iavazzo C. Single incision laparoscopic hepatectomy: A systematic review. *J Minim Access Surg* 2014;10:107-12.
- Tayar C, Subar D, Salloum C, Malek A, Laurent A, Azoulay D. Single incision laparoscopic hepatectomy: Advances in laparoscopic liver surgery. *J Minim Access Surg* 2014;10:14-7.
- Tacchino R, Greco F, Matera D. Single-incision laparoscopic cholecystectomy: Surgery without a visible scar. *Surg Endosc* 2009;23:896-9.
- Nguyen NT, Reavis KM, Hinojosa MW, Smith BR, Wilson SE. Laparoscopic transumbilical cholecystectomy without visible abdominal scars. *J Gastrointest Surg* 2009;13:1125-8.
- Gumbs AA, Milone L, Sinha P, Bessler M. Totally transumbilical laparoscopic cholecystectomy. *J Gastrointest Surg* 2009;13:533-4.
- Chamberlain RS, Sakpal SV. A comprehensive review of single-incision laparoscopic surgery (SILS) and natural orifice transluminal endoscopic surgery (NOTES) techniques for cholecystectomy. *J Gastrointest Surg* 2009;13:1733-40.
- de la Torre RA, Satgunam S, Morales MP, Dwyer CL, Scott JS. Transumbilical single-port laparoscopic adjustable gastric band placement with liver suture retractor. *Obes Surg* 2009;19:1707-10.
- Huang CK, Hwang JY, Chiang CJ, Chen YS, Lee PH. Single incision transumbilical laparoscopic Roux-en-Y gastric bypass: A first case report. *Obes Surg* 2009;19:1711-5.
- Steele K, Schweitzer MA, Lyn-Sue J, Kantsevov SV. Flexible transgastric peritoneoscopy and liver biopsy: A feasibility study in human beings (with videos). *Gastrointest Endosc* 2008;68:61-6.
- Denzer U, Arnoldy A, Kanzler S, Galle PR, Dienes HP, Lohse AW. Prospective randomized comparison of minilaparoscopy and percutaneous liver biopsy: Diagnosis of cirrhosis and complications. *J Clin Gastroenterol* 2007;41:103-10.

Cite this article as: Góis e Cunha JR, de Oliveira IR, Lima MP, Júnior AA. Transumbilical videolaparoscopic (single site) liver biopsy with laparoscopy equipment. *J Min Access Surg* 2016;12:135-8.

Date of submission: 25/01/2015, **Date of acceptance:** 04/03/2015

Source of Support: Nil, **Conflicts of Interest:** None declared.