



Emergency right hepatectomy after laparoscopic tru-cut liver biopsy



Nicolás Quezada, Felipe León, Jorge Martínez, Nicolás Jarufe, Juan Francisco Guerra*

Hepato-Pancreato-Biliary Unit, Department of Digestive Surgery, School of Medicine, Pontificia Universidad Católica de Chile, Marcoleta 350, Patio Interior, Postal Code: 8320000 Santiago, Chile

ARTICLE INFO

Article history:

Received 19 October 2014

Accepted 9 January 2015

Available online 14 January 2015

Keywords:

Tru-cut

Liver biopsy

Emergency hepatectomy

ABSTRACT

BACKGROUND: Liver biopsy is a common procedure usually required for final pathologic diagnosis of different liver diseases. Morbidity following tru-cut biopsy is uncommon, with bleeding complications generally self-limited. Few cases of major hemorrhage after liver biopsies have been reported, but to our knowledge, no cases of emergency hepatectomy following a tru-cut liver biopsy have been reported previously.

PRESENTATION OF CASE: We report the case of a 38 years-old woman who presented with an intrahepatic arterial bleeding after a tru-cut liver biopsy under direct laparoscopic visualization, initially controlled by ligation of the right hepatic artery and temporary liver packing. On tenth postoperative day, she developed a pseudo-aneurysm of the anterior branch of the right hepatic artery, evolving with massive bleeding that was not amenable to control by endovascular therapy. Therefore, an emergency right hepatectomy had to be performed in order to stop the bleeding. The patient achieved hemodynamic stabilization, but developed a biliary fistula from the liver surface, refractory to non-operative treatment. In consequence, a Roux-Y hepatico-jejunostomy was performed at third month, with no further complications.

DISCUSSION: Bleeding following tru-cut biopsy is a rare event. To our knowledge, this is the first report of an emergency hepatectomy due to hemorrhage following liver biopsy. Risks and complications of liver biopsy are revised.

CONCLUSION: Care must be taken when performing this kind of procedures and a high level of suspicion regarding this complication should be taken in count when clinical/hemodynamic deterioration occurs after these procedures.

© 2015 The Authors. Published by Elsevier Ltd. on behalf of Surgical Associates Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Background

Liver biopsy is a common procedure usually required for final pathologic diagnosis of different liver diseases. Tru-cut biopsies are generally preferred by hepatologists [1] due to its technical simplicity, acceptable histological samples obtained and safety, making this procedure an attractive alternative for many physicians worldwide. Complications following tru-cut liver biopsy are uncommon and include bleeding, hemobilia or bile peritonitis [2–7]. Severe hemorrhage is an exceptional situation an even less frequent is the requirement of an emergency surgery due to liver hemorrhage following this procedure.

To our knowledge, there are no previous reports of major hepatectomies required after a tru-cut liver biopsy. Here we present a case of major bleeding after tru-cut biopsy under direct laparoscopic visualization, which evolved to a pseudo-aneurysm of the anterior branch of the right hepatic artery that bled after systemic anticoagulant therapy, requiring an emergency right hepatectomy.

2. Presentation of case

We report the case of an obese 38 years-old woman who presented to outpatient clinic because of recurrent right upper quadrant abdominal pain associated with nausea and vomiting. She denied jaundice or dark urine. Physical examination was unremarkable. Pre-operative work-up demonstrated mildly elevated transaminases and cholelithiasis (abdominal ultrasound). Remarkably, severe liver steatosis was also described.

Patient was then referred to surgical clinic to perform a laparoscopic cholecystectomy. In addition, a liver biopsy was decided in order to better characterize the diagnosis of non-alcoholic fatty liver disease (NAFLD) versus non-alcoholic steatohepatitis (NASH). Written informed consent was obtained.

After an uneventful cholecystectomy, a tru-cut needle was used to obtain a liver biopsy under laparoscopic view. Two initial passes retrieved non-satisfactory samples and a third pass resulted in a massive bleeding from the right liver surface as shown in Fig. 1. Laparoscopic hemostasis was unsuccessful and then the decision was to convert to open surgery. After liver mobilization, exploration demonstrated an expansive intrahepatic hematoma with active bleeding. Hepatic inflow control (Pringle maneuver) allowed us to identify that a branch of the right hepatic artery

* Corresponding author at: Marcoleta 350, Patio Interior, División de Cirugía, Postal Code: 8320000 Santiago, Chile. Tel.: +56 2 23543462; fax: +56 2 23543462.
E-mail address: jfguerra@med.puc.cl (J.F. Guerra).



Fig. 1. Laparoscopic view of hepatic bleeding after tru-cut biopsy. Note the two initial passes with coagulated liver surface and adequate hemostasis. The third pass presented a pulsatile bleeding that could not be controlled by laparoscopy.

was injured. After ligation, temporary hemostasis was obtained but soon after Pringle maneuver, bleeding restarts and therefore, based on patient's hemodynamic instability, a liver packing was placed.

On first postoperative day (POD), patient complained of left arm pain and swelling, and the diagnosis of a deep venous thrombosis (DVT) was demonstrated by ultrasound; nevertheless systemic anticoagulation was not initiated due to recent hemorrhage. On third POD, a second look laparotomy revealed adequate hemostasis and therefore liver packing was removed. Once considered safe and after clinical stabilization, systemic heparin anticoagulation was started for DVT treatment on POD 7.

Three days later (POD 10), the patient developed sudden abdominal pain and bloody output through drains. A computed tomography-angiogram demonstrated an active bleeding pseudoaneurysm from the anterior branch of the right hepatic artery (Fig. 2a), fed by "left to right" communicants (Fig. 2b). Endovascular embolization was attempted but it was unsuccessful due to prior right hepatic artery ligation, thus an emergency right hepatic lobectomy was performed.

After surgery, the patient achieved hemodynamic stabilization but she developed a high output biliary fistula from the liver section surface. Non-operative management, including endoscopic retrograde cholangiopancreatography and stent placement, failed to control the fistula and after 12 weeks, a Roux-Y hepaticojejunostomy was performed to resolve the biliary fistula. At six months follow-up, the patient has had no further complications.

3. Discussion

Liver biopsy is becoming a widely common procedure among hepatologists and surgeons, in order to establish an accurate pathological diagnosis of many liver diseases. Whether what type of liver biopsy should be used is a debatable topic in the American society for the study of liver diseases guidelines, although they recommend the use of needles over wedge samples [1], since the latter over-estimates liver fibrosis due to proximity to Glisson's capsule.

Tru-cut liver biopsy is considered a low morbidity procedure and it can be performed under direct visualization (i.e., under laparoscopic view). Nevertheless, complications have been reported as bleeding, hemobilia or bile peritonitis [2–7]. The frequency of hemorrhage after percutaneous biopsies has been reported in the order of 1/500 for bleedings that causes minimal hemodynamic changes and 1/2,500–1/10,000 for major bleedings, those requiring transfusion or other interventions such as surgery.

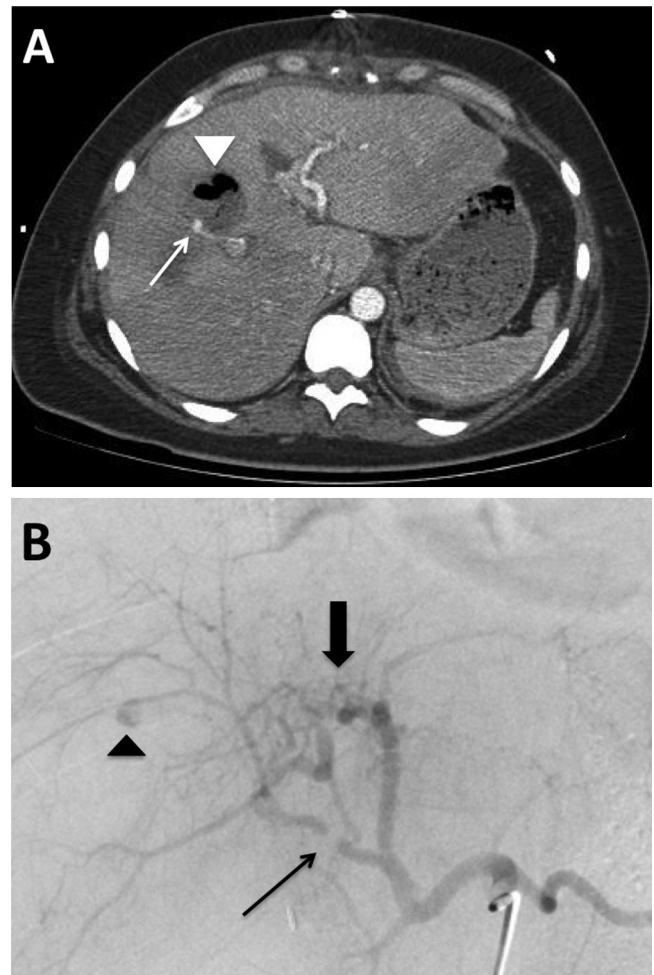


Fig. 2. Computed tomography-angiogram (A) and celiac trunk selective angiography (B).

A. Tomographic angiogram demonstrates a right anterior hepatic artery pseudoaneurysm (arrow) and an intra-parenchymal hematoma (arrowhead).

B. Angiography demonstrates an interruption in the right hepatic artery (ligated, thin arrow), perfusion of the right arterial tree from communicant branches from left arterial tree (thick arrow) and the right anterior pseudo-aneurysm (arrowhead).

Mortality has also been reported in up to 1/10,000 patients but occurred mainly in cirrhotics, hemophiliacs and chronic renal failure patients [3,8]. There is few data about the frequency of major bleeding after laparoscopic tru-cut biopsies, although it has been suggested by some authors that it could carry a higher risk of major bleeding as compared to classic percutaneous approach [9].

Well-known risk factors have been linked and proposed as the cause of a major risk of bleeding after liver biopsy, and are divided into related to the patient and to the procedure itself. Patient's factors include chronic liver disease, renal failure, and coagulation disorders such as hemophilia [4]. Procedure's factors include operator expertise [10,11], gage diameter [1], and number of passes [2–4,12]. Cutting needles such as tru-cut needle, have been also reported to have a slightly higher risk of post procedure bleeding [4,12].

In respect to potential sources of major bleeding following tru-cut liver biopsies, predominantly it might be the injury of an intrahepatic major vessel. Portal or hepatic vein branches will result in immediate intraoperative bleeding. On the other hand, hepatic artery injuries might result in both immediate (direct trauma-transection) and/or delayed bleeding probably secondary to a pseudo-aneurysm formation, as the result of a non-complete injury of the vessel.

Intrahepatic arterial pseudo-aneurysms have been reported after multiple conditions, such as hepatic trauma [13], derivative procedures such as porto-systemic shunts [14], amebic abscess [15], endoscopic retrograde cholangiopancreatography [16,17], liver transplantation [18], and thoracocentesis [19]. In regard to clinical manifestations, pseudo-aneurysms can be clinically silent; although they can present with vague, non-specific abdominal pain to a life-threatening massive hemorrhage.

Treatment options for either common or proper hepatic artery pseudo-aneurysms includes surgical or endovascular therapy. In the case of intrahepatic pseudo-aneurysms, excellent results have been reported with endovascular treatment [20]. In our case, remarkably is the fact that this patient had or developed arterial communicants from left to right liver, which fed the pseudo-aneurysm to bleed, since right hepatic artery was previously ligated. In addition, prior ligation of the right hepatic artery made the pseudo-aneurysm not suitable for endovascular treatment, so surgery was indicated.

4. Conclusion

In conclusion, here we present the first report of an emergency right hepatectomy after a tru-cut liver biopsy, due to a massive arterial bleeding and subsequent development of a right hepatic pseudo-aneurysm, not suitable for endovascular embolization; therefore care must be taken when performing this kind of procedures and a high level of suspicion regarding this complication should be taken in count when clinical/hemodynamic deterioration occurs after these procedures.

Conflict of interest

Nicolás Quezada, Felipe León, Jorge Martínez, Nicolás Jarufe and Juan Francisco Guerra have no conflicts of interest to declare.

Sources of funding

Nicolás Quezada, Felipe León, Jorge Martínez, Nicolás Jarufe and Juan Francisco Guerra have no funding sources to declare.

Ethical approval

The Ethical committee of Pontificia Universidad Católica de Chile approved this study.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Nicolás Quezada, Felipe León and Juan Francisco Guerra were the major contributors in writing the case report and they were

involved in the acquisition, analysis and interpretation of the data. Nicolás Quezada, Nicolás Jarufe and Juan Francisco Guerra provided clinical care of the patient during his treatment and supervised the writing of the case report and were involved in the review and preparation of the manuscript. Jorge Martínez and Felipe León contributed by drafting the article and revising it critically for important intellectual content. Images were courtesy of the Department of Radiology, with patient consent. All authors read and approved the final manuscript, with Nicolás Quezada and Juan Francisco Guerra giving the final approval of the manuscript for submission.

Guarantor

Juan Francisco Guerra is the Guarantor of this study.

References

- [1] D.C. Rockey, S.H. Caldwell, Z.D. Goodman, R.C. Nelson, A.D. Smith, Liver biopsy, *Hepatology* 49 (2009) 1017–1044.
- [2] J. Perrault, D.B. McGill, B.J. Ott, W.F. Taylor, Liver biopsy: complications in 1000 inpatients and outpatients, *Gastroenterology* 74 (1978) 103–106.
- [3] D.B. McGill, J. Rakela, A.R. Zinsmeister, B.J. Ott, A 21-year experience with major hemorrhage after percutaneous liver biopsy, *Gastroenterology* 99 (1990) 1396–1400.
- [4] F. Piccinino, E. Sagnelli, G. Pasquale, G. Giusti, Complications following percutaneous liver biopsy. A multicentre retrospective study on 68,276 biopsies, *J. Hepatol.* 2 (1986) 165–173.
- [5] J.F. Huang, M.Y. Hsieh, C.Y. Dai, et al., The incidence and risks of liver biopsy in non-cirrhotic patients: an evaluation of 3806 biopsies, *Gut* 56 (2007) 736–737.
- [6] R.P. Myers, A. Fong, A.A. Shaheen, Utilization rates, complications and costs of percutaneous liver biopsy: a population-based study including 4275 biopsies, *Liver Int.* 28 (2008) 705–712.
- [7] A.A. Bravo, S.G. Sheth, S. Chopra, Liver biopsy, *N. Engl. J. Med.* 344 (2001) 495–500.
- [8] D.H. Van Thiel, J.S. Gavalier, H. Wright, A. Tzakis, Liver biopsy: its safety and complications as seen at a liver transplant center, *Transplantation* 55 (1993) 1087–1090.
- [9] J. Glaser, J. Pausch, The risk of liver biopsy, *Z. Gastroenterol.* 33 (1995) 673–676.
- [10] F. Froehlich, O. Lamy, M. Fried, J.J. Gonvers, Practice and complications of liver biopsy: results of a nationwide survey in Switzerland, *Dig. Dis. Sci.* 38 (1993) 1480–1484.
- [11] S.Y. Chuah, G.A. Moody, A.C. Wicks, J.F. Mayberry, A nationwide survey of liver biopsy – is there a need to increase resources, manpower and training? *Hepatogastroenterology* 41 (1994) 4–8.
- [12] J. Glaser, J. Pausch, Risk of liver biopsy, *Z. Gastroenterol.* 34 (1996) XXII.
- [13] P. Taourel, H. Vernhet, A. Suau, C. Granier, F.M. Lopez, S. Aufort, Vascular emergencies in liver trauma, *Eur. J. Radiol.* 64 (2007) 73–82.
- [14] J. Forster, R. Delcore, K.M. Payne, E.L. Siegel, The role of transjugular intrahepatic portosystemic shunts in the management of patients with end-stage liver disease, *Am. J. Surg.* 168 (1994) 592–596.
- [15] A. Khan, K.M. Pal, H.I. Khan, Hepatic artery pseudoaneurysm: a rare complication of amoebic liver abscess, *J. Pak. Med. Assoc.* 61 (2011) 839–840.
- [16] U. Gottschalk, D.R. Meyer, J. Steinberg, Pseudoaneurysm of the left hepatic artery as a complication of ERCP with sphincterotomy, *Z. Gastroenterol.* 44 (2006) 329–332.
- [17] H. Inoue, S. Tano, R. Takayama, et al., Right hepatic artery pseudoaneurysm: rare complication of plastic biliary stent insertion, *Endoscopy* 43 (Suppl 2 UCTN) (2011) E396.
- [18] J.N. Itri, M.T. Heller, M.E. Tublin, Hepatic transplantation: postoperative complications, *Abdom. Imaging* 38 (2013) 1300–1333.
- [19] E. Ruiz Ruiz, J. Alegre Martin, M. Moreiras Barreiro, T. Fernandez de Sevilla Ribosa, Hemoperitoneum secondary to intrahepatic pseudoaneurysm as a complication of thoracocentesis, *Med. Clin. (Barc.)* 117 (2001) 39.
- [20] A. Sigdel, M.E. Morris, A. Yancey, A.J. Dwivedi, Endovascular management of hepatic artery pseudoaneurysm, *Am. J. Surg.* 78 (2012) 1411–1412.

Open Access

This article is published Open Access at scimedirect.com. It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.