

Evaluation of Percutaneous Liver Biopsy Complications in Patients with Chronic Viral Hepatitis

Kronik Hepatit Hastalarında Perkütan Karaciğer Biyopsi Komplikasyonlarının Değerlendirilmesi

Sukran Kose¹, Gursel Ergan¹, Bengu Tatar¹, Pelin Adar¹, Buket Erturk Sengel²

¹Clinic of Infectious Diseases and Clinical Microbiology, İzmir Tepecik Training and Research Hospital, İzmir, Turkey

²Clinic of Infectious Diseases and Clinical Microbiology Clinic, Tekirdağ Public Hospital, Tekirdağ, Turkey

Abstract

Objective: Liver biopsy is still the gold standard for the determination of liver fibrosis and necroinflammatory activity. It is an invasive method and may lead to severe complications. The aim of this study was to determine the evaluation of percutaneous liver biopsy complications in patients with chronic viral hepatitis.

Materials and Methods: 1165 patients, who were followed with the diagnosis of chronic viral hepatitis and who were applied percutaneous liver biopsy between January 2000 and February 2013 at the outpatient clinic of Infectious Diseases and Clinical Microbiology, were included in the study.

Results: Of 1165 patients who underwent liver biopsy, 196 (86 male, 110 female) were diagnosed with chronic hepatitis C, 969 (559 male, 410 female) were diagnosed with chronic hepatitis B. The mean age was 43.3 and 55.4% were male. 11% of the patients were diagnosed with chronic renal failure and underwent haemodialysis. Minor complication rate was about 20% (severe pain required usage of analgesic drugs in 19.8%, abdominal pain in 22.6%) whereas major complication rate was 1.15% (pneumothorax in 0.17%, haemobilia in 0.08%, hematoma in 0.9%). We did not observe severe complications such as fever, abscess, anaphylaxis, bacteraemia, organ perforations, sepsis or death.

Conclusion: Despite being an invasive procedure, percutaneous liver biopsy can be considered a safe method because of the low rates of severe complications observed in our patients.

Keywords: Chronic viral hepatitis, liver biopsy, complication

Özet

Amaç: Karaciğer biyopsisi karaciğer fibrozisi ve nekroinflamatuvar aktivitesini belirlemede günümüzde halen altın standart olarak kabul edilmektedir. Ancak invaziv olması nedeniyle ciddi komplikasyonları olabilen bir işlemdir. Bu çalışma ile perkütan karaciğer biyopsisi yapılan kronik viral hepatitli hastalarda biyopsiye bağlı komplikasyonların değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntem: Ocak 2000-Şubat 2013 tarihleri arasında İzmir Tepecik Eğitim ve Araştırma Hastanesi Enfeksiyon Hastalıkları ve Klinik Mikrobiyoloji Kliniğinde kronik viral hepatit tanısı ile izlediğimiz ve karaciğer biyopsisi yapılan 1165 hasta retrospektif olarak incelendi.

Bulgular: Karaciğer biyopsisi yapılan 1165 hastanın 196'sı (86 erkek, 110 kadın) kronik hepatit C, 969'sı (559 erkek, 410 kadın) kronik hepatit B tanılı idi. Hastaların yaş ortalaması: 43,3 , %55,4'ü erkek, %11'i kronik böbrek yetmezliği tanısı ile hemodiyalize giriyordu. Hastaların yaklaşık beşte birinde minör komplikasyonlar gözlenirken (%19,8'inde analjezik gereksinimi olan ağrı, %22,6'sında sağ üst kadranda ve sağ kola vuran ağrı), majör komplikasyon oranı %1,15 idi (%0,17'sinde pnömotoraks, %0,08'inde hemobiliya, %0,9'unda hematoma). Ateş, abse, anafilaksi, bakteriyemi, organ perforasyonu, sepsis, ölüm gibi komplikasyonlar görülmedi.

Sonuç: Perkütan karaciğer biyopsisi invaziv bir işlem olmasına rağmen hastalarımızda görülen ciddi komplikasyon oranı düşüktür, bu nedenle güvenli bir işlem olarak kabul edilebilir.

Anahtar Kelimeler: Karaciğer biyopsisi, komplikasyon, kronik viral hepatit

Introduction

Percutaneous liver biopsy is a diagnostic method that has been used for more than a century. It was first performed in 1883 by Paul Erlich [1]. It has become an easier method with lower risk due to the implementation techniques developed in the course of time. Although laboratory methods used in the diagnosis of chronic hepatitis partially assess necroin-

flammation in the liver tissue, it does not give information on fibrosis. Today, liver biopsy is still the gold standard in determining liver fibrosis and necroinflammatory activity [2-4].

Currently, the fields that mostly require liver biopsy include chronic viral hepatitis, autoimmune hepatitis, alcoholic liver disease, hemochromatosis, Wilson's disease, primary biliary cirrhosis, primary sclerosing cholangitis, staging of chronic liver diseases, determining indications for treatment,

Received: October 21, 2014 / **Accepted:** March 14, 2015

Correspondence to: Pelin Adar, Clinic of Infectious Diseases and Clinical Microbiology, İzmir Tepecik Training and Research Hospital, İzmir, Turkey
Phone: +90 232 469 69 69 - 1704 e-mail: estrellabella_83@hotmail.com

©Copyright 2015 by the Atatürk University School of Medicine - Available online at www.eurasianjmed.com

DOI: 10.5152/eurasianjmed.2015.107



and histopathological evaluation of treatment response. In addition, evaluation of hepatic function disorders of undefined etiology, space-occupying lesions of the liver and liver involvement of systemic diseases can be considered as the main indications for biopsy.

Complications that may be encountered during liver biopsy can be classified as minor and major complications. Whilst minor complications include localized temporary pain in the biopsy site, analgesia-requiring pain and mild temporary hypotension (vasovagal), major complications include bleeding, haemobilia, bile peritonitis, bacteraemia, sepsis, pneumothorax, haemothorax and death. In general, patients that underwent liver biopsy experience serious pain problems; however, pain that requires additional analgesic administration is encountered in 10% of the patients. The source of pain may be pleuritic, peritoneal or diaphragmatic. Presence of intensive pain that begins just after the procedure and continues for a long time should be considered as a sign indicating that biopsy-related complications might have developed [1].

Today, percutaneous, transjugular and laparoscopic biopsy methods are used, and percutaneous methods include Menghini technique, tru-cut needle and fine needle aspiration techniques. Ultrasonography (US)-assisted fine needle aspiration biopsy (FNAB) has some characteristics including high diagnostic value in hepatic lesions, easy application, cheap, non-ionizing technique and availability of performing simultaneously in various planes [5-8].

The present study aimed to evaluate complications encountered in the patients followed due to the diagnosis of chronic hepatitis and underwent percutaneous liver biopsy.

Materials and Methods

Totally, 1165 patients, who were followed with the diagnosis of chronic hepatitis and underwent liver biopsy between January 2000 and February 2013 at İzmir Tepecik Training and Research Hospital, Infectious Diseases and Clinical Microbiology Clinic, were retrospectively investigated. Ethics committee approval of İzmir Tepecik Training and Research Hospital was obtained before the study. An informed consent was signed by each patient before the procedure. Complete blood count, coagulation levels were checked. Anti-aggregant, anticoagulant and non-steroidal anti-inflammatory drugs were discontinued at appropriate time intervals before biopsy. Liver biopsy was performed just after dialysis in the patients receiving haemodialysis. Localization of intervention site was determined by abdominal US. Short-term sedation was performed in case of anxiety and panic attack. Each patient was placed in supine position and dullness was heard by percussion on the area marked by US. Sterile conditions were

provided. Fine needle aspiration biopsy was performed after local anaesthesia. The biopsy materials were kept in prepared solutions and transferred to the laboratory under appropriate conditions. After the procedure, the patients were kept under supervision for at least two hours for likely complications. Complete blood count was checked for bleeding control. Vital signs of each patient that had symptoms such as pain, shortness of breath and palpitation were frequently monitored over the course of supervision, and they were evaluated in terms of complications via chest X-ray and abdominal US. Patients with stable general status were discharged with recommendations.

Results

Of the 1165 patients that underwent liver biopsy, 55.3% were male (645 patients), 16.8% (196 patients) (86 males, 110 females) had chronic hepatitis C and 83.1% (969 patients) (559 males, 410 females) had chronic hepatitis B. The mean age of the patients was 43.3 years and 11% (128 patients) were under routine haemodialysis program because of chronic renal insufficiency (CRI). The mean age of the patient group with CRI was 59.8 years and 25% (32 patients) of them had chronic hepatitis B, whereas 75% (96 patients) had chronic hepatitis C.

Of the patients included in the study, approximately one-fifth had minor complications (analgesic-requiring pain in 19.8% and right upper quadrant pain and pain reflecting to the right arm in 22.6%), whereas 1.15% had major complications (pneumothorax in 0.17%, haemobilia in 0.08% and haematoma in 0.9%). Side effects such as fever, abscess, anaphylaxis, bacteraemia, organ perforation, sepsis or death were not observed as shown in the Table 1.

Of the CRI patients under haemodialysis program, 24% had analgesic-requiring pain, 25% had right upper quadrant pain and pain reflecting to the right arm, and 1.5% had haematoma. Side effects such as haemobilia, pneumothorax, fever, abscess, anaphylaxis, bacteraemia, organ perforation, sepsis or death were not observed.

Discussion

Today, viral hepatitis B remains as an important public health program despite immunization programs developed for hepatitis B. Worldwide, there are more than 350 million people infected with hepatitis B virus. Despite advances in non-invasive diagnostic methods, histopathological examination of tissue obtained by liver biopsy is still the gold standard in the diagnosis of chronic viral hepatitis, in determining disease stage and in monitoring disease course. Although demonstration of virological, serological and biochemical improvement is important in evaluating response to treat-

Table 1. The rate of complications that developed following liver biopsy

Side effect	%	N
Right upper quadrant pain/pain reflecting to the right arm	22.6	263
Analgesic need	19.8	230
Hematoma	0.9	10
Pneumothorax	0.17	2
Heamobilia	0.08	1
Bile peritonitis	0	0
Heamothorax	0	0
Fever	0	0
Abscess	0	0
Bacteraemia, sepsis	0	0
Anaphylaxis	0	0
Organ perforation	0	0
Death	0	0
Hospitalization	0	0

ment, demonstration of histological improvement gives important information on the prognosis of disease.

Accuracy of diagnosis with FNAB in abdominal lesions changes between 66% and 97% depending on localization, size and structure [7]. Moreover, sensitivity and specificity of FNAB in abdominal lesions are reported to be 75-95% and 100% respectively and it is widely used for liver biopsies [6, 7, 9-12]. In the present study, we performed FNAB method as well. Glaser and Pausch [13] found the rate of fatal complications to be lower in percutaneous liver biopsies as compared to laparoscopy. Li et al. [4] found the reliability of percutaneous FNAB higher than that of tru-cut biopsy. Again, D'Incao et al. [14] evaluated percutaneous biopsies performed in chronic hepatitis cases and found this rate to be 0.3%. In another study, in which Menghini technique was used in 156 paediatric patients, the rate of serious complication was found to be 0.6% [15]. Similar with laparoscopic biopsies, it was observed that complication rate was between 1.3% and 6.5% in transjugular biopsy, which is performed as a different technique [16].

Ultrasonography is the first choice guide method in liver biopsies because it definitely assesses parenchyma, gives real-time image, does not expose the patient to radiation, visualizes intrahepatic main vascular configurations and gallbladder well, and it is cheap, easily applicable and portable [5]. Complication rate is high in the biopsies performed without using imaging method. Piccinino et al. [17] found this rate to be 2.2%. Lindor et al. [18] compared hospitalization rates

and found this rate to be 2.2% in the procedures performed without using ultrasonography and 0.5% in ultrasound-guided procedures. In the study conducted by Siddharth et al. [19], complications were determined at a rate of 2% in ultrasound-guided biopsies and most of them were minor complications. In the present study, the localization of intervention site was determined by ultrasonography to minimize the likelihood of development of complication after the intervention. Consistent with the literature, overall complication rate was 1.1% in the present study (pneumothorax in 0.17%, heamobilia in 0.08%, and hematoma in 0.9%). Fever, abscess, anaphylaxis, bile peritonitis, heamothorax, bacteraemia, organ perforation or sepsis was not observed. The majority of complications were minor with analgesic-requiring pain observed in 19.8% and right upper quadrant pain and pain reflecting to the right arm observed in 22.6% of the participants. All of the cases were discharged from the hospital on the same day without problem. Govender et al. [20] performed percutaneous liver biopsy in 597 patients, and serious complications were determined at a rate of 1.7% including pneumothorax, pseudo aneurysm and symptomatic hematoma. In a similar study, overall complication rate was found to be 2.0% (abdominal pain 0.9%, symptomatic hematoma 0.6% and infection in the intervention site 0.4%) [19].

Although higher complication rate was expected in CRI patients under haemodialysis, the present study determined analgesic-requiring pain in 24%, right upper quadrant pain and pain reflecting to the right arm in 25% and hematoma in 1.5% of the cases. No major complication was observed. This may be explained by the limited number of patients included in the study (128 patients) and performing biopsy just after dialysis.

In the present study, each patient underwent percutaneous FNAB. Based on the available biopsy set, Menghini technique or semi-automatic or automatic sets were used. However, complications were evaluated as a whole under the name of percutaneous liver biopsy without technical discrimination. In addition, not recording the number of attempts made until obtaining the material and the number of experiences of physician that performed the procedure are among the limitations of study. Some studies have demonstrated that experience of the physician influences complication rates. In a study, it was demonstrated that complication rates are lower for clinicians that perform more than 50 liver biopsies in a year [21]. One of the limitations of the present study is the fact that biopsies were performed by more than one physician having different experiences. However, there are also studies indicating that experience of physician does not influence complication rate [22].

Considering overall studies in the literature, percutaneous liver biopsy is a quite common, effective and reliable method

with very low serious complication rate in the definite diagnosis of hepatic lesions and chronic diseases. Most of the cases are discharged from hospital without problem on the same day after the procedure. Considering the rates as was reported in different series, mortality of this invasive procedure is quite low changing between 0.0088% and 0.3% [1]. Biopsy complications can be substantially limited by taking detailed patient anamnesis before biopsy, questioning drug use, physical examination and performing coagulation tests.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of İzmir Tepecik Training and Research Hospital.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - B.T., P.A.; Design - G.E.; Supervision - S.K.; Resources - S.K.; Materials - P.A.; Data Collection and/or Processing - B.T., P.A.; Analysis and/or Interpretation - P.A., B.E.S.; Literature Search; B.T., P.A.; Writing Manuscript - P.A.; Critical Review - G.E., S.K.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

References

- Sonsuz A. Karaciğer biyopsisi endikasyonları ve riskleri. Gastroenterolojide Klinik Yaklaşım Sempozyum Dizisi 2004; 38: 73-5.
- Bravo AA, Sheth SG, Chopra S. Liver biopsy. N Engl J Med 2001; 344: 495-500. [CrossRef]
- Campbell MS, Reddy KR. Review article: the evolving role of liver biopsy. Aliment Pharmacol Ther 2004; 20: 249-59. [CrossRef]
- Li GP, Gong GQ, Wang XL, Chen Y, Cheng JM, Chung YL. Fine needle aspirating and cutting is superior to Tru-cut core needle in liver biopsy. Hepatobiliary Pancreat Dis Int 2013; Vol 12, No 5. [CrossRef]
- Arıbaş BG, Ünlü DN, Dingil G, et al. Yarı-otomatik 16 Gauge Tru-cut iğne ile perkütan karaciğer biyopsileri. Van Tıp Dergisi 2010; 17: 69-76.
- Arıbal ME, Dingil G, Arıbaş B, Albayrak Y, Yücel K, İnce A. İntraabdominal lezyonların tanısında ultrasonografi eşliğinde ince iğne aspirasyon biyopsisi. Radyoloji ve Tıbbi Görüntüleme Dergisi 1992; 2: 290-3.
- Arıbaş BK, Dingil G, Koşar S, et al. Ultrasonografi eşliğinde ince iğne aspirasyon biyopsisinin intra-abdominal lezyonlarda tanı değeri. Acta Oncologica Turcica 2005; 38: 18-25.
- Malnick S, Melzer E. Routine ultrasound-guided liver biopsy: a time whose idea has come? J Clin Gastroenterol 2005; 39: 900. [CrossRef]
- Bernardino ME. Percutaneous biopsy. AJR 1984; 142: 41-5. [CrossRef]
- Charboneau JW, Reading CC, Welch TJ. CT and sonographically guided needle biopsy: current techniques and new innovations. AJR 1990; 154: 1-10. [CrossRef]
- Gazelle GS, Haaga JR. Guided percutaneous biopsy of intra-abdominal lesions. AJR 1989; 153: 929-35. [CrossRef]
- Fagelman D, Chess Q. Non aspiration fine needle cytology of the liver: a new technique for obtaining diagnostic samples. AJR 1990; 155: 1217-9. [CrossRef]
- Glaser J, Pausch J. The risk of liver biopsy. Z Gastroenterol. 1995; 33: 673-6.
- D'Incao RB, Silva MC, Almeida PR, Renon VP, Tovo CV. Percutaneous liver biopsy--2 decades of experience in a public hospital in the South of Brazil. Ann Hepatol 2013; 12: 876-80.
- Boskovic A, Kitic I, Prokic D, Stankovic I. Sample representativeness and incidence of liver biopsy complications caused by needles of bigger diameter (1.6 mm) and smaller diameter (1.2 mm) in children with cholestatic syndrome. Med Pregl 2013; 66: 367-71. [CrossRef]
- Behrens G, Ferral H. Transjugular liver biopsy. Semin Intervent Radiol 2012; 29: 111-7. [CrossRef]
- Piccinino F, Sagnelli E, Pasquale G. Complications following percutaneous liver biopsy. A multicentre retrospective study on 68, 276 biopsies. J Hepatol 1986; 2: 165. [CrossRef]
- Lindor KD, Bru C, Jorgensen RA. The role of ultrasonography and automatic-needle biopsy in outpatient percutaneous liver biopsy. Hepatology 1996; 23: 1079. [CrossRef]
- Padia SA, Baker ME, Schaeffer CJ, et al. Safety and efficacy of sonographic-guided random real-time core needle biopsy of the liver. Journal of Clinical Ultrasound 2009; Vol 37, No 3. [CrossRef]
- Govender P, Jonas MM, Alomari Al, et al. Sonography-guided percutaneous liver biopsies in children. AJR J Roentgenol 2013; 201: 645-50. [CrossRef]
- Froehlich F, Lamy O, Fried M. Practice and complications of liver biopsy. Results of a nationwide survey in Switzerland. Dig Dis Sci. 1993; 38: 1480-4. [CrossRef]
- Seeff LB, Everson GT, Morgan TR, HALT-C Trial Group. Complication rate of percutaneous liver biopsies among persons with advanced chronic liver disease in the HALT-C trial. Clin Gastroenterol Hepatol 2010; 8: 877-83. [CrossRef]