

Renal Biopsy Technique and Complications

Turgay Turan, Bulent Erol

Turgay Turan, Bulent Erol, Department of Urology, Istanbul Medeniyet University Faculty of Medicine, Istanbul, Turkey
Corresponding Author: Bulent Erol, MD, Department of Urology, Istanbul Medeniyet University Faculty of Medicine, 34722, Istanbul, Turkey.

Email: erolbulent@yahoo.com

Telephone: +90-532 352 65 64

Fax: +90-216 5709417

Received: April 17, 2016

Revised: June 1, 2016

Accepted: June 4, 2016

Published online: June 29, 2016

ABSTRACT

Renal biopsy is notably used for diagnosis and therapy guidance of renal diseases. Percutaneous renal biopsy has crucially improved safety-wise after the routine use of spring-loaded needles and the use of real-time ultrasound guidance. Renal biopsy includes potential complications such as bleeding, infection, pain and loss of kidney. As percutaneous approach is contraindicated, laparoscopic or transjugular renal biopsy can be used as an alternative.

Key words: Renal biopsy; Percutaneous renal biopsy; Complications; Laparoscopic

© 2016 The Authors. Published by ACT Publishing Group Ltd.

Turan T, Erol B. Renal Biopsy Technique and Complications. *Journal of Nephrology Research* 2016; 2(2): 113-114 Available from: URL: <http://www.ghrnet.org/index.php/jnr/article/view/1682>

Abbreviations

RB: Renal biopsy;

TJRB: Transjugular renal biopsy.

INTRODUCTION

Renal biopsy (RB) is notably used for diagnosis and therapy guidance of renal diseases. Iversen and Brun were first introduced percutaneous

renal biopsy in the early 1950s^[1]. Glomerular hematuria/proteinuria with or without renal dysfunction and unexplained renal failure are primary indications of kidney biopsy. Percutaneous renal biopsy has crucially improved safety-wise after the routine use of spring-loaded needles and the use of real-time ultrasound guidance. Hence, bleeding continues to be one of the most serious complications in this procedure. High blood pressure, age, decreased renal function, obesity, anemia, low platelet count and hemostasis disorders are some identified risk factors for complications after RB. As percutaneous approach is contraindicated, laparoscopic or transjugular renal biopsy have been described.

INDICATIONS FOR RENAL BIOPSY

The analysis of a renal biopsy sample brings about a specific diagnosis and get information about planned treatment. Unexplained acute or rapidly progressive renal failure, nephrotic syndrome, persistent glomerular hematuria, systemic diseases with renal involvement and renal allograft dysfunction are indications for renal biopsy. Bleeding diathesis is one of the most important contraindications. Hypertension, solitary kidney, hypotension, perinephric abscess, pyelonephritis, hydronephrosis, severe anemia, large renal tumors, and multiple cysts are some other relative contraindications to renal biopsy. Shetye *et al*^[2] explained in their study that biopsy adequate tissue was obtained in 96% of all patients. Percutaneous renal biopsy is usually performed in the prone position. Lower pole of the left kidney is preferred to reduce the risk of vessel complications. The transplant kidney biopsy is performed under real-time ultrasound guidance with use of an automated biopsy needle from anterior abdominal wall.

COMPLICATIONS

Percutaneous renal biopsy includes potential complications such as bleeding, infection, pain, loss of kidney and even death. Bleeding complications are classified as either major or minor. Hemorrhage requiring transfusion, bleeding with necessity of nephrectomy, even death are among major complications. Gross hematuria or subcapsular perinephric hematoma that will be resolved without a necessity of further intervention are minor complications.

There are some modifiable factors that influence the renal biopsy complications such as hypertension, abnormality of the coagulation and high serum creatinine. If it is necessary, exist and measures should be taken into account^[3].

ALTERNATIVE APPROACH

The indications for transjugular renal biopsy (TJRB) are bleeding diathesis, severe hypertension, a solitary or horseshoe kidney, end-stage renal disease or bilaterally small kidneys and morbid obesity^[4]. Levi *et al*^[5] recognized TJRB as an alternative, safe and effective technique in patients with renal parenchymal disease in their study. Renal biopsy may be performed with an open incision or laparoscopic technique. This method ensures positive identification of kidneys for a macroscopic diagnosis, and biopsy is better succeeded under direct vision^[6]. Laparoscopic renal biopsy is in fact that currently recommended procedure for pediatric cases. This approach is combined with a percutaneous needle biopsy^[7].

DISCUSSION AND CONCLUSION

The overall incidence of serious complications is low after RB. However, risk factors for bleeding must be analyzed with great care. Tondel *et al*^[8], in their study, shows that gross hematuria rate after biopsy is 1.9%. Corapi *et al*^[9] carried out a study which encompasses the complication rate of macroscopic hematuria is 3.5%. In addition, in the study of Daram *et al*^[10], it is explained that requiring blood transfusion in 3.6-9% of the patients and an incidence of gross hematuria of 3.6-17%.

According to the study of Kim *et al*^[11], the use of 14-gauge versus 18-gauge in native kidney renal biopsies caused greater incidence of complications. Eiro *et al*^[12] carried out a study which explained the frequency of the puncture was an independent risk factor for bleeding complications. Moreover, Pasquariello *et al*^[13] showed that there was a relationship between the depth insertion of needle and the bleeding complications. Both studies of Maya *et al*^[14,15], demonstrated that the use of the real-time ultrasound-guided technique alleviated the risk of major complications. Although these studies indicate that renal biopsy has become more secure, there is still risk.

On the first day of RB, patients need to be followed closely in case of the occurrence of complications such as gross hematuria, flank pain, hypotension and acute renal obstruction.

The RB is significant in the establishment of the diagnosis and management of kidney diseases. The overall incidence of serious complications is low. However, risk factors for bleeding must be analyzed with great care and if possible, they are corrected before the biopsy. TJRB and laparoscopic renal biopsy can be used as an alternative approach.

CONFLICT OF INTERESTS

The authors report no conflicts of interest.

REFERENCES

- 1 Iversen P, Brun C. Aspiration biopsy of the kidney. *J Am Soc Nephrol.* 1951; 1997; **8**: 1778-1787, discussion 1778-1786.
- 2 Shetye KR, Kavoussi LR, Ramakumar S, Fugita OE, Jarret TW. Laparoscopic renal biopsy: A 9-year experience. *BJU Int.* 2003; **91**: 817-820.
- 3 Zhu MS, Chen JZ, Xu AP. Factors that can minimize bleeding complications after renal biopsy. *Int Urol Nephrol.* 2014; **46**: 1969-1975.
- 4 See TC, Thompson BC, Howie AJ, Karamshi M, Papadopoulou AM, Davies N et al. Transjugular renal biopsy: our experience and technical considerations. *Cardiovasc Intervent Radiol.* 2008; **31**: 906-918.
- 5 Levi IM, Ben-Dov IZ, Klimov A, Pizov G, Bloom AI. Transjugular kidney biopsy: enabling safe tissue diagnosis in high risk patients. *IMAJ.* 2011; **13**: 425-427.
- 6 Agarwal SK, Sethi S, Dinda AK. Basics of kidney biopsy: A nephrologist's perspective. *Indian J Nephrol.* 2013; **23**: 243-252.
- 7 Peces R, de Sousa E, Peces C. Renal biopsies in special situations. *Nefrologia.* 2011; **31**: 627-629.
- 8 Tondel C, Vikse BE, Bostad L, Svarstad E. Safety and complications of percutaneous kidney biopsies in 715 children and 8573 adults in Norway 1988-2010. *Clin J Am Soc Nephrol.* 2012; **7**: 1591-1597.
- 9 Corapi KM, Chen JL, Balk EM, Gordon CE. Bleeding complications of native kidney biopsy: a systematic review and meta-analysis. *Am J Kidney Dis.* 2012; **60**: 62-73.
- 10 Daram SR, Reddivari V, Bastani B. Bleeding complications associated with percutaneous renal biopsy using Biopince needle. *Int Urol Nephrol.* 2010; **42**: 841-842.
- 11 Kim D, Kim H, Shin G, Ku S, Ma K, Shin S et al. A randomized, prospective, comparative study of manual and automated renal biopsies. *Am J Kidney Dis.* 1998; **32**: 426-431.
- 12 Eiro M, Katoh T, Watanabe T. Risk factors for bleeding complications in percutaneous renal biopsy. *Clin Exp Nephrol.* 2005; **9**: 40-45.
- 13 Pasquariello A, Innocenti M, Batini V, Pasquariello G, Beati S, Rindi S et al. Theoretical calculation of optimal depth in the percutaneous native kidney biopsy to drastically reduce bleeding complications and sample inadequacy for histopathological diagnosis. *Nephrol Dial Transplant.* 2007; **22**: 3516-3520.
- 14 Maya ID, Allon M. Percutaneous renal biopsy: outpatient observation without hospitalization is safe. *Semin Dial.* 2009; **22**: 458-461.
- 15 Maya ID, Maddela P, Barker J, Allon M. Percutaneous renal biopsy: comparison of blind and real-time ultrasound-guided technique. *Semin Dial.* 2007; **20**: 355-358.