

Frequency of Haemorrhagic Complications of Renal Biopsy

IRFAN ELAHI¹, FAZAL-E-MATEEN², TANZEEL ABBASI³, SADIA MAQBOOL⁴

ABSTRACT

Aim: To determine frequency of haemorrhagic complications of renal biopsy and to determine the frequency of haemorrhagic complications occurring within 6 hrs after the procedure.

Results: We studied 75 patients admitted in the general nephrology ward via outpatient department over a period of six months from November 2012 April 2013. There were 48 male and 27 female patients. The patients had a mean age of 35.52±12.8 years. Frequency of haemorrhagic complications was 26.7%, 90% of these complications occurred within 6 hours during post biopsy observation.

Conclusion: Renal biopsy is a safe procedure with low frequency of haemorrhagic complications most of the complications occur during first 6 hours of post biopsy period. As most of the complications occur during early post biopsy period and none of them was life threatening patients may be discharged same day after renal biopsy.

Keywords: Renal biopsy, Complications of renal biopsy, Out-patient renal biopsy, Post biopsy hematuria.

INTRODUCTION

Renal biopsy is an integral part of the nephrologist's diagnostic armamentarium. It was first reported in 1934 by Ball and became a routine procedure later². It is an important diagnostic procedure in nephrology practice and can aid in determining the underlying cause of renal disease, decision of therapy, assigning prognosis and monitoring response to therapy¹. Four groups of patients benefit from the findings of renal biopsy: those with a nephrotic syndrome, those with a renal disease in a context of systemic disorder, those with acute renal failure and those with a renal transplant. Some patients with non-nephrotic proteinuria, hematuria and chronic renal failure may also benefit from the procedure³.

Renal biopsy is essential for the diagnosis of kidney disease, but complications, particularly bleeding incidents, remain problematic. Recent studies have shown a complication rate of 5-30% in different series. The frequency of gross hematuria ranges from 4-70% in various reports,¹ whereas microscopic hematuria is almost present in all patients⁴. On ultrasonography, perirenal hematoma is detected immediately after biopsy in 86.1%⁵. A study showed that Clinically significant bleeding complications occur in >30% of patients undergoing percutaneous renal biopsy of native kidneys and can be severe in up to 10% of patients⁶.

The use of ultrasonography has made renal biopsies safer and easier. This was compounded by

the invention of automated-gun biopsy devices which have made performing biopsies less taxing^{1,2}. The technique has significantly improved over the past two decades, percutaneous renal biopsy has become a relatively safe procedure with life-threatening complications occurring in less than 0.1% of biopsies in recent reports³.

The optimal period of post-biopsy bed rest and in-hospital observation is controversial, as is the issue of whether or not kidney biopsy should be performed as an outpatient procedure. It is not determined yet whether strict overnight bed rest in the hospital after a kidney biopsy decreases the risk of complications⁴.

We intend to study time course of hemorrhagic complications in renal biopsy patients during post biopsy period to establish that if all complications occur during early post biopsy period then day care biopsies would be safe. As day care biopsies will have great impact on reducing cost, saving time and resources in third world country like Pakistan this fact justifies significance of this study.

MATERIAL AND METHODS

A total of 75 subjects having definitive indication for renal biopsy of both genders presenting to outpatient and inpatient Department of Nephrology Shaikh Zayed hospital Lahore were offered enrollment in the study, after obtaining informed consent. The confidentiality of patients was ensured and ethical issues were addressed. Demographic information including age & gender were collected. Labs like CBC PT APTT were done from pathology laboratory Shaikh Zayed Hospital prior to biopsy to see coagulation status of patients. Biopsy was performed

¹Assistant Professor Nephrology King Edward Medical University

^{2,3}Senior Registrar Nephrology Department Mayo Hospital

⁴Renal Dialysis Technologist Nephrology Department Mayo Hospital

Correspondence to Dr. Irfan Elahi Email: drirfanelahii@gmail.com
Cell: 03218498128

under ultrasound guidance using BARD^R MONOPTY Disposable automated biopsy under local anesthesia by Nephrologist. Patient was observed for hemorrhagic complications (Gross hematuria & Post biopsy hematoma) and time of their occurrence in post biopsy period. Gross hematuria was recorded by gross inspection of urine voided during 24 hours of hospital admission till discharge. Ultrasound was done at 1, 6 and 24 hours after biopsy to see perinephric hematoma. All this information was recorded in the Proforma.

RESULTS

We studied 75 patients admitted in the general nephrology ward via outpatient department over a period of six months from November 2012 till April 2013. There were 48 male (64%) and 27 female (36%) patients. Mean age of patients was 35.52±12.8. The age range varied from 16 years to 65 years. The maximum numbers of cases were in the range of 25-34 years of age i.e. 23 cases.

Frequency of haemorrhagic complications was 26.7%, (20 out of 75 patients) 90% of these complications occurred within 6 hours during post biopsy observation. Gross hematuria occurred in 5 out of 75 patients (6.7%) all the patients developed gross hematuria within 6 hours during post biopsy observation period. Perinephric hematoma was observed in 20 out of 75 patients (26.7%), 90% of patient developed hematoma within 6 hours during post biopsy period.

DISCUSSION

In our study we found 26.7% frequency of haemorrhagic complications perinephric hematoma was found in 20 out of 75 patients (26.7%). 90 % of patients developed hematoma within first 6 hours post biopsy and gross hematuria was noted in 5 out of 75 patients (6.7%). All of these patients developed hematuria within first 6 hours. All the patients who developed gross hematuria had perinephric hematoma visible on ultrasound done within first 6 hours post biopsy thus positive predictive value of hematoma for hematuria was only 25% whereas negative predictive value was 100% in our study.

The results, of Al-Hweish AK were even better than our study rate of haemorrhagic complications in in-patients was only 13.6% and complications were apparent within 6 hours in 97.7% of patients⁴ (although their sample size was very small 44 patients only). Perhaps because they used real time ultrasound for renal biopsy, whereas we used ultrasound for localization of kidney only. Some studies have compared the use of real-time

ultrasound to the "blind" approach (using ultrasound for localization only). A retrospective study demonstrated a higher diagnostic yield (100 percent versus 84 percent) as well as a lower major hemorrhagic complication rate (0 vs 11%) in the group using real-time ultrasound⁹.

Many other studies showed frequency of gross hematuria to be 3-9% which was comparable to our results^{10,11}. Waldo B found that with the use of renal ultrasound 1 hour post percutaneous renal biopsy, the absence of perinephric bleeding is predictive of an uncomplicated course while the presence of a perinephric hematoma is not reliably predictive of a clinically significant complication post-renal biopsy⁶.

Another study showed the ultrasound findings of a hematoma at one hour had a positive predictive value of only 43 percent but a negative predictive value of 95% for the development of a complication¹². While our study showed positive predictive value of 25% and negative predictive value of 100%.

Yesudas SS et al showed renal biopsy is more safe in the hand of nephrologist as compared to radiology they recommended that more nephrologist should take up this simple yet vital and rewarding procedure to reduce complication rate of renal biopsies²

An important question in this era of cost-containment is; what is the optimal period of observation after renal biopsy? This is determined primarily by the time course of complications, particularly bleeding. Studies show variable results, some favoring Outpatient, real-time, ultrasound-guided percutaneous renal biopsy and minimizing post biopsy hospitalization thus resulting in significant cost savings without exposing the patients to an increased risk of complications^{7,8,13}.

As most of the complications occur during first 6 hours of post biopsy period, it is unnecessary to retain patient for entire 24 hours. Day care biopsies can significantly reduce cost of procedure, save time of patients and their family, reduce the discomfort of prolong forced bed rest. Still most of centers in Pakistan do renal biopsy as in-patient procedure with retention of patient & forced bed rest for twenty four hours despite growing evidence in favor of day care biopsies (same day discharge after 8 hours).

Ishikawa E et al showed Shortening the period of strict bed rest after renal biopsy from 7 h to 2 h decreased the incidence of back pain, but there was no increase in bleeding or other biopsy-related complications. Our findings suggest that a shorter period of strict bed rest can safely reduce discomfort in renal biopsy patients⁷.

While some other studies recommend 24 hr post biopsy observation to avoid missing any complication they claimed post biopsy observation for eight hours

or less would miss 33% complications.¹⁴⁻¹⁵ Our study did not support this observation.

Overall, percutaneous renal biopsy has become a relatively safe procedure, with life-threatening complications occurring in less than 0.1% of biopsies in recent reports^{16,17,18}. In low risk patients (e.g., serum creatinine concentration < 2.5 mg/dl, blood pressure <140/90 mmHg & no evidence of coagulopathy) a shorter observation period may be justified. Our study also excluded these high risk patients but correlation of serum creatinine with haemorrhagic complications was not studied. The results cannot be generalized to high risk patients who might need prolonged observation and might need other modes of renal biopsy (open renal biopsy or transjugular biopsy).

In our study, we studied the frequency of haemorrhagic complications of renal biopsy and complications occurring within 6 hours in in-patients only. More studies comparing haemorrhagic complications with a head to head analysis in in-patient and out-patient renal biopsies are needed to establish safety of daycare (out-patient) renal biopsies.

REFERENCES

1. Khemchand NM, Sadaf A, Saeed HC, Afroze RS. Outcome of pediatric renal biopsy with monopty gun technique. *J Surg Pak*, 2010; 15(1): 9-14.
2. Yesudas SS, Georgy NK, Manickam S, Raheena A, Monai RC, Noble BA, et al. Percutaneous real-time ultrasound guided renal biopsy performed solely by nephrologist: A case series *Indian J Nephrol*, 2010; 20(3): 137-141.
3. Lefaucheur C, Nochy D, Bariety J. Renal biopsy: procedures, contraindications, complications. *Nephrol Ther*, 2009, 5(4): 331-9.
4. Al-Hweish AK, Abdul-Rehman IS. Outpatient percutaneous renal biopsy in adult patients. *Saudi J Kidney Dis Transpl*, 2007; 18: 541-6.
5. Ishikawa E, Nomura S, Hamaguchi T, Obe T, Inoue-Kiyohara M, Oosugi K, et al. Ultrasonography as a predictor of overt bleeding after renal biopsy. *Clin Exp Nephrol*, 2009, 13(4): 325-31.
6. Waldo B, Korbet SM, Freimanis MG, Lewis EJ. The value of post biopsy ultrasound in predicting complications after percutaneous renal biopsy of native kidneys. *Nephrol Dial Transpl*, 2009; 24(8): 2433-9.
7. Ishikawa E, Nomura S, Obe T, Katayama K, Oosugi K, Murata T, et al. How long is strict bed rest necessary after renal biopsy? *Clin Exp Nephrol*, 2009; 13(6): 594-7.
8. Maya ID, Allon M. Percutaneous renal biopsy: outpatient observation without hospitalization is safe. *Semin Dial*, 2009, 22(4): 458-61.
9. 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.
10. Parrish AE. Complications of percutaneous renal biopsy: a review of 37 years experience. *Clin Nephrol*, 1992;38:135-41.
11. Wicker CG, Gopler TA. Complications of percutaneous needle biopsy of the kidney. *Am J Nephrol*, 1982; 2:173-8.
12. Waldo B, Korbet SM, Freimanis MG, Lewis EJ. The value of post-biopsy ultrasound in predicting complications after percutaneous renal biopsy of native kidneys. *Nephrol Dial Transplant* 2009; 24:2433.
13. Iannaccone S, Manganelli R, Gagliardi B, et al. Renal biopsy: outpatient procedure? *G Ital Nefrol*, 2003; 20(3):253-7
14. Whittier WL, Korbet SM. Timing of complications in percutaneous renal biopsy. *J Am Soc Nephrol* 2004; 15:142.
15. Whittier WL, Korbet SM. Renal biopsy: update. *Curr Opin Nephrol Hypertens*, 2004; 13(6):661-5.
16. Marwah DS, Korbet SM. Timing of complications in percutaneous renal biopsy: What is the optimal period of observation? *Am J Kidney Dis* 1996;28:47-52.
17. Burstein DM, Schwartz MM, Korbet SM. Percutaneous renal biopsy with the use of real time ultrasound. *Am J Nephrol* 1991; 11:195-200
18. Mendelssohn DC, Cole EH. Outcome of percutaneous kidney biopsy, including those of solitary native kidneys. *Am J Kidney Dis* 1995;26:580-5.