

Theoretical calculation of optimal depth in the percutaneous native kidney biopsy – a new mathematical formula

Nora TOMA, Specialist in Cardiology, Research Fellow in Cardiology
Cardiology Department, University Hospital of Bucharest, Romania

Percutaneous native kidney biopsy (PNKB) is a very useful method for renal disease diagnosis, if performed by experienced physicians. Despite of this, some problems such as hemorrhagic complications or inadequate tissue sample for the diagnosis may still occur. That's why, finding a mathematical formula to determine the depth in centimeter where pushing the trigger could be very helpful.

This prospective study analyzed data from 249 PNKB performed by two experienced nephrologists using the 14-gaugex150mm automated biopsy gun under continuous sonographic control. These patients were divided in two groups with similarly characteristics respect of gender, mean age, BMI, with normal BP, and without anticoagulant/ antiplatelet treatment. All patients underwent an abdominal ultrasound and renal Colour-Doppler sonography examination before the procedure, to exclude the presence of cysts in the lower pole of the kidneys, the renal longitudinal diameter under 9 cm, or the presence of an accessory renal artery of the lower pole.

In the Group I (126 PNKB) the trigger was pushed exactly at the depth previously

calculated by a mathematical formula: BW/H (body weight expressed in hectograms divided by patient height expressed in centimeters) less 0.5 ($BW/H - 0.5$). As soon as the distance calculated by the formula was reached, the patient was asked to hold his breath while expiring and the renal specimen was carried out. The complications were compared with those occurred in Group II (123 PNKB) performed in absence of this formula.

The results showed that the use of this mathematical formula improved the safety of PNKB and the accuracy of diagnosis (from Group I only four subjects presented post biopsy gross haematuria and three experienced symptomatic small subcapsular haematoma comparative with nine subjects and respective five patients from Group II; adequate sampling was 100% in Group I and 94.8% in Group II).

In conclusion, PNKB is an invasive procedure, very helpful for renal disease diagnosis, but still involving minor or major risks. This study showed that applying this mathematical formula for optimal depth of PNKB we can significantly reduce the incidence of bleeding complications and take enough renal tissue for diagnostic evaluation.

Comment on the paper:

Antonio Pasquariello, Maurizio Innocenti, Valentina Batini, 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