Acta Med. Nagasaki 24 : 1 – 5

Instrumental Utilization to Elevate Puncture Result in Percutaneous Renal Biopsy

H. NOUTOMI*, S. TANAKA** and Y. SATOU***

Department of Urology,
Japan Red Cross Society Nagasaki Atomic Bomb Hospital,
Nagasaki, Japan

Received for publication, November 15, 1978

In performing percutaneous renal biopsy, it seems that the lesser the amount of the intercalative tissue existing in the space between the derm to the kidney, the more improved the results of puncture would be, with minimal complications of puncture. As we believe such ideal operation may be secured by methods based on open needle biopsy, we have carried out renal puncture by employing the technic which constitutes of insertion of ascites trocar needle in the direction and to the depth as determined by renal explorative needle, followed by removal of the inner trocar needle and insertion of a Tru-Cut needle into the outer trocar. As a result, in 49 out of 50 cases renal tissue could be obtained, the mean length of preparations for optical microscopy being 13.8±4.3 mm and the mean number of the glomerulus contained being 25.3±15.8 with a range from 7 at the smallest and 66 at the greatest. The value of the utilization of outer trocar of the ascites trocar needle as a guide needle in renal puncture was discussed in detail.

MATERIALS AND METHODS

During the period from October 1975 to November 1977, in 50 cases suspected of glomerulonephritis or nephrotic nephropathy percutaneous renal biopsy was carried out. There were 28 males and 22 females, ranging in age from 4 to 56 years. Twenty-three of these patients who were under the age of 15 years were those detected of proteinuria and hematuria at the regular urine examination at school, namely they were the patients with asymptomatic proteinuria and hematuria (Table 1).

Renal biopsy was performed with patients placed in prone position using a sand bag for restriction of renal mobility. On the basis of the pyelogram and nephrogram

*納 富 寿, **田 中 精 二, ***佐 藤 幸 憲

Table 1. Cases of percutaneous renal biopsy

Age	Male	Female	Total
4 — 9	6	3	9
10 — 19	13	8	21
20 — 29	5	4	9
30 — 39	2	2	4
40 — 49	2	2	4
50 — 59		3	3

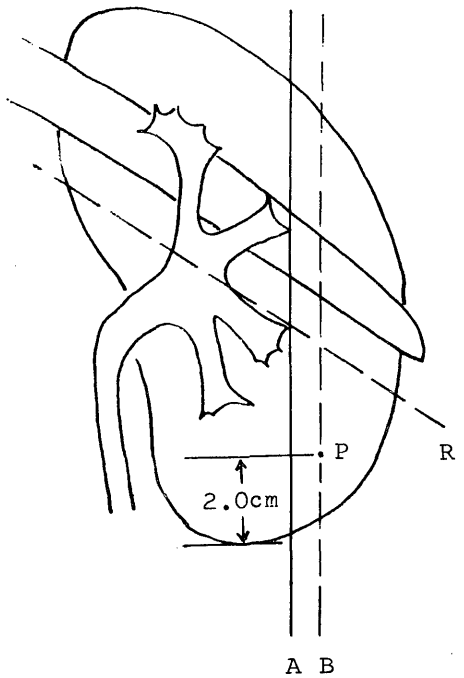

Fig. 1. A, outer calyceal line in parallel with the posterior median line. B, a line in parallel with line A, with a distance of 0.5 cm to the outer side. R, a line running 1.0 cm below the 12th rib. P, puncturing point.

obtained by IVP and of the status of 12th rib, the field and point of puncture were designed on the back-lumbar area of patients with a skin pencil (Fig. 1). The site to be punctured was anesthesized locally and an incision of 4mm was made. Conduction anesthesia was given in 5 directions, namely in the vertical direction to the puncture site and in the upper and lower directions as well as inner and outer directions of 10° each from the center of puncture point. Renal explorative examination was performed for each of the above described 5 directions using lumbar needle in order to determine the depth and the direction of renal puncture precisely. In all of 4 children who were more than 4 but less than 6 years of age, renal biopsy was performed under systemic anesthesia by Ketalar (2-0-chlorophenyl-2-methylamino-cyclohemanone hydrochloride) given intramuscularly in a dosage of 6 to 8 mg/kg.

On the basis of the informations obtained through renal exploration, the second smallest ascites trocar needle was inserted to the predetermined depth and direction and the inner trocar was removed leaving outer trocar alone, which, in tern, was newly inserted of a Tru-Cut needle (Travenol disposable biopsy needle) for renal puncture (Figs. 2, 3 and 4). In routine examinations, renal puncture using ascites trocar needle (MIC 648) as the guide was performed twice. One of the obtained tissue preparations was used as the sample for light microscopic examination, and the other for electron microscopic and fluorescent antibody examination.

Out of 50 cases received renal puncture because of suspection of glomerulonephritis and nephrotic nephropathy, diagnosis could be established histologically in 49 cases (98.0 %). The mean length of renal tissues served for optical microscopic examination was 13.8±4.3 mm and the mean number of glomerulus 25.3±15.8, with a range from 7 at

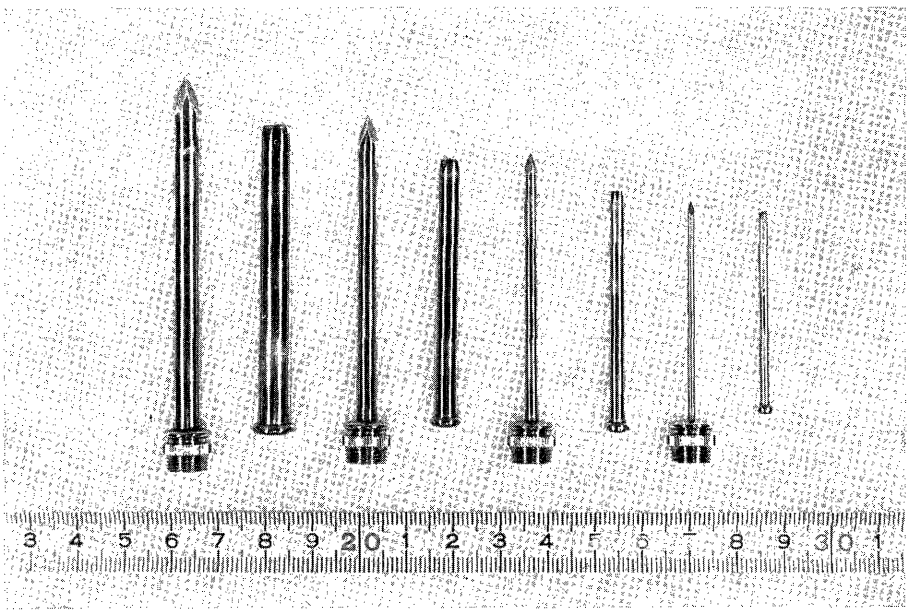

Fig. 2 Ascites trocar needles (MIC 648, with 4 needles).

Table 2. Number of glomerulus in light microscopic specimen

No. glomerulus	No. cases
7 — 9	5
10 — 19	14
20 — 29	16
30 — 39	7
40 — 49	3
50 — 59	2
60 —	2

the smallest to 66 at the greatest. Looking into the side of the kidney biopsied, cases in which left kidney was selected for biopsy were prevailing since 12 cases were biopsied of right kidney, while there were 40 cases which received biopsy of left kidney.

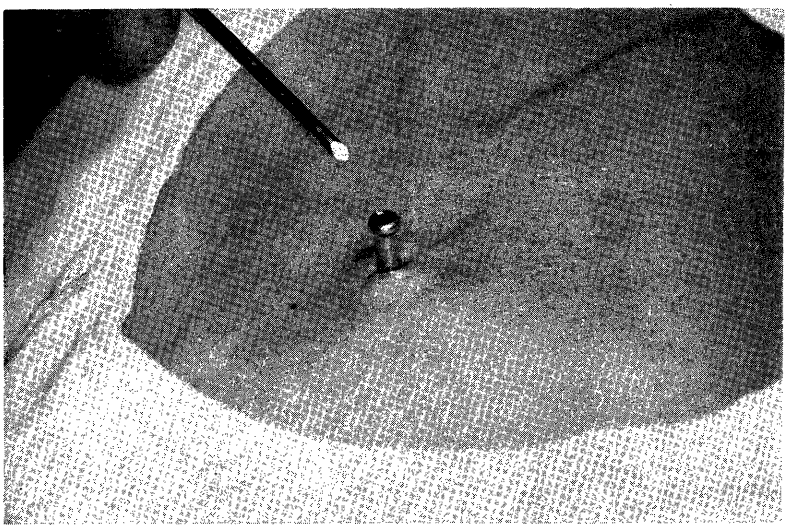

Fig. 3. Insert the second smallest ascites trocar needle to the depth and direction determined by the renal explorative needle, and extract the inner trocar needle leaving the outer trocar.

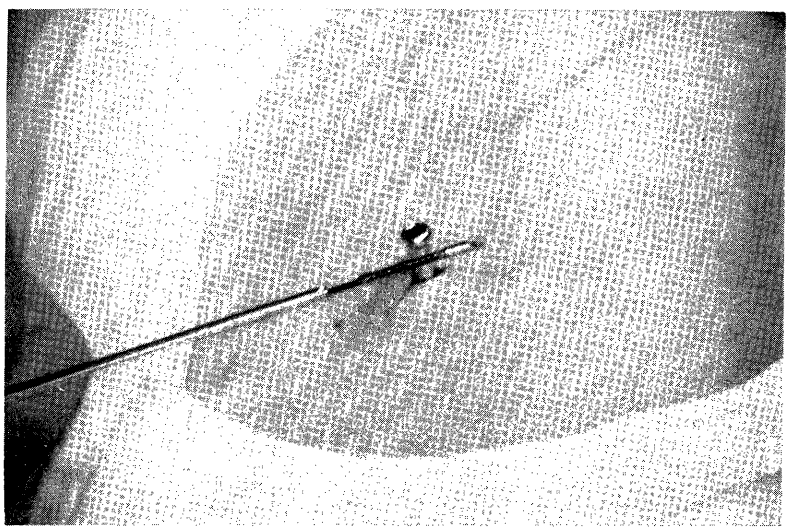

Fig. 4. Insert renal puncturing needle and puncture renal tissue assuredly with safety.

DISCUSSION

As it appears that punctures employing operation method as used for open needle biopsy may ensure sampling of renal tissue with favorable puncturing results, we have performed renal biopsy by inserting ascites trocar needle to the vicinity of the renal capsule, followed by extraction of inner trocar needle to be replaced by renal puncturing needle in order to make little the intervening tissue as well as possible.

It was found that the renal puncture employing outer trocar of ascites trocar needle as the guide provided us the following advantages: 1) Ascites trocar needle can be inserted under local anesthesia with simple technic, 2) it is possible to make the amount of intervening tissue minimal, 3) it is often that the renal resistance can be recognized directly through puncturing needle, 4) the sort of puncturing needle and the posture of patients at puncture can be selected freely, 5) this method can be indicated for obese patients or those with great muscular development, 6) punctures can be performed repeatedly through the inserted outer trocar, 7) sliding back of inner needle during puncture can be prevented as far as possible, 8) a large number of glomerulus will be contained in the sampled tissue and 9) puncture can be performed with the minimal possibility of occurrence of complications.

In performing renal puncture, ultrasound and imageamplification fluoroscopy have been utilized for localization of the kidney, and by means of these aids renal biopsies can be carried out even in cases of severe uremia under hemodialysis or cases of renal transplantation. Although favorable results have been reported at various institutions, it is not infrequent that complications due to puncture may occur. Localization of the kidney is also important in percutaneous renal biopsy, but it is equally of great importance to minimize the intervening tissue and to perform renal punction in an operative procedure resembling to that used for open needle biopsy. Therefore, our method which consists of insertion of puncturing needle through outer trocar of ascites trocar needle provides us safe renal puncture with least possibility of causing complications. At the end of our paper, we would like to ask medical staffs in charge of renal biopsy at various institutions to try our method to add the experiences with this method.

REFERENCES

DIAZ-BUXO, J. S. and DONADIO, J. V., Jr. (1975). Complications of percutaneous renal biopsy : an analysis of 1000 consecutive biopsies. *Clinical Nephrology*, 4, 223–227.

MERTZ, J. H. O., LANG, E. and KLINGERMAN, J. J. (1966). Percutaneous renal biopsy utilizing cinefluoroscopic monitoring. *Journal of Urology*, 95, 618–621.

NOUTOMI, H., KANETAKE, H. and HAKARIYA, H. (1976). Use of guide canal of biopsy needle to elevate tissue collection rate in percutaneous renal biopsy. *Japanese Journal of Urology*, 67, 543–547.

SPIGOS, D., CAPEK, V. and JONASSON, O. (1977). Percutaneous biopsy of renal transplants using ultrasonographic guidance. *Journal of Urology*, 117, 699–700.

WARREN, K.B. and EDWIN, D.V., Jr. (1977). A comparative study of open surgical and percutaneous renal biopsies. *Journal of Urology*, 117, 696–698.