Instrumental Utilization to Elevate Puncture Result in Percutaneous Renal Biopsy

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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

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Table 1. Cases of percutaneous renal biopsy

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<thead>
<tr>
<th>Age</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
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<tbody>
<tr>
<td>4 - 9</td>
<td>6</td>
<td>3</td>
<td>9</td>
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<td>10 - 19</td>
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<td>20 - 29</td>
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<td>4</td>
<td>9</td>
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<td>30 - 39</td>
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<td>40 - 49</td>
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<td>2</td>
<td>4</td>
</tr>
<tr>
<td>50 - 59</td>
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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-cycloheptamone 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 turn, 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 suspicion 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 $13.8 \pm 4.3$ mm and the mean number of glomerulus $25.3 \pm 15.8$, with a range from 7 at
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.

Table 2. Number of glomerulus in light microscopic specimen

<table>
<thead>
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<tbody>
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<tr>
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<td>60 -</td>
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Fig. 2 Ascites trocar needles (MIC 648, with 4 needles).
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 in-
tervening 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

biopsy needle to elevate tissue collection rate in percutaneous renal biopsy. Japanese