MATERIAL AND METHODS
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The case material for the present study consisted of the patients of acute renal failure (ARF) coming from different parts of Bundelkhand region to this medical college and those patients developing ARF after admission in medical, surgical and obstetrical wards. The patients with known pre-existing chronic renal diseases developing ARF were excluded from the study.

This study comprised of both male and female patients of age between 15-75 years. In each case, a detailed history was elicited with reference to find out the cause of ARF and detailed past history was also enquired for the presence of pre-existing chronic renal disease.

In every case, careful clinical examination and investigation were done to confirm cause of uraemia. The following investigations were done in every case - Total and differential leucocyte count, hemoglobin estimation, BSR, urinary microscopic and albumin were determined by standard methods. Urinary specific gravity was measured by calibrated urinometer. Blood urea was estimated by urease Messlerization method. Serum creatinine was estimated by manual method (Bord and Sirotta, 1943). Urinary creatinine was estimated by alkaline picrate method (Bonsnes & Taussky, 1945).
Serum sodium, serum potassium and urinary sodium were calculated with the help of systronics flame photometer type 121 by using sodium or potassium filter respectively. Twelve leads electrocardiogram was also done in each case.

Glomerular filtration rate was determined by endogenous creatinine clearance. Creatinine clearance means rate of urinary excretion of creatinine from plasma into urine in unit time expressed as number of ml of plasma cleared of the creatinine in one minute. Creatinine clearance is the amount of excreted creatinine divided by plasma creatinine concentration.

\[
\text{Creatinine clearance (ml/minute)} = \frac{UV}{P}
\]

\[U = \text{Urinary creatinine concentration (mg/100 ml)}.
\]

\[P = \text{Serum creatinine concentration (mg/100 ml)}.
\]

\[V = \text{Volume of urine per minute (ml/minute)}.
\]

Renal biopsy, plain x-ray abdomen, intravenous pyelography, and ultrasonography were done in some cases to establish the cause of acute renal failure.

RENAL BIOPSY

The renal biopsy was done according to the technique described by Kark and Muehrke (1954) using Franklin's modification of vim Silvermann's needle.

Biopsy pieces were procured in the autotechnical tissue processor for 24 hours and then embedded in paraffin.
blocks. Sections were cut with the help of microtome and sections were stained by Haematoxylin and Eosin stain. Permanent slides were made and examined with the help of microscope. The diagnosis was made according to the criteria laid down by Symmar's (1978)\textsuperscript{101}.

The diagnosis of ARF is based on the sudden onset of renal decompensation as evidenced by a rapid rise of serum creatinine to above 2 mg/dl or the blood urea nitrogen to above 40 mg/dl in the presence of likely predisposing factors.

Oliguria was defined as twenty four hour urinary volume of less than 400 ml. Non oliguric ARF was diagnosed when patients had twenty four hour urinary volume consistently greater than 400 ml through out the anatomic phase of their illness.

Clinical diagnosis of pre-renal failure, acute tubular necrosis, glomerulonephritis and post renal failure was made on following parameters.
<table>
<thead>
<tr>
<th>Pro-renal Azotaemia</th>
<th>A.T.N. Oliguric</th>
<th>Glomerular Nephritis</th>
<th>Post renal failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary specific Gravity</td>
<td>1.020</td>
<td>1.010-1.015</td>
<td>1.015</td>
</tr>
<tr>
<td>Urinary sodium (m eq/l)</td>
<td>20</td>
<td>Oliguric-740-60 (variable)</td>
<td>20-40</td>
</tr>
<tr>
<td>Nonoliguric</td>
<td>730-40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine/plasma creatinine ratio</td>
<td>7 40</td>
<td>10-15</td>
<td>740</td>
</tr>
<tr>
<td>Fractional excretion of sodium</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Renal failure index</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Fractional excretion of sodium and renal failure index are the most accurate parameter to assess the tubular function. Fractional excretion of sodium is the ratio expressed as a percentage of excreted sodium to filtered sodium.

Fractional excretion of sodium (FE Na) was calculated by the following formula in this study.

\[
FE \ Na = \frac{\text{Urinary sodium}}{\text{Plasma creatinine}} \times \frac{\text{Plasma sodium}}{\text{Urinary creatinine}} \times 100
\]

Renal failure index is the ratio of urinary sodium concentration to urinary and plasma creatinine concentration ratio. Determination of RFI is particularly useful in non oliguric renal failure because of lower
urinary sodium concentration and better preservation of renal function in these patients. NFI has the advantage of being rapidly determined on a spot urine sample. Nefal failure index was calculated by following formula in present study.

\[
\text{NFI} = \frac{\text{Urinary sodium} \times \text{Plasma creatinine}}{\text{Urinary creatinine}}
\]

In this study, both peritoneal and haemodialysis were performed as part of the treatment in some patients. Intermittent peritoneal dialysis was performed with peritoneal dialysis catheter, \( Y \) connection and disposable peritoneal dialysis fluid. Haemodialysis were done by Travenol 5PJ 450 hemodialysis machine with use of the Travenol capillary flow dialyzer (Hollow fibre kidney) of surface area 1.3 m². Blood access was made by femoral catheterization or quinton scribner arteriovenous shunt.

All the data obtained were statistically analysed and evaluated by using Paired 't' test and Chi square test.