Vancomycin Concentrations in Autosomal Dominant Polycystic Kidney Disease

Str—It has long been recognized that various classes of antibiotics display differential drug penetration into renal cysts among patients with autosomal-dominant polycystic kidney disease [1]. How the kidneys handle vancomycin and data on the penetration of vancomycin into cysts, nevertheless, remain unknown in the absence of formal studies. On the basis of 1 isolated case report, vancomycin was suggested to be a drug of choice for the treatment of staphylococcal cyst infection from a hematogenous source, but the success of this treatment could have been related to percutaneous drainage [2].

To define the precise role of vancomycin in autosomal-dominant polycystic kidney disease, we report our experience with a 38-year-old anuric man with end-stage renal disease who had undergone bilateral nephrectomy for renal cell carcinoma after receiving 300 mg of parenteral vancomycin at induction. Blood samples and nephrectomy cyst fluid specimens were obtained intraoperatively and were assayed for vancomycin levels by use of the fluorescent polarization immunoassay (TDx; Abbott Laboratories). As shown in table 1, concentrations of vancomycin in the cystic fluid from the left kidney were undetectable 3 h after drug administration, despite a simultaneous serum vancomycin level of 12.07 μg/mL. Vancomycin was again undetectable in samples from proximal cysts of the right nephrectomized kidney 4 h after drug administration.

This report provides “proof of concept” that cyst penetration of vancomycin—although vancomycin is lipid soluble—could be impaired in the proximal cysts of the polycystic kidneys, and it calls into question the use of vancomycin for treatment of polycystic kidney infection. Whether parenteral vancomycin administration can achieve therapeutic levels within the gradient or distal cysts is open to debate.

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Table 1. Concentrations of vancomycin in cyst fluid and serum specimens

<table>
<thead>
<tr>
<th>Time after parenteral vancomycin administration</th>
<th>Vancomycin level, μg/mL</th>
<th>Serum</th>
<th>Proximal cyst fluid</th>
<th>Distal cyst fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 h</td>
<td>12.07*</td>
<td>&lt;0.6*</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>4 h</td>
<td>...</td>
<td>&lt;0.6</td>
<td>...</td>
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</tr>
</tbody>
</table>

NOTE. Distal cysts are defined as cysts with a low sodium concentration, thereby maintaining a steep gradient between cyst fluid and plasma sodium concentrations. Proximal cysts are defined as those with a sodium concentration not greatly different from the plasma concentration [3].

* Detection limit.