A recent letter [1] dealing with deamino-8-D-arginine vasopressin (DDAVP) in patients with uremia prompted this reply. The authors showed that the bleeding time was not reduced in 5 patients with chronic glomerulonephritis undergoing regular hemodialysis 1 h after the infusion of DDAVP. Furthermore, DDAVP did not produce any important increase in factor VIII: von Willebrand factor activities.

Uremic bleeding reflects a complex disorder of hemostasis commonly associated with variations in the levels of factor VIII: von Willebrand factor activities. Holmberg and Nilsson [2] noted that elevated levels of factor VIII clotting activity accompanied chronic renal failure. Katchkine et al. [3] found elevated von Willebrand factor antigen levels, but the ristocetin cofactor activity lower than normal, suggesting that chronic renal failure was accompanied by a functional abnormality of the von Willebrand factor that might partly explain the prolonged bleeding time in chronic renal failure. The study by Janson et al. [4], using cryoprecipitate, known to be enriched in both VIII: C and the larger von Willebrand components of the factor VIII complex, and the study by Mannucci et al. [5], using DDAVP, showed that the bleeding time shortened in uremic patient. The bleeding time is the single test that most closely correlates with clinical bleeding in patients with renal failure [6, 7]. We have evaluated the response of factor VIII: von Willebrand factor and bleeding time to DDAVP (0.3 µg/kg body-weight), cryoprecipitate (50 IU/kg body weight), and highly ‘purified’ factor VIII concentrates (55 IU/kg body weight) in 1 uremic patient (a 40-year-old woman) undergoing 5 years of regular hemodialysis with a history of complicated postoperative bleedings during the last 4 years (table I). She was planned for a related-donor

Table I. Response of factor VIII: von Willebrand factor and bleeding time to highly purified Hemospray, cryoprecipitate, and DDAVP

<table>
<thead>
<tr>
<th>Normal range</th>
<th>0.80- 0.70- &gt; 40</th>
<th>1.0</th>
<th>1.20</th>
<th>1.30</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-9.5</td>
<td>0.80- 0.70- &gt; 40</td>
<td>1.0</td>
<td>1.20</td>
<td>1.30</td>
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<td>3-9.5</td>
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<td>1.20</td>
<td>1.30</td>
</tr>
<tr>
<td>F = Factor; AHF = antihemophilic factor; n.d. = not determined.</td>
<td></td>
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</tr>
</tbody>
</table>

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kidney. After all three infusions we found minor but significant increases in plasma concentrations of factor VIII: von Willebrand factor properties, VIII:C, VIII-R:Ag, VIIIIR:RCo, and ristocetin-platelet aggregation. A temporary shortening of the Ivy bleeding time was demonstrated after administration of cryoprecipitate and DDAVP, but not after highly ‘purified’ factor VIII concentrate. Factor VIII: von Willebrand factor circulates in a multimeric form, of which larger multimers are essential for its biologic interaction with platelets. Only cryoprecipitate and DDAVP increase the larger multimeric factor VIII: von Willebrand factor forms in plasma [5, 8], and the temporal association between the increase and half-life for factor VIII: von Willebrand factor in a specific state of polymerization and shortening of bleeding time is striking. Such a phenomenon is shown to over-come-temporarily-the platelet adhesion defect in uremia. The mechanisms of action of factor VIII: von Willebrand factor in shortening the bleeding time are unclear, but the platelet hypoaggregation demonstrated by raised ristocetin-platelet aggregation values and the elevated levels of factor VIII: von Willebrand factor activities with normal structure of the plasma von Willebrand multimers [4, 5, 9] show a von Willebrand factor receptor defect of uremia. Immunochemical studies of platelet membrane abnormalities in patients with chronic renal failure are in progress.

References