A New Classification Based on Angiographic Arterial Supply to Neoplasms

The extensive vascularity of extra and intracranial neoplasms is vulnerable to superselective intraarterial injection of embolic particles. The goal is to inject embolic material such as polyvinyl alcohol particles, gelfoam powder, fibrin glue, microfibrillar collagen, or gelatin microspheres until the vascular blush is completely obliterated. The angiographic supply pattern determines the likelihood of success of selective microcatheter placement and injection of embolic material with maximal penetration and minimal reflux into normal vasculature. A classification scheme is proposed that assigns a score from 1 to 3 (see Table 1) on the basis of angiographic appearance of the vasculature. Increasing grade suggests a higher level of complexity for embolization procedure.

The classification is based on three factors: 1. End versus side origin; 2. Tree versus plant configuration; and 3. Possibility of ischemic complications with reflux into proximal vasculature. The tree configuration is defined by presence of an angiographically identifiable trunk (see Figure 1). The grade is assigned based on the predominant pattern of vasculature.

Indirect comparisons between results of surgical removal of meningiomas with and without preoperative embolization suggest that embolization reduces the intraoperative blood loss particularly in large tumors when a high degree of obliteration can be achieved. Further studies to determine the inter-observer agreement for assigning grades to vascular supply patterns for neoplasms and prognostic value of assigned grades are required.

Table 1: Proposed classification scheme for classifying the predominant pattern of arterial blood supply.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Point of origin</th>
<th>Branching pattern</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>End arterial supply</td>
<td>Tree or plant configuration</td>
<td>Low likelihood of ischemic complications if proximal reflux occurs</td>
<td>High likelihood of ischemic complications if proximal reflux occurs</td>
</tr>
<tr>
<td>2</td>
<td>Side arterial supply</td>
<td>Tree configuration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Side arterial supply</td>
<td>Plant configuration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1: Schematic representation of proposed classification scheme for classifying the predominant pattern of arterial blood supply.

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References