CHAPTER 17

Angiographic Protocol of the Carotid Region

This area corresponds to the retroparotid region, extending from the common carotid bifurcation inferiorly to the petro-occipital suture superiorly. The lower cranial nerves and the arteriovenous axis course throughout this area. Multiple lesions can develop in this region, carotid and vagal paragangliomas representing the most illustrative example of pathology for our purpose (see Vol. 2). As seen in Chapter 14, the compartmented composition of these lesions will be extremely useful here to show the vascular territories of the carotid region. As the neoplasm grows, it recruits additional arterial feeders from the territory it invades. The objective of the protocol is to analyze each of these compartments separately (Table 17.1) and to reconstruct the entire lesion by reassembling every single compartment visualized.

Schematically, the region is centered on the musculospinal to ascending cervical artery anastomosis (Figs. 17.1, 17.2). Therefore, two areas can be individualized: above the anastomosis (outer cranial base of the skull) and below the anastomosis (cervical). Above the anastomosis, paragangliomas most frequently develop from the vagal receptors or correspond to the cervical extension of jugulotympanic paragangliomas. Below the anastomosis they develop either from the carotid body or from the laryngeal paraganglion. There is a hemodynamic balance between the ascending pharyngeal and the ascending cervical arteries in the supply of the area (see Chapters 3 and 4).

Above the anastomotic point, the area is explored through the pharyngocervical system (including the vertebral artery) which includes the vessels of upper three cervical spaces and the musculospinal artery (Fig. 17.3). The main anatomical dangers in this area are represented by the vertebro-opharyngeal anastomoses and the neuromeningeal trunk of the ascending pharyngeal artery supplying the Xth, Xth, XIth and XIIth cranial nerves (see Chapters 7 and 8). However, superselective catheterization of the tumoral feeder can usually be achieved (Fig. 17.3).

Below the anastomotic point, the main arterial feeder is the ascending cervical artery (Fig. 17.4). Clinically, the lesions present either as pharyngeal or as cervical masses. In this topography, compression, encasement or occlusion of the internal carotid artery must be looked for. It can be due to tumoral invasion (discussed as the true mechanism) or, most probably, to extrinsic compression; competency of the circle of Willis therefore has to be verified. The anterior extension of the lesions often reaches the submandibular area and even the floor of the mouth or the base of the tongue.

Facial and lingual arterial recruitments, although rare, are observed in extensive lesions (Fig. 17.4). Even if there is no clinical evidence of invasion anteriorly, proper lesion mapping is not complete until normal-looking territories are demonstrated all around the lesion.
Table 17.1. Angiographic Protocol of the Carotid Region*

<table>
<thead>
<tr>
<th>Region to Explore</th>
<th>Ipsilateral Artery to Inject</th>
<th>Vertebral Artery</th>
<th>Ascending Pharyngeal Artery</th>
<th>Occipital Artery</th>
<th>Ascending Cervical Artery</th>
<th>Common Carotid Artery</th>
<th>Other Pedicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retroparotid area</td>
<td>+ (L)</td>
<td>+ (L)</td>
<td>+ (L)</td>
<td>+ (L)</td>
<td>+ (L or oblique)</td>
<td>+ Posterior auricular artery (L)</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>± Deep cervical artery (L)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>± C4 collateral of the external carotid artery (L)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>± Facial artery (L)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>± Thyroid arteries (L)</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>± Deep cervical artery (L)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>± Contralateral vertebral artery (AP)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>± Contralateral ascending pharyngeal artery (AP)</td>
<td></td>
</tr>
<tr>
<td>Upper cervical spine</td>
<td>+ (L and AP)</td>
<td>+ (L)</td>
<td>+ (L)</td>
<td>+ (L)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Figures for reference</td>
<td>10.5 10.3, 17.4E 17.3D-E 17.3A 10.6, 17.4F 17.3F</td>
<td>17.2 17.3A 10.4, 17.5</td>
<td>10.7, 10.3 10.4, 17.4A</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* +, must be explored; -, useless to explore; ±, should be explored in specific congenital arterial arrangements, depending on the extension of the lesion (see Chapters 3 and 4); (L), lateral projection; (AP), anteroposterior projection.