Surgical Management of Cirsoid Aneurysms

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Summary

Background. Cirsoid aneurysms (arteriovenous fistulas) of the scalp are rare lesions. They are infrequently encountered in neurosurgical practice. These lesions are difficult to manage because of their complex vascular anatomy, high shunt flow and cosmetic disfigurement. We report our experience in the surgical management of these lesions.

Methods. We treated 11 patients with cirsoid aneurysms surgically. All except one patient were males who were in the second and third decades of life. History of trauma was present in 6 patients. In one patient, the lesion had been present since birth. Occipital and frontal regions were the sites commonly involved. Superficial temporal, occipital and posterior auricular arteries were the most frequent feeding arteries. The size ranged from 3 cms to 12 cms. Following investigations were done: CT, MRI, MRA, angiography and Doppler studies.

Findings. Excision of the lesion was done in 8 patients and en bloc resection of the lesion with the scalp with reconstruction was done in the remaining three. One among the three patients who underwent en bloc resection had undergone prior surgery. None of the patients underwent preoperative endovascular treatment. One patient had undergone intralesional injection of sclerosing agents twice. Superficial scalp necrosis occurred in two patients but was treated successfully. All the patients except one had good cosmetic results and there was no recurrence during an average follow up of 18 months.

Interpretation. Surgical excision with good cosmetic results is feasible in patients with cirsoid aneurysms.

Keywords: Arteriovenous fistula; cirsoid aneurysm; scalp.

Introduction

Cirsoid aneurysms of the scalp are infrequently encountered by the neurosurgeon. They are difficult lesions to manage. They pose problems in management because of their complex vascular anatomy, high shunt flow and cosmetic disfigurement. This lesion is really an arteriovenous fistula [12]. A cirsoid aneurysm develops as a result of abnormal connections between arteries and veins of the scalp with subsequent dilatation of the vascular channels and aneurysm formation. This lesion has been previously named as arteriovenous aneurysm, aneurysm by anastomosis, recemose aneurysm, pulsating anigoma, aneurysmal varix, plexiform angioma, arteriovenous malformations [9, 17, 30]. The term cirsoid aneurysm is used because of the variceal dilatation of the draining vessel (Greek Kirosos = Varix). The treatment of these lesions have evolved over a period of time and include: endovascular treatment, direct intralesional injection of sclerosing agents, ligation of feeders and surgical excision [3, 9, 12, 13, 25, 26]. We report our experience in the surgical management of these complex lesions.

Patients and Methods

We treated 11 patients with cirsoid aneurysms the clinical features of whom are summarized in Table 1. The age ranged from 13 to 30 years. There were ten males and one female. History of trauma was present in 6 patients. In these patients, the trauma antedated the appearance of the lesions by a few months to a few years. In one patient the lesion had been present since birth. Except one patient who had undergone prior surgery and another who had undergone intralesional injection of sclerosing agents, no patient had undergone prior interventions for the lesion. All the patients presented with cosmetic disfigurement produced by the lesion. All the patients had a pulsatile swelling with bruit and thrill. The duration of the symptoms varied from 6 months to 12 years. None had neurological deficits. Frontal and occipital regions were the most frequently involved sites and the superficial temporal artery was the major feeder in majority of the cases. The following investigations were done: Plain and contrast enhanced CT, MRI (Fig. 1), MR angiogram (Fig. 2), Doppler and selective external carotid angiograms (Fig. 3).

Surgical Procedure

All the patients were managed by a combined team of neuro, vascular and plastic surgeons. After induction of general anaesthesia, an appropriately placed scalp flap was raised; bicoronal in the case of frontal lesions and horse-shoe shaped in the case of lesions in other locations. In most of the cases, the scalp was thicker than normal. The pericranium underlying the lesion was also found to be thicker than normal. However, we could not observe any obvious feeding
vessels from the pericranium as noted by Fisher-Jeffes et al. [9]. In the larger lesions, prior to raising the scalp flap, the accessible feeding arteries were ligated through a full-thickness scalp suture underrunning the feeding artery. Once the scalp flap was raised, the lesion could be seen and palpated through the galea. Using a no. 15 knife, the galea around the lesion was incised and the lesion was separated from the underlying skin using a combination of bipolar diathermy and sharp dissection. In the early cases, this procedure resulted in the creation of button-holes in the skin. In the later cases, the incidence of button-holes decreased and was almost completely eliminated. The lesion was progressively separated from the underlying skin and totally excised. In three patients, (early in the series), en bloc resection was done. One among these three patients had undergone multiple attempts at transcutaneous ligation of feeders and this rendered the establishment of a plane of cleavage impossible. In one patient the bleeding during the procedure was so profuse, it was decided to do an en bloc resection. In the other patient, the overlying skin was so thin it could not be preserved and hence an en bloc resection was done. In the cases in which en bloc resection was done, continuous locking stitches involving the full thickness of the scalp were applied all around the lesion and then the lesion was excised in toto. The scalp defect so created was repaired using rotation flaps or skin grafts. Average operating time varied from 60 to 240 minutes for the primary procedure. Blood loss varied from 50 ml to 1500 ml. Superficial scalp necrosis occurred in two patients but was successfully managed with ultimately good result (Figs. 4a,b, 5a,b, 6a,b). The cosmetic result was acceptable in 10 of the eleven patients. In one patient, treated early in the series, the result was judged as fair (Fig. 7a,b). During the follow-up period (average follow up = 18 months) no patient presented with recurrence.

**Discussion**

Scalp arteriovenous fistulae (cirsoid aneurysms) are rare despite the intense vascularity of the scalp and the relatively high frequency of trauma to this region [1]. Most of the reports in the literature consist of individual case reports with very few studies consisting of a sufficient number of patients [3, 9, 26]. The earliest ac-

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Age</th>
<th>Sex</th>
<th>Location</th>
<th>Size (cms)</th>
<th>Feeding arteries</th>
<th>Prior intervention</th>
<th>History of trauma</th>
<th>Surgical procedure</th>
<th>Outcome</th>
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<tr>
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<td>right frontal</td>
<td>5</td>
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<td>transcutaneous</td>
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<td>en bloc resection and repair</td>
<td>good</td>
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<td>17</td>
<td>M</td>
<td>middle of forehead</td>
<td>4</td>
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<td>nil</td>
<td>present</td>
<td>excision</td>
<td>good</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
<td>M</td>
<td>middle of forehead</td>
<td>8</td>
<td>supra-orbital and superficial temporal</td>
<td>nil</td>
<td>present</td>
<td>excision</td>
<td>fair</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>M</td>
<td>right parietal</td>
<td>3</td>
<td>superficial temporal and posterior auricular</td>
<td>nil</td>
<td>absent</td>
<td>en bloc resection and repair</td>
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<td>10</td>
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<td>present</td>
<td>en bloc resection and repair</td>
<td>fair</td>
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<tr>
<td>6</td>
<td>18</td>
<td>M</td>
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<td>absent</td>
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<td>absent</td>
<td>excision</td>
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<td>4</td>
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<td>absent</td>
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<td>M</td>
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<td>10</td>
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<td>9</td>
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</tr>
<tr>
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