Blister aneurysms (BA) are rare lesions characterized by a hemispherical shape and fragile walls. Several reports have described BA as aneurysms arising from non-branching sites from the dorsomedial wall of the internal carotid artery (ICA).\(^1\)\(^-\)\(^3\) There are very few reports of such aneurysms at other sites such as anterior communicating (AComA) and basilar artery.\(^4\) As was reported by Seo \textit{et al.},\(^5\) in this issue, it may also arise at the complex anatomy of the AComA region which may result in possible false-negative angiography particularly for detection of very small blister aneurysms. It is imperative to suspect the blister nature of aneurysm planning surgical and endovascular procedures. Pathological studies have been done in few cases and have shown focal wall defects covered by a thin layer of fibrous tissue and adventitia and lack of usual collagenous layer.\(^6\) These pathological features result in a marked weakness of the wall which seems to constitute the very nature of blister-aneurysms that differentiates these lesions from berry aneurysms. Therefore they have high risk of premature rupture during surgery and are associated with development of large lacerations on the parent vessel with resultant poor outcome in many of these patients. BA also exhibit rapid change in size and morphology in follow-up angiograms. Other features mentioned regarding these aneurysm include preponderance of arterial hypertension, atherosclerosis, ICA dissection, younger age, and female sex.\(^1\)\(^-\)\(^3\) Pathogenesis of these aneurysms is uncertain bit atherosclerotic weakening leading to wall changes, hemodynamic stress and possible dissection have been suggested as possible causes.

Small size of BA and atypical location may result in incomplete visualization of these lesions. Therefore, multiple oblique views are essential during angiography. Rotational angiography followed by 3D reconstruction is probably the most sensitive investigation to detect these aneurysms. It is now known that 3D angiography may detect very small aneurysms in cases with negative conventional digital subtraction angiography as in the present reported case. CT angiography may help in some cases because of inherent 3D nature, however meticulous evaluation is essential. It is also imperative to evaluate collateral flow through circle-of-Willis because of high incidence of intra-operative rupture with need of trapping of aneurysm in some of the cases.

Since BAs are different than saccular aneurysms both morphologically and histologically, their treatment is also different making surgical exploration and standard clipping more hazardous.\(^1\)\(^-\)\(^3\) Numerous therapeutic strategies have been used including direct clipping, clipping plus wrapping, wrapping alone, clipping with Sundt encircling graft clips, encircling silicone clip application, primary suturing of ICA, vascular staple clip closure of ICA and trapping with or without extracranial-intracranial bypass. These methods may have to be used in conjunction with exposure of cervical ICA so as to have proximal control before aneurysm dissection, gentle subpial dissection, complete trapping of the aneurysm before clipping and good brain protection.\(^5\) One may also take care to prepare the superficial temporal artery in anticipation of need for emergency bypass surgery in the event of trapping of the aneurysm. One must prepare for all potential surgical treatments, including clipping, clipping onto wrapping, trapping, bypass, and direct suturing.\(^3\) All surgical equipment must be prepared before opening the dura. Clips should be applied while pressure in the...
ICA is low, and the clip blades should ideally be situated parallel to the parent artery and should catch the arterial wall beyond the lesion. If clip blades do not catch the wall of the artery, rebleeding and aneurysm growth can occur. One should realize the clip application may result in arterial narrowing in many cases and one may have to adjust the clip to ensure vascular patency. In case of intra-operative rupture with lack of control of bleeding one may have to trap the aneurysm. The angiograms should have been carefully studied to determine the site of trapping, particularly location of posterior communicating and anterior choroidal arteries. Oblique clipping of the ICA may be needed so as to maintain patency of these vessels. As far as possible trapping of the aneurysm should be avoided in acute phase of subarachnoid hemorrhage because of possibility of vasospasm which may render the collateral flow inadequate.

In the past decade considerable advances have been made in endovascular treatment of aneurysms. Endovascular treatment is preferred mode of treatment in certain aneurysms and clinical situations. Broad neck aneurysms can also be treated by using balloon or stent assistance. In our centre endovascular neurosurgery has become the preferred mode of treatment in most cases with cerebral aneurysms. However, the weak nature of BA and small size of the aneurysms with a broad neck renders endovascular treatment technically challenging. A stent placement is essential in most cases so as to retain the coils within the aneurysm sac. However an attempt to pack the aneurysm with coils may result in intra-operative rupture and loose packing is likely to result in continued growth of aneurysm. Stent placement also necessitates anti-platelet therapy. Literature review as well as our own experience has shown that aneurysm recurrence/growth is quite common after stent-assisted coil placement. These patients may need another stent placement (stent with in stent technique) to achieve a stable result. Other options include stent-graft placement. However these are stiff devices and are difficult to navigate to appropriate position. Placement of a stent graft may not be feasible if normal branches are arising from the diseased arterial segment. Combined treatment have been attempted such as stent assisted coil embolization in acute phase followed by parent vessel occlusion with trapping of the aneurysm after few weeks. This procedure may have to be combined with extracranial-intracranial bypass surgery. With the advances in technology we are likely to witness further improvement in endovascular results.

To conclude, it is imperative to suspect blister nature of the aneurysm before planning treatment. Meticulous evaluation and planning is essential to achieve acceptable clinical results in these cases.

References


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