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MULTI-MODAL TREATMENT OF ARTERIO-VENOUS MALFORMATIONS AND ITS OUTCOME: A SINGLE CENTRE PROSPECTIVE STUDY

Cardiology

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ABSTRACT

50 patients from 6 months to 40 years of age presented to us from July 2017 to December 2018 were included in this study. The location of AVM and its symptoms was different. 20 yrs old was with recurrent strider and syncope for 8 years having worst symptoms. Preoperative colour Doppler and CT angiography was diagnostic of arterio-venous malformation (AVM). 25 patients were treated with sclero-therapy alone and 25 patients were treated with sclero-therapy and surgery or surgery alone. Both the groups have excellent outcome, so it is necessary to select the patient and plan the modality of treatment for each patient depending upon his profile of AVM. Complete excision of AVM with proximal and distal control of feeding vessels as well as draining vessels was necessary.

Arterio-venous malformation (AVM) is a congenital vascular malformation that is neither a venous malformation nor a haemangioma. An AVM is a potentially life-threatening and limb-threatening lesion, especially the 'fistulous' truncular form due to its unique embryological and hemodynamic characteristics. AVM treatment requires an early aggressive approach, one that is careful and based on a thorough assessment of the risks and benefits associated with the treatment plan.

A successful treatment strategy requires an accurate assessment of the AVM taking into account the extent, severity and progression of the lesion. This is critical in order to minimize the morbidity associated with the currently available therapies. A multidisciplinary approach that integrates endovascular and surgical therapy can substantially improve the treatment results seen in patients with AVMs. Preliminary treatment of a fistulous AVM with coil embolization is essential in order to minimize associated morbidity and to alter the lesion hemodynamics from a high-flow lesion to a low-flow lesion that is more amenable to subsequent, definitive management with ethanol or NBCA glue embolo/sclerotherapy.

KEYWORDS

AVM: arterio-venous malformation, CA: carotid artery, IJV: internal jugular vein, CTA: C T Angiography, MRI: Magnetic resonance imaging, GA: general anaesthesia

INTRODUCTION

Arterio-venous malformation is an abnormal mesh of network between arterial and venous system. The swelling progressively increases in due course of time and patient developed symptoms depending on the location of AVM. We will discuss all such patient where successful surgical /multimodal correction was achieved. Patients with extended vascular anomalies may suffer from significant aesthetic and functional impairment and represent a challenge to therapeutic planning, which is best met by an interdisciplinary concept. In agreement with the International Society for the Study of Vascular Anomalies (ISSVA), vascular lesions are classified into haemangioma as proliferating endothelial tumours on the one hand and congenital vascular malformations on the other. According to the preponderant vascular channels and hemodynamic characteristics, malformations are subdivided into low flow (venous, lymphatic and capillary) lesions and high-flow malformations. Diagnostic imaging should be targeted at the specific structural and functional information required for treatment planning. The imaging modality of choice to provide these information is magnetic resonance imaging (MRI) supplemented by magnetic resonance angiography (MRA) with high spatial and temporal resolution.

Treatment indications for haemangioma depend on the proliferative behaviour of the lesion and comprise β-blockers in order to induce involution as well as cryotherapy, laser and open surgery. Interventional radiological procedures have evolved as an essential element in an interdisciplinary treatment plan for vascular malformations and include percutaneous sclerotherapy with ethanol and OK-432 for venous and lymphatic malformations and transarterial embolization for high-flow lesions.

Arteriovenous malformations (AVM) are part of the big chapter of vascular anomalies. They have a Wide range of clinical presentations and an unpredictable course [1].Traumatism is the most common Cause of arteriovenous communications between the blood vessels in the cervical area. Spontaneous malformations in this area also occur [2]. Intraoperative bleeding is one of the most hazardous Complications in the surgical management of high-flow vascular malformations. It is even more Relevant for massive AVM within the cervical region, where the presence of vital vascular structures, Such as the carotid artery and jugular vein, may evolve in uncontrollable bleeding [3]. The care of Congenital arteriovenous malformations are challenging. This is a case of massive arteriovenous malformation deforming the neck and the face aspect of this aged lady and growing for several years.

PATIENTS & METHODS:

A typical patient was 21 years old male presented to us with features of history of respiratory distress, since the age of 12 years. The patient was having recurrent syncope attack, since the last two months. The patient came in opd with the presenting complaints, the swelling was non tender and compressible. Dimension was 10 x 10cms. We did colour Doppler, CT Angiography and MRI to confirm the diagnosis. We planned the elective surgery of surgical correction of the AVM. Under general anaesthesia neck was exposed along the left sternocleidomastoid muscle, starting from suprasternal notch to angle of mandible. Carotid artery and jugular vein was identified and looped proximally as well as distally to AVM. The extent of the AVM from left suprasternal notch to left submandibular salivary gland, laterally it was partially beneath the left sternocleidomastoid, posterior encroaching up to carotid sheath. The AVM is isolated and feeder from superior thyroid artery and inferior thyroid artery was ligated and draining vein was isolated and ligated. The AVM is excised into to and sent for histopathological examination. Wound closed in layers over minivac drain. Post operative period is uneventful; drain is removed on post operative day 2. Similarly 49 other patients underwent surgery either alone or following sclerotherapy/embolisation.

DISCUSSION:

The localization of arteriovenous malformation on the neck induces surgical difficulties. The complete excision of the mass without nerve or vascular injury or major bleeding is a surgical challenge. Because of the risk of bleeding, some authors indicate proceeding with 2 steps for the surgical care [1, 4]. To reduce the blood flow into the mass, embolization is used for some surgical teams [3]. Embolization is done before surgery to reduce the inflow, to permit formation of thrombus before the resection. Some authors describe the use of embolization at the same time of surgery. Some teams use surgery only after

embolization failed. Considering the high flow of this kind of fistula, embolic materials such as gel foam and ethanol are at higher risk for pulmonary embolism [5].

The first step could be an arterial ligation as we had done in this case. Imaging permits identifying the Inflow vessels. It could be one artery, but in complex arteriovenous malformation there are several Inflow vessels [6]. In all cases there are multiple vessels connected to the mass; most of them Came from adjacent arteries and draining into adjacent veins.The main risk of surgery was bleeding due to the gigantism of the mass and the complexity of the AVM. The first ligation of major arterial supply reduces significantly the blood flow Into the AVM. That first procedure permitted secondarily the complete ablation of the AVM without major bleeding even though multiple ligations were done.

For Porch, the ligation of the feeding arteries is Ineffective or can offer only a temporary improvement because of the recruitment of distal vasculature with persistence of the fistula [7]. In this case, authors used it just as the first step to prevent major bleeding and it was followed by complete ablation of the mass. The resection should be as complete as possible because recurrence rate is high [4, 8].

The recurrence of the mass makes the redo-intervention very difficult because of fibrosis and modification of the anatomy of the AVM. Primary surgical correction by ligation and resection give good results in very selective cases with single communication [8]. Facial nerve injury has, however, been reported in neck and facial AVM [9, 10].

Trauma is a frequent cause of arteriovenous malformations, but most of the time the AVMs are congenital [2].

4. CONCLUSION

Surgery of cervical arteriovenous malformation is challenging. The different AVM mass was linked to multiple different arteries and draining veins. The gigantism and complexity of this AVM put the patient at risk of injury. Primary Arterial ligation reduces significantly the flow and permits secondarily the mass resection without major bleeding. Sclerotherapy/ embolisation of feeding arteries are very much helpful and reduces the risks of surgery.

Conflict of interest:

Author doesn't have any conflict of interest.

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