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Abstract- Acute bleeding in the head and neck area occurs due to various causes and often is a life-threatening situation. Head and neck cancers can be a cause of intractable hemorrhage from local tumour irradiation or spontaneous tumourbleeding[1]. In addition to tumour-related bleeding, iatrogenic bleeding related to surgical procedures or trauma, can also lead to intractable, life-threatening bleeding[1]. A pseudoaneurysm is an extravascular hematoma that communicates with the intravascular space. This rare lesion receives its name from the fact that its vascular wall is composed of fibrous connective tissue (pseudo-capsule) that develops after rupture of the endothelium[2]. Pseudoaneurysms occur when there is a partial disruption in the wall of a blood vessel, causing a hematoma that is either contained by the vessel adventitia or the perivascular soft tissue[3].

Keywords: hemorrhage, pseudoaneurysm, internal maxillary artery, embolization, interventional radiology

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Pseudoaneurysm of the Internal Maxillary Artery in Recurrent Head and Neck Cancer Patient- A Rare Case Report

Dr. Vikash Agarwal [α], Dr. Manas Saha [σ], Dr. Swarupjit Ghata [ρ], Dr. Chaitanya Hawaldar [ω], Dr. S K Todi [¥] & Dr. Hirak Roy Choudhary [§]

Abstract- Acute bleeding in the head and neck area occurs due to various causes and often is a life-threatening situation. Head and neck cancers can be a cause of intractable hemorrhage from local tumour irradiation or spontaneous tumourbleeding[1]. In addition to tumour-related bleeding, iatrogenic bleeding related to surgical procedures or trauma, can also lead to intractable, life-threatening bleeding[1]. A pseudoaneurysm is an extravascular hematoma that communicates with the intravascular space. This rare lesion receives its name from the fact that its vascular wall is composed of fibrous connective tissue (pseudo-capsule) that develops after rupture of the endothelium[2]. Pseudoaneurysms occur when there is a partial disruption in the wall of a blood vessel, causing a hematoma that is either contained by the vessel adventitia or the perivascular soft tissue[3].The role of interventional radiology is immaculate in the management of aneurysms.

Here we present a rare case of Pseudoaneurysm of the internal maxillary artery in head and neck cancer patient operated previously and its management.

Keywords: hemorrhage, pseudoaneurysm, internal maxillary artery, embolization, interventional radiology.

I. Introduction

Pseudoaneurysm (PA), which is also known as a false aneurysm, is an out pouching of a blood vessel, having actual disruption of 1 or more layers of its wall, as compared to an expansion of all wall layers as in case of a true aneurysm. PA is characterized by residual contrast media retention in the lesion for a long period of time after the arterial phase of diagnostic angiogram is over[4].

Pseudoaneurysm (PA) is a rare life-threatening complication that consists of an incomplete tear of the vessel causing blood flow into the surrounding tissues. If the inelasticity of the surrounding tissues allows a compressive effect, bleeding is counterbalanced by the compressive action, leading to hematoma formation.

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Internal maxillary arterial pseudoaneurysm (IMPA) is rare. The various clinical manifestations of PA include bleeding, cranio-cervical pain, dysphagia, pulsatile mass, hoarseness, asymmetries, neurological deficits, and thromboembolism[5].

The internal maxillary artery (IMA) is the last terminalbranch of the carotid artery. Because of its deep lie, hemorrhage cannot be easily managed by digital pressure. Treatment of such complication can be achieved by interventional radiology through a selective embolization of the vessel, which allows a well-acknowledged management with excellent outcomes[6].

II. Case Report

A 47 year old male previously operated Right Hemiglossectomy+Rt Modified Radical neck dissection post Radiotherapy (2009), presented with pain in left side of tongue with severe trismus.

PET scan revealed lesion in the left lateral border tongue involving the mandible. After all the necessary investigations and obtaining fitness from the anaesthesia team, patient was operated for Left Segmental Mandibulectomy with wide local excision left tongue +Left Modified Neck Dissection and reconstruction done using pectoralis major myocutaneous (PMMC) flap. Patient shifted to ICU post operatively in hemodynamically stable condition.

On postoperative day 2 (POD -2), patient complained of pain in the left side of the face, with frank bleeding from the chest drain area and expanding swelling in the left axillary area. Patient immediately shifted to the operation theatre, neck and chest wounds opened and blood clots removed (Figure 1 and 2).

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Figure 1



Figure 2

After achieving hemostasis fresh drains were placed and flaps sutured back in place. Patient shifted to ITU in stable condition. 1 unit packed red blood cells (PRBC) transfused.

On postoperative day 6 (POD-6), facial swelling was seen on the left side of the face extending from the left corner of mouth upto the left lower eyelid (Figure 3). USG examination revealed collection in left parotid region and aspiration was done to remove the collection.



Figure 3

On postoperative day 8, patient complained of chest discomfort and pain on the left anterior aspect of chest wall, following one episode of cough and frank bleeding in the chest drain along with increased facial swelling on the left side of the face (Figure 4).



Figure 4

CECT of the face and neck was done and discussed with Interventional Radiologist who detected Pseudoaneurysm in the Left Internal Maxillary Artery.

After multidisciplinary approach and discussion with the interventional radiologist, oncology team and plastic surgeon, patient was planned for embolization of the internal maxillary artery pseudoaneurysm. Consent was obtained for the same after discussing with the relatives about the procedure, the risks and the cost involved.

Patient shifted into the operation theatre and prepared in routine surgical manner. Procedure done under local anaesthesia (LA) taking all the aseptic

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precautions after placing the 6Fr sheath. 5Fr vertebral glidecath over 0.035 Terumo wire used for cannulation of the vessels. Left ECA injection showed distal lobulated pseudoaneurysm from left internal maxillary artery with massive extravasation (Figure 5).



Arteriogram showing distal lobulated pseudoaneurysm from left internal maxillary artery with massive extravasation.

Figure 5

Catheter advanced distally and initially partially embolised using diluted gel-foam followed by two 3*30 and 4*30mm coils. Post procedure check injection showed occluded left distal internal maxillary artery and non-filling of the pseudoaneurysm (Figure 6 and Figure 7). Patient shifted to ITU post op and discharged afterwards in hemodynamically stable condition.

Patient underwent Adjuvant radiotherapy and is on regular follow up till date (Figure 8).



Figure 6



Figure 7

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Figure 8

III. Discussion

The IMA is the largest and terminal branches of the ECA. It originates behind the neck of the mandible at the distal ECA bifurcation and is divided into 3 main segments: the proximal mandibular, the middle pterygoid, and the terminal pterygopalatine segment.

The IMA terminates within the pterygopalatine fossa by dividing into branches that supply the deep face andnose. The distal IMA has numerous anastomoses with other ECA branches such as the facial artery and is a major source of potential collateral blood flow from the external to the internal carotid artery via the inferolateral trunk and vidian artery; and anastomoses with the ophthalmic artery via the ethmoid artery[8].

Internal Maxillary Artery Pseudoaneurysms (IMPAs) are rare, which have been documented as a complication arising due to trauma, infections, or a result of maxilla mandibular surgeries. IMPAs are also known to occur due to post radiation vasculopathy or tumour invasion in head and neck cancer patients[7].

Pseudoaneurysm (PA), or false aneurysm, is an uncommoncon sequence of arterial damage, resulting from an incomplete disruption of the arterial wall causing an expanding lesion between the artery and the surrounding tissues. The PA is influenced by three factors: (1) the extent of the tear; (2) the elasticity of the surrounding tissues; and (3) the arterial blood flow[6] .

Radiation therapy affects all sizes of blood vessels within the field of treatment. Degeneration of the endothelium, vacuolization and thickening of the intima associated with changes in the elastic fibres have been described in the radiated arteries of humans. However, vascular occlusion is the most common form of presentation. These changes manifest as early as 4 monthsor as late as 2-3 years after radiotherapy. Since then, Thomas and For bus published the first report of radiation injury to blood vessels; literature review shows many numbers of similar reports of radiation-induced vasculopathy[9].

Computed Tomography (CT) are widely used to evaluate the extension of the maxillofacial trauma and to evaluate the treatment outcome in patients with Head Neck Cancers (HNCs). Although the diagnosis of IMPA depended solely on catheter angiography, CT can directly visualize IMP Alarger than 1 cm; nevertheless, precise detection of IMPA is difficult, especially when it is small or obscured by hematoma or oronasal packing[4].

The role of interventional radiology in hemorrhage control by selective embolization has been well accepted and acknowledged.

The advantages of endovascular embolization include---the same session in the diagnostic angiography andembolization, demonstration of bleeding points, the more distal access to the bleeding points, control of multiple bleeding points, no necessity for general anesthesia in most cases and short procedural time. Also super-selective localization of the bleeding to the IMA allows preservation of all the other branches of the ECA. The goal of embolization is not directed toward cure of the underlying cancer disease, but is palliative for controlling catastrophic hemorrhage and prolonging life, whether caused by tumor, trauma, orpostsurgical complications[4].

An important concept in endovascular management of IMPAs is to deliver the embolic materials precisely to the PAs and a small segment of the affected IMA with the preservation of the branches adjacent to the affected artery and to reduce the risk of ischemia of the face and neck[4].

In regards to the selection of embolicagents for IMPA, a permanent embolic agent that can mechanically obstruct the IMPA is effective. The common permanent embolic agents employed for endovascular embolization of vascular lesions in the head and neck are polyvinyl particle (PVA) foam, microcoils, and liquid adhesive. PVA has been widely used for the treatment of idiopathic epistaxis or for preoperative tumor embolization[4].

Microcoils such as platinum microcoils or Guglielmi detachablecoils (GDC, Boston Scientific, Fremont, CA, USA) have been used successfully to treat intracranialaneurysms or arteriovenous fistulas.12–14 GDCs have the advantage of being very soft and

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retrievable, and can be precisely placed in the affected artery[4].

Selective embolization is a safe and effective method for the treatment of pseudoaneurysms that affect vessels which are difficult to reach by surgery. Also, it reduces the risk of bleeding and revascularization[11].

Complications of embolization-- stroke orblindness, can result from the reflux of embolization material outside the intended area of embolization.

Immediate and late follow-up examinations of our patient did not show any clinical signs or symptoms of complications of internal maxillary artery embolization.

IV. Conclusion

Acute bleeding in the head and neck is a common life-threatening situation. When conventional techniques fail to stop the hemorrhaging, conventional angiography plays an important role in localizing the bleeding foci and controlling the bleeding by endovascular treatment, a safe and effective therapy for the management of hemorrhage.

Early diagnosis and treatment of a pseudoaneurysm is essential to minimize morbidity and mortality.

Conflict of Interest
None.

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