International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2025: 7.089

Post-Extraction Catastrophic Bleeding Revealing an Undiagnosed Arteriovenous Malformation: A Case Report

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Abstract: ***Intraosseous arteriovenous malformations of the mandible are rare but may present as life-threatening haemorrhage following tooth extraction. A 9-year-old female developed profuse bleeding after extraction of a mandibular premolar, progressing to haemorrhagic shock requiring resuscitation, blood transfusion, and endotracheal intubation. CT angiography and digital subtraction angiography revealed a high-flow mandibular arteriovenous malformation, and emergency endovascular embolization achieved haemostasis. The patient subsequently developed Klebsiella pneumoniae–associated ventilator-related pneumonia and was treated with intravenous antibiotics. After stabilization, ligation of feeder vessels and segmental mandibulectomy were performed for definitive management. Histopathology confirmed arteriovenous malformation. The patient recovered uneventfully with no recurrent bleeding. This case emphasizes early suspicion and combined embolization with surgical resection in managing post-extraction haemorrhage due to mandibular arteriovenous malformations.***

Keywords: Arteriovenous malformation, Mandible, post-extraction haemorrhage, Haemorrhagic shock, Endovascular embolization, Segmental mandibulectomy

1. Case Report

A 9-year-old female patient developed profuse intraoral bleeding immediately following extraction of the left mandibular second premolar performed at a local dental clinic. The bleeding persisted despite placement of local haemostatic packing and pressure application. The patient subsequently developed features of haemorrhagic shock with pallor, tachycardia, and hypotension, requiring aggressive resuscitation with intravenous fluids and multiple blood product transfusions including packed red blood cells and platelet concentrates. Due to worsening hemodynamic status and inability to maintain airway, the patient was intubated and managed in the intensive care unit.

Contrast-enhanced CT angiogram of the neck revealed a well-marginated hypervascular lesion measuring approximately 8.8 × 8.4 mm in the left mandibular second premolar region. The lesion demonstrated arterial enhancement and was supplied predominantly by branches of the inferior alveolar artery with prominent draining veins, suggestive of an arteriovenous malformation. (FIGURE 1) Digital subtraction angiography confirmed a high-flow vascular malformation, and emergency selective endovascular coil embolization of the feeder vessels was performed, resulting in control of haemorrhage.

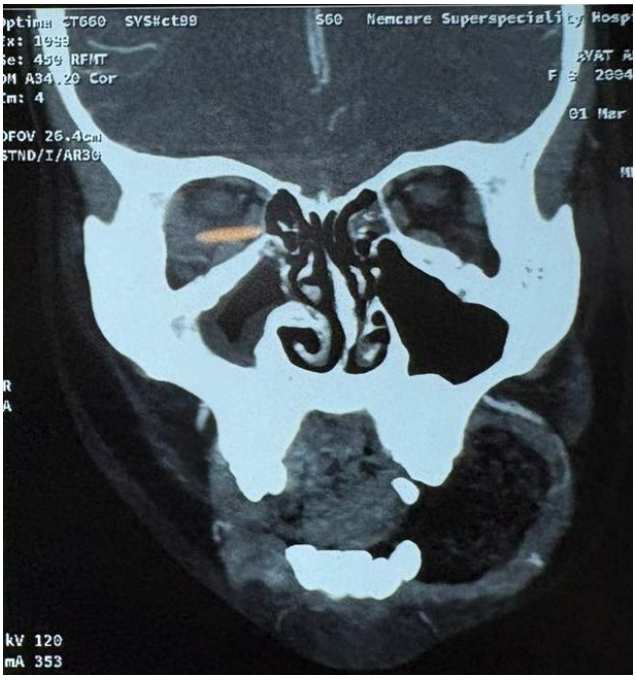

Figure 1: CECT angiogram showing mandibular AVM

During the hospital course, the patient developed ventilator-associated pneumonia, and endotracheal secretion culture grew Klebsiella pneumoniae. Appropriate intravenous antibiotics were administered, and gradual clinical improvement was noted. Following stabilization, definitive surgical management was planned. The feeding vessel was identified intraoperatively and ligated, followed by segmental mandibulectomy of the involved mandibular segment to excise the nidus completely. (FIGURE 2).

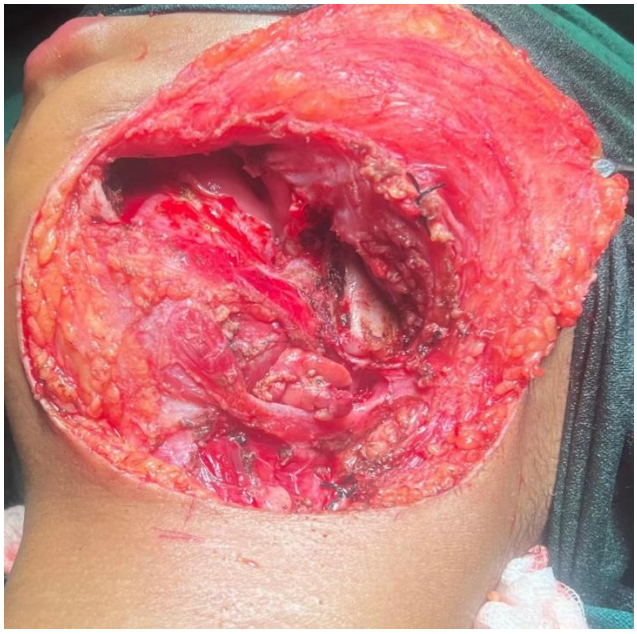

Figure 2: Intraoperative view following segmental mandibulectomy

Intraoperative bleeding was minimal due to prior embolization. Histopathological examination of the resected specimen revealed malformed dilated congested vascular channels with numerous capillary-sized vessels within bone and fibrous tissue, consistent with arteriovenous malformation (FIGURE 3). The postoperative course was uneventful, and no further bleeding episodes were noted on follow-up.

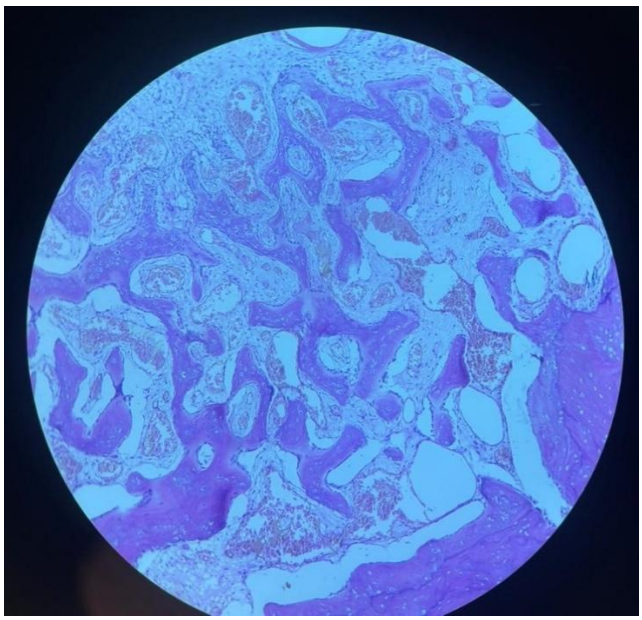

Figure 3: Histopathology showing malformed vascular channels consistent with AVM

2. Discussion

Arteriovenous malformations (AVMs) are high-flow vascular anomalies characterized by direct communication between arteries and veins without an intervening capillary bed, resulting in rapid shunting of blood and risk of significant haemorrhage. These lesions are structural vascular abnormalities that persist throughout life and may enlarge following trauma, infection, or surgical intervention [1,2]. In the maxillofacial region, intraosseous AVMs are uncommon but potentially life-threatening because of their propensity for sudden and massive bleeding. The mandible is more frequently involved than the maxilla, particularly the posterior region supplied by branches of the inferior alveolar artery [3,4].

Clinical presentation of mandibular AVMs is often nonspecific and may include tooth mobility, gingival bleeding, swelling, bruit, or radiolucent lesions mimicking odontogenic pathology. Because of these subtle findings, the diagnosis is frequently missed and routine dental extraction may precipitate catastrophic haemorrhage [3,5]. Several reports have documented life-threatening bleeding following dental extraction as the first manifestation of intraosseous AVM [5–8]. In the present case, extraction of a mandibular premolar resulted in profuse bleeding progressing to haemorrhagic shock requiring blood transfusion, airway protection, and intensive care management. Such presentation highlights the importance of considering vascular malformations in cases of unexplained post-extraction bleeding, particularly in paediatric patients.

Radiological evaluation plays a critical role in diagnosis. Contrast-enhanced CT angiography may demonstrate hypervascular lesions with arterial feeders and early venous drainage. Digital subtraction angiography remains the gold standard for diagnosis and treatment planning, as it allows identification of feeding vessels and facilitates therapeutic embolization [4]. In the present case, CT angiogram demonstrated a hypervascular lesion supplied by branches of the inferior alveolar artery, and angiography confirmed a high-flow AVM.

Management of mandibular AVMs requires a multidisciplinary approach. Initial management focuses on hemodynamic stabilization with fluid resuscitation, blood transfusion, and airway protection. Endovascular embolization is considered the first-line treatment for acute haemorrhage as it reduces vascularity and stabilizes the patient [4,9]. Recent reports have highlighted successful control of post-extraction haemorrhage using endovascular embolization techniques prior to definitive management [9–11]. However, embolization alone may not eliminate the nidus and recurrence may occur due to collateral recruitment. Therefore, combined therapy consisting of embolization followed by surgical resection is recommended in extensive intraosseous lesions to achieve definitive management and prevent recurrence [3,4].

Histopathological examination typically demonstrates malformed dilated vascular channels of varying caliber within bone and fibrous tissue without endothelial proliferation. In the present case, histopathology showed malformed congested vascular channels with numerous capillary-sized vessels, consistent with arteriovenous malformation. Early recognition and prompt management are essential, as delayed diagnosis may result in significant morbidity and mortality. This case emphasizes the importance of suspecting vascular malformations in cases of unexplained post-extraction bleeding and highlights the role of emergency endovascular embolization followed by definitive surgical resection in the

management of mandibular AVMs presenting with haemorrhagic shock.

3. Conclusion

Intraosseous arteriovenous malformations of the mandible are rare but potentially life-threatening lesions that may remain undiagnosed until precipitated by dental procedures such as tooth extraction. Sudden massive haemorrhage following extraction should raise suspicion of an underlying vascular malformation, particularly in paediatric patients. Prompt recognition and aggressive resuscitation, including blood transfusion and airway management, are essential to prevent morbidity and mortality. Radiological evaluation with CT angiography and digital subtraction angiography plays a crucial role in diagnosis and treatment planning. Emergency endovascular embolization is effective in controlling acute haemorrhage and stabilizing the patient, while definitive surgical resection following embolization helps in complete removal of the nidus and prevention of recurrence. This case highlights the importance of considering vascular malformations in unexplained post-extraction bleeding and emphasizes the role of a multidisciplinary approach involving interventional radiology and surgical management for successful outcomes.

Conflict of Interest:
We have no conflicts of interest.

Ethics Statement/Confirmation of Patient's Permission:
Ethics approval not applicable. The patient's permission was obtained.

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