Hemophilia C in maxillofacial surgery – A rare finding
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Abstract
Factor XI (FXI) deficiency or hemophilia C is a very rare, autosomal recessive bleeding disorder. Patients with this deficiency do not typically show spontaneous bleeding or any specific symptoms. Those who have this disorder are seldom identified during situations such as trauma or surgery or during pre-surgical workups. Hence, operating on such patients, especially those with intraoral or vascular tumors, is particularly associated with a high bleeding risk. Therefore, great care must be taken when treating patients with disorders such as FXI deficiency. There are very few reports that address the management of patients with bleeding disorders in maxillofacial vascular lesions. Here, we report a patient with FXI deficiency, who underwent surgical excision of pyogenic granuloma of her upper right alveolus under general anesthesia and describe all the measures taken to reduce the chances of excessive bleeding.

Keywords: Bleeding disorders, factor XI deficiency, hemophilia C, pyogenic granuloma, vascular lesions

Case Report
A 27-year-old female reported to the emergency department with the chief complaint of persistent bleeding from a swelling on her gums [Figure 1]. She gave a history of toothbrush trauma 6 weeks prior then, following which a persistent ulcer had formed. It later increased in size and formed a swelling on the right upper alveolus between the canine and the first premolar. She also gave a history of spontaneous, intermittent bleeding from the growing mass for 3 days with no apparent aggravating or relieving factors.

An immediate treatment of compression with a hemocoagulase solution, Botroclot, was undertaken at the emergency department and a slow infusion of intravenous (IV) tranexamic (TXA) acid 0.5 g was started to prevent chances of spontaneous bleeding. The patient was admitted under the maxillofacial team for further examination.

On examination of the swelling, the mass was bluish-red in color, measuring approximately 1 × 1.5 cm, firm, tender, non-pulsatile, pedunculated with pinpoint bleeding points presenting on its surface. The surrounding gingiva was normal in color and consistency and no lymph nodes were palpable.

Routine investigations were carried out to and computed tomography (CT) angiography was advised. CT angiogram revealed presence of no feeding arteries onto the mass measuring 1 cm × 1.5 cm and gave provisional diagnosis of a vascular lesion/hemangioma of the upper right alveolus.

On routine investigation, her serum aPTT values were found to be 89.1 s (reference 26.5–32.3 s normal range) while her
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prothrombin time (13.2 s), INR (0.98), bleeding time (2.3 min), and clotting time (4.3 min) all came in the normal reference range. Her aPTT tests were repeated on the 2nd day, which continued to be high (86.7 s). On further probing of clotting factors, it was found that she suffered from FXI deficiency (2.8%) which was a very rare sighting. Her aPTT values remained as high as 71.0 s and precautionary measures were hence undertaken to reduce the chances of intraoperative and post-operative bleeding. The patient was transfused with IV TXA acid every 6th hourly and a 4-unit transfusion of fresh frozen plasma to increase the FXI levels was also undertaken. FXI value after transfusion of 3 units of FFP came up to 40% preoperatively.

Excision of the vascular lesion was then carried out under general anesthesia and hemostats such as electrocautery were used to control the bleeding intraoperatively [Figures 2 and 3]. The soft tissue after the excision was closed using fibrin glue (Evicel, 2 ml) to allow for hemostasis and better post-operative results. The patient’s post-operative stay was uneventful with no spontaneous/secondary bleeding noted from the operative site [Figure 4].

Histopathological report revealed stratified squamous epithelium with ulceration covered by necroinflammatory tissue and underlying stroma showing lobules of capillaries lined by endothelial cells with prominent lamina consistent with pyogenic granuloma.

Discussion

Hemophilia C is a rare disease which one seldom encounters in a clinical setting. Even though its signs and symptoms are not as obvious as other bleeding disorders, this disease manifests itself after a trauma, surgery, or dental extractions. Routine maxillofacial surgeries require pre-operative analysis of blood investigations as intraoral lesions are prone to extensive bleeding. When vascular lesions are presented with bleeding tendencies, a full blood workup should be undertaken including aPTT, INR, bleeding time, and clotting time to avoid any inadvertent risks. It is been documented that in FXI deficiency, low-risk patients are those with >15% FXI levels or those with 5–14% FXI levels but with no major bleeding complication after any major surgical procedure. High-risk patients are those with FXI levels <15% but with a history of either spontaneous bleeding or after surgery.

The recommended method for managing FXI deficiency during surgery in which severe bleeding is expected is with FFP transfusions. A dose of 10–20 mL/kg (4–6 units in adults) will raise factor levels by approximately 20%. An increase of 10% of

Figure 1: Intraoral image showing the shape, color, and size of the lesion

Figure 2: Intraoperative image showing bleeding from the site after excision

Figure 3: Post-operative image showing the size of the lesion

Figure 4: Post-operative image after achieving hemostasis
several factors is enough to affect htemostasis. The preparation of concentrated FXI is difficult and expensive. Therefore, the use of FFP is the first choice in cases that require the replacement of product. However, care should be taken of conditions, such as allergies, volume overload, and thrombosis, that may occur when FFP is used.

An antifibrinolytic drug such as TXA acid has also been reported to be highly effective in reducing bleeding. Those undergoing surgery, had reduced blood loss by 27% intraoperatively. Hence, with patients who report with tendencies of uncontrolled or spontaneous bleeding, TXA acid slow infusions – 0.5 mL/min should be undertaken and be continued till the source of bleeding can be managed.

The surgical treatment plan must be undertaken under hypotensive anesthesia and with a cover of FFP transfusion. Gelatin and collagen sponge act as local hemostats and bind tightly to blood surfaces to provide a matrix for clot formation and for enhancement of platelet aggregation. Newer agents including oxidized regenerated cellulose, porcine gelatin, bovine collagen, polysaccharide spheres, and thrombin have also been developed to assist in hemostasis. Electrocautery, laser, or argon beam coagulators should be preferred over traditional surgical blades to reduce the chances of bleeding.

Fibrin sealants, like fibrin glue, are derived from human or animal blood products, which emulate the final stages of the coagulation cascade in the formation of a fibrin clot. Evicel, which is a fibrin sealant, is derived from pooled human plasma. It is supplied as two separate vials of fibrinogen and human thrombin packages, respectively. The active ingredients are from pooled human plasma. The two deep frozen solutions must be defrosted before use and after thawing to 20–30°C, after which they are mixed. The solution is sprayed over the defect which acts as a layer of fibrin covering closing the defect effectively and with minimum blood loss. Other sealants such as Tisseel, Vitagel, TachoSil, Bolheal, and CryoSeal are also available in the market to choose from.

Chances of reactionary and secondary bleeding are high and hence the post-operative care and assessment of such patients should be done at regular intervals. The effects of FFP transfusion downgrades after 48 h and the surgeon must be prepared for either further transfusions or medical management of the surgical wound, if any.

It is the maxillofacial surgeon responsibility to note any blood dyscrasias and to not jump into surgically treating vascular looking lesions at its first site. All necessary precautions should be taken, preferably in a hospital setup where multiple teams can be involved to assess correctly and to be armed to combat any kind of complications. The surgeon should duly report any such cases which he encounters to further help others in assessment and management protocols.

**Conclusion**

Bleeding disorders can be a menace to manage if all necessary blood investigations are not carried out as a routine. Every patient should be assumed to have blood dyscrasias until proven otherwise. Careful and meticulous planning with multidisciplinary management should be done for Rare Deficiencies such as that of Factor XI.

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