



“LIVERCLOT” –A RARE POST-SURGICAL COMPLICATION- A REVIEW

**Swathi B S., Suchetha Aghanashini., Sapna Nadiger., Darshan Basavarajappa Mundinamane.,
Apoorva Sokke Mallikarjunappa and Divya Bhat**

Department of Periodontics, D.A.P.M R.V Dental College, Bangalore, Karnataka, India

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ABSTRACT

Liver clot, a reactionary hemorrhage associated with periodontal surgery is an unusual finding. Though periodontal surgery is being a common routine procedure, occurrence of post-surgical hemorrhage is relatively uncommon because, it is generally self-limiting due to the primary closure of the soft tissues following surgical procedures. Formation of liver clot is a rare instance. Hence it is important for a clinician to be proficient and have thorough knowledge of probable etiology and management of such unusual complications.

Key words:

Hemorrhage, liver clot, Currant jelly clot, post-surgical complication.

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INTRODUCTION

Periodontal surgical procedures are a common component of comprehensive periodontal practice. Significant postsurgical hemorrhage following periodontal surgery is usually uncommon.^[1] Occurrence of hemorrhage is considered to be a common sequel after periodontal surgery that lasts for a short period of time. It can range from a minor leakage or oozing at the site of any traumatic injury or surgical procedure to extensive bleeding complication. Significant post-operative bleeding is not very common as it is generally self-limiting due to the primary closure of the soft tissues following periodontal surgical procedures thus providing favorable outcome without any unpredictable events but in few cases, it might lead to certain complications that could alter these predictable outcomes.^[2]

A complication is defined as a secondary disease or condition which develops in the course of a primary disease or condition. Complications are an integral part of any minor or major surgical procedures. After flap surgery different types of complication can be encountered by a periodontist such as post-operative hemorrhage, pain, recession, hypersensitivity etc.^[3] Presence of hemorrhage after periodontal flap surgical procedure is not common unless the patient who underwent surgical procedure is having any systemic disorder associated with any clotting mechanism or other related factors.

The surgical procedure may introduce challenges to the body's hemostatic mechanism. Firstly, there are chances where patients tend to play with the area of surgery with their tongue and occasionally dislodge the blood clot, which initiates secondary bleeding and also salivary enzymes contributes, in breaking down the clot which prevents the organization of the blood clot as well as ingrowth of granulation tissue. Post-operative surgical complication associated with periodontal procedures can be categorized into two different groups such as: those complications related to bleeding and those complication related to delayed wound healing and infection.^[4]

Risk Factors for Post-Operative Bleeding Complication^[5]

Patient related factors

- Patient non-compliant with post-operative instructions.
- Certain systemic diseases like Bleeding Disorders, Deficiency of clotting factors as in Hemophilia, Von Willebrand.
- Certain drugs that influence blood circulation such as parenteral anticoagulants, Oral anticoagulants; Antiplatelet drugs (Aspirin, Dipyridamole, Ticlodipine, and Clopidogrel).
- Various factors such as infection, intrinsic trauma, presence of foreign bodies.

Signs

- Presence of bleeding within 24 hours after periodontal surgery
- Presence of liver clot as result of venous bleeding; which slowly develops as a brown-black clot

*Corresponding author: **Swathi B.S**

Department of Periodontics, D.A.P.M R.V Dental College,
Bangalore, Karnataka, India

- Occurrence of hematoma within the soft tissue

Symptoms

- Continuous bleeding, even after 24 hours
- Difficulty in controlling the bleeding with pressure alone

Most of the post-operative complication which commonly occurs is often acknowledged by the clinician by their knowledge and experience regarding etiology and their management in order to achieve successful periodontal therapy. But there are certain rare complications which have been documented, whose importance and management of such rare complication has remained unfamiliar. One such rare complication is occurrence of liver clot as post-surgical complication of periodontal surgery.

In order to understand the aforementioned concept, it's important to have a thorough knowledge regarding, hemorrhage and the mechanism of hemostasis. Post-operative bleeding can occur as primary hemorrhage- occurs during the intraoperative period, whereas, reactionary hemorrhage- occurs within 24 hours of trauma or surgery and secondary hemorrhage- occurs after 7-14 days of trauma or surgical. Any infection, foreign bodies, bone replacement graft, or restorative dressing material can cause secondary hemorrhage after 24 h which interfere with the organization of blood clot. This can lead to slow, oozing hemorrhage from the surgical wound to form a “liver clot.”^[6] The characteristic of hemorrhage will depend on the type of vessels severed - arteries, veins, or capillaries. Arterial hemorrhage is characterized by its pulsating character, vigor of the flow, and bright red coloration of the blood. Venous hemorrhage is distinguished by less rapid, non-pulsatile and darker hue.

Normally after periodontal flap surgery, the process of blood coagulation cascade and fibrinolysis takes place. Immediately after vessel injury, there will be adherence of platelets in the sub-endothelial tissue at the injury site. Further platelets aggregate to form the primary hemostatic plug. These platelet cause the activation of clotting factors leading to the formation of fibrin clot that reinforces platelet aggregate. Hence platelet are key players in hemostasis.

Deficiency in platelets results in inability of blood to form clots. Hence this can be one of the reason which can lead to oozing of blood from periodontal wounds.^[4]

“Liver Clot” or “Currant Jelly Clot” Are defined as a red, jellylike clot that is rich in hemoglobin from erythrocytes within the clot and resembles a piece of liver- hence its name.^[7]

The etiology for liver clot formation is unknown. The probability of its occurrence can be attributed to many factors, like infection, intrinsic trauma, presence of foreign bodies like splinter of bone, or a dental restorative dressing material may cause, delayed organization of blood coagulum.

Characteristic Features

Liver clot, is characterized by slow, oozing dark hemorrhage which is rich in hemoglobin from erythrocytes which forms a rich red clot. According to literature, the formation of liver clot, after surgical procedure tends to occur after 24- 48 hours.^[8] Biopsy of the liver clot reveals the presence of fibrous band surrounded by erythrocytes.

Mechanism

For the liver clot formation the probable mechanism involved may be due to venous hemorrhage which is non pulsatile and dark-red in colour. Tissue factor (TF) is a transmembrane protein which serves as the primary initiator of physiological hemostasis with no enzymatic activity involved of its own. Exposure of the sub endothelial matrix also triggers coagulation wherein enzymatic reaction incite on exposure of the sub endothelial matrix on the activated platelet surface resulting in the formation of thrombin which polymerizes the fibrin monomers to form fibrous gel which helps to stabilize the clot. Initiation of venous thrombosis is uncertain but it may involve the stasis of deoxygenated blood or slow flow of the blood and the clot contains mainly of trapped RBC's, fibrin and some platelets leading to clot formation.

Highest expression levels of TF are seen at various sites such as brain, lung, and the epithelial cells of the skin, mucosa, around the blood vessels. The degree of exposure of tissue factors and collagen to the blood would determine the clot morphology. The size of clot formation is directly related to the length of exposure of the tissue factors.

Another possible reason for the formation of liver clot could be due to continuous irritation of the surgical site by the patients tongue. That irritation can disrupt the normal clotting mechanism which ultimately can result in the formation of liver clot.^[9]

Thus liver clot represents incomplete fibrin clotting, and its presence can prevent normal clotting mechanism and delays the healing. These clots have not only been reported in periodontal post-surgical complications, it has also occurred as a result of oral surgical procedures, especially involving the removal of mandibular third molars. Occurrence of Primary, Intermediate or Secondary hemorrhage from the extraction socket may appear ranging from an aggressive oozing of blood that continuously fills the oral cavity, or may lead to a liver clot formation, or mere blood tinged saliva which may cause alarm to the uninformed patient (Kruger, 1984). Formation of liver clot was also documented after removal of mandibular root stumps as well (Hunasgi *et al.*, 2015).

Management

Formation of liver clot is a rare instant. It is important for a clinician to be proficient and have thorough knowledge of management of such complications. It is important to take a proper history of the patient before proceeding with surgical procedures, such as determining the patient's medical history for any bleeding or clotting disorders. Question if the patient is taking any medication which can interfere with normal hemostatic mechanism (e.g- Oral anticoagulants, Aspirin, or any other antiplatelet drugs, etc.).

Laboratory investigations such as complete blood count, bleeding time, coagulation time, tourniquet test, international normalized ratio (INR), prothrombin time (PT), and partial thromboplastin time (PTT) can help to diagnose such cases reliably.

Liver clots are managed by:

1. High-speed suction
1. Curetted out with large curette,
2. Low level laser therapy which heals the tissues by biostimulation.

3. Tissue forceps. [1, 2, 8, 10, 11]

Following the clot removal, it is proceeded with saline irrigation and application of direct pressure if needed to the exposed area. Application of hemostatic agents is also favorable. Rarely sutures are required. If there is slight oozing of blood, Reassure the patient that it is normal after surgery and apply continuous pressure to the concerned area with moist gauze for about 15 minutes. If there is bleeding to an extent even after the removal of the liver clot at the post-surgical site it can be managed by hemostatic agents which helps to control the bleeding. These include; absorbable gelatin sponge (Gel foam), oxidized regenerated methylcellulose (Surgicel) or hemostatic collagen and others etc.^[5]

In emergency situations, if liver clot is associated with pain, application of laser can be beneficial not just in removal of blood clot but in addition, it also promotes healing by utilizing low level laser therapy. The hemostatic action of vasoconstrictor must be weighed against the frequency of postoperative bleeding and the healing of extraction socket is delayed when epinephrine is employed. This phenomenon may result in a rebound vasodilation, possibly mediated by beta-adrenergic receptors.

CONCLUSION

Dental extractions and periodontal surgical procedures which are proved to be safe procedure might end up with complications related to bleeding at times due to various factor. The number of reported cases on liver clot formation after dental surgical procedures is of limited.

Yet it is important to have thorough knowledge of surgical anatomy and awareness about post-surgical complications, thorough planning and careful surgical techniques should be considered and also it's equally important in informing the patient about the possible chances of postoperative complication to occur.

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