PERIODONTAL APPROACH IN PATIENTS WITH BLEEDING DISORDER

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ABSTRACT
Dental invasive procedures such as periodontal surgery and extractions are most commonly employed in routine dental patients. These invasive procedures usually manifest clinical bleeding either at the time of surgery or few days after the procedure. In most cases intraoperative and postoperative bleeding is self-limiting and controllable but unexpected clinical bleeding delivers a serious challenge to the clinician in managing patient. Therefore, the clinician must be aware of such complications and must be knowledgeable in managing such cases. In this review paper, we have highlighted the most common hematologic disorder and meticulous periodontal approach in planning their management.

KEYWORDS: Periodontal, Bleeding Disorder, Dental Care, Management

INTRODUCTION - Periodontal disease is increasingly manifested in medically compromised patients and patient undergoing pharmacotherapy. Treatment of periodontal disease, either by surgical or non-surgical measures more or less involves increased risk of bleeding. Although only small number of population is encountered with inherited bleeding disorders, the dental professional must be aware of the possibility of bleeding in patient with no previous history of bleeding disorder. Excessive bleeding in these patients distresses the clinician due to difficulty in visibility and maintenance of clear surgical field and also compromises treatment procedure (e.g., suture insertion). However it is in the hand of dental care provider to prevent such complications through proper dental and medical evaluation of patients beforehand. A complete medical history including physical examination and laboratory evaluation is of paramount importance in diagnosing patient with bleeding disorder. The patient should be asked for any history of significant and prolonged bleeding after injury/trauma or bleeding from gingivae. Family history of bleeding disorders should be carefully elicited as many bleeding disorders, such as hemophilia and von Willebrand’s disease, run in families. On finding of any significant medical history, patient’s primary physician, hematologist or both must be consulted to
assess the risk and plan appropriate management.

Physical examination, revealing multiple mucocutaneous hemorrhagic lesions in the form of petechiae and ecchymoses, is indicative of vascular or platelet disorders. Moreover, bleeding wounds, evident hematomas or swollen joints may be evident in patients with severe inherited coagulation bleeding disorders.\(^1\) Patients with liver disease may have jaundice, spider angioma, palmar erythema, ascites and other signs of impaired hepatic function. A cardiac patient can show tachycardia or hypertension, which may make hemostasis more difficult to achieve.

A complete drug history is important as a number of medications may interfere with hemostasis and prolong bleeding. A possible side effect of anticoagulant and antiplatelet drugs is excessive bleeding (hemorrhage), because these so called blood thinners inhibit clot formation. Hence, it will be important to consult his or her physician before any major surgical procedure in patient taking these drugs. In addition, drugs of abuse, such as alcohol or heroin, may also cause excess bleeding\(^2\) by causing liver damage resulting in altered production of coagulation factors.

Screening of patients with suspected bleeding disorder can be accomplished using a few inexpensive lab tests\(^2,3\):

- Platelet time (normal range: 12–13 seconds) and International normalized ratio (normal range: 0.8-1.2) to evaluate the extrinsic coagulation pathway.
- Activated partial thromboplastin time to evaluate the intrinsic coagulation pathway (normal range: 25 ± 10 seconds)
- Platelet count to quantify platelet function (normal range: 150,000–450,000/µL).
- Bleeding time to determine platelet function (normal range: 2–7 minutes)

If any of the above tests are abnormal, more expensive tests are usually employed such as measures of protein, bone marrow examination and determination of missing factor in clotting system. Measurement of hepatic enzymes can be done indirectly by measuring their level in the circulating blood.

**TYPES OF BLEEDING DISORDERS**

Bleeding disorders reportedly affect 1 in 1,000 men and women globally.\(^4\) Bleeding disorders can be classified broadly as inherited and acquired which can be further subdivided into vascular disorders, coagulation disorder, platelet disorders or fibrinolytic defects (Table 1).\(^5,6\)

**INHERITED BLEEDING DISORDERS**

**Vascular disorders**

Hereditary vascular defects are characterized by blood vessel developmental abnormalities. They are usually associated with syndromes and manifest bleeding diathesis because of malformed blood vessels.\(^7\) They typically cause petechiae, purpura, and bruising, except for hereditary hemorrhagic telangiectasia, in which bleeding occurs spontaneously or from minor trauma, seldom leading to serious blood loss.\(^8\) Bleeding may result from deficiencies of vascular and perivascular collagen in Ehlers-Danlos syndrome and in other rare hereditary connective tissue disorders such as marfan syndrome. For most disorders, diagnosis is clinical; tests of hemostasis are usually normal while specific tests are available for some.
Coagulation Disorders

Among the congenital coagulation defects, hemophilia A, hemophilia B (Christmas disease), and von Willebrand's disease are the commonly encountered.

Hemophilia is an inherited X-linked recessive bleeding disorder caused by deficiencies of either Factor VIII (hemophilia A) or Factor IX (hemophilia B). The prevalence of hemophilia is 1 in 5,000 males\(^9\) among which type A is more common accounting for 85% to 90% whereas type B is seen in 10% to 15% of hemophiliacs.

Hemophilia A and B are not clinically distinguishable; symptoms may include easy bruising, delayed bleeding, ecchymosis, deep hematomas, hemarthrosis, epistaxis, spontaneous gingival bleeding and excessive bleeding following trauma and surgical procedures. Patients are classified as having severe, moderately severe or mild haemophilia based on percentage of normal clotting factor levels (Table 2).\(^5,10\)

The most important objective for dental care is to do patient counseling and provide instructions which help patients to prevent most prevalent dental diseases like dental caries and periodontal diseases. Hemophilic patients are susceptible to periodontal diseases more than ordinary people because of their inability to perform oral hygiene procedures.\(^11\) Proper oral hygiene instructions must be provided which includes: brushing teeth at least twice daily with toothpaste containing fluoride and mouthwashes of triclosan or chlorhexidine which also help reduce plaque.\(^5,12\) Minimizing the intake of any food containing sticky carbohydrates between meals should be encouraged.

As hemophilia patients are at high risk of secondary bleeding following oral surgery surgical treatment depends upon severity of bleeding. International guidelines advise the use of clotting factor replacement therapy for all invasive surgical interventions in patients with hemophilia.\(^13\) The World Federation of Hemophilia (WFH) recommends the use of factor concentrates to cryoprecipitate or fresh frozen plasma for replacement therapy in patients with hemophilia.\(^12\) Replacement therapy comprising coagulation factor VIII and Desmopressin (DDAVP) is used, if necessary, to achieve a transient increase in factor VIII level through the release of endogenous factor VIII in patients with hemophilia A.

Antifibrinolytic therapy consisting of epsilon-aminocaproic acid and tranexamic acid is commonly used to protect the formed blood clot. Tranexamic acid in an oral rinse can be used to prevent postoperative bleeding.\(^14\) Surgery must be performed with caution to reduce trauma to soft tissues. Management of intraoperative and postoperative hemorrhage must be undertaken with pressure and other local hemostatic measures such as fibrin glue and oxidized cellulose. Proper suture placement and fabrication of surgical stent postoperatively protects the surgical site during healing.\(^15\)

Hemophilia B is ten times less frequent than hemophilia A and is the result of factor IX deficiency. It is managed by replacement therapy with highly purified, virally inactivated factor IX concentrates.

von Willebrand’s disease is the most common hereditary coagulation disorder and most common inheritable cause of spontaneous intraoral haemorrhage. It is inherited in an autosomal dominant fashion with an incidence of 1 in 10,000.\(^16\) It is characterized by a quantitative or qualitative deficiency of von willebrand factor and
impaired platelet adhesion. It is classified as Type I to Type IV and may vary in severity. Unlike hemophilia, the clinical manifestations are usually mild with rare hemarthrosis and fatal hemorrhages. The signs of disease are prolonged bleeding time and mild mucocutaneous haemorrhage. History of easy bruising, epistaxis diminishing with age, gingival bleeding and bleeding after any trauma indicates towards disease condition. Therefore, stringent preoperative and postoperative precautions should be taken if surgical procedure has to be performed in these patients. Management of these patients is done according to the severity of disease. For mild conditions, use of desmopressin or 1-desamino-8-D arginine vasopressin may be sufficient, but severe disease warrants factor VIII replacement. Desmopressin induces the short-term release of factor VIII/von Willebrand Factor from platelets and endothelial cells. Treatment sessions are programmed according to the half life of coagulation factors. For instance, factor VIII has a half life of 10–12 hours, and prophylactic coverage with factor VIII is sufficient for dental treatment performed in only one appointment.

Platelet disorders
Platelet disorders are classified into quantitative and qualitative disorders. One of the quantitative platelet disorder is congenital thrombocytopenia which may be considered if the platelet count is less than 150,000/µL. It is classified as mild (100–150 × 109 /L), moderate (50–100 × 109 /L) or severe (< 50 × 109 /L). The most common clinical features are bleeding from superficial lesions and cuts, spontaneous gingival bleeding, petechiae, ecchymosis and epistaxis. The minimum blood platelet level before dental surgical procedures is approximately 50,000/µL, whereas extensive surgery may require > 100,000/µL. Replacement therapy may be required if the count is below this level. Local measures are usually sufficient to control the bleeding in patients with platelet levels below 100,000/µL whereas platelet transfusion is required in patients with platelet below 50,000/µL.

Qualitative platelet disorders are divided into platelet receptor and platelet secretion defects. The platelet receptor defects include a number of rare syndromes, such as Bernard–Soulier syndrome and Glanzmann’s thrombasthenia having a common symptom i.e., excessive mucocutaneous bleeding. Platelet secretion defects, known as storage pool defects, can be caused by absent or deficient granules. These disorders are the most common of the congenital platelet disorders, which include Gray platelet syndrome, dense granule deficiency and Wiscott–Aldrich syndrome. Qualitative platelet disorders present with mucocutaneous bleeding and excessive bruising in the setting of an adequate platelet count, PT, and aPTT.

Meticulous oral hygiene measure is initiated immediately in all patients with platelet disorder. Optimal oral hygiene should be encouraged and a soft-bristle toothbrush prescribed. Preventive therapeutic means are very important in these patients. In cases of idiopathic thrombocytopenic purpura, an acquired platelet disorder, oral systemic steroids may be prescribed 7–10 days before surgery to increase the platelet count. Patients with Glanzmann thrombasthenia, involving both qualitative and quantitative defect in platelet are given platelet infusion before surgery.

ACQUIRED BLEEDING DISORDERS
Vascular disorders
Acquired vascular defects are associated with diseases affecting the epithelium and...
connective tissue of blood vessels. Scurvy (as a vitamin C deficiency) affects collagen synthesis and thus the formation of connective tissue and perivascular connective tissue network. The weakened capillaries are prone to hemorrhage, creating a series of challenging bleeding episodes.  

Generalized manifestations of scurvy include bleeding abnormalities like petechiae, perifollicular and subperiosteal hemorrhage, ecchymoses, purpura, bleeding gums, and hemarthrosis. Intraoral manifestation includes red, painful swollen gingiva that bleeds spontaneously on slightest provocation, resulting in hemorrhages/purpuras/bruising.

Management of scurvy includes repletion of deficient nutrient through the correction of dietary habits of the patient and by intake of nutritional supplements. Initially anti-inflammatory drug is administered for the relief of pain followed by gentle removal of necrotic slough with cotton swabs soaked in 3% hydrogen peroxide.

Platelet disorders

Acquired platelet disorders can be categorized as quantitative and qualitative disorders.

Etiology of acquired thrombocytopenia includes platelet destruction, decreased production and increased sequestration. In regard to platelet destruction, the cause can be immunologic or nonimmunologic in nature, such as immune thrombocytopenic and nonimmune thrombocytopenic purpura. The disease entities associated with decreased platelet production involve primarily anemia, leukemia and medication-induced infection, abnormal marrow, hereditary disorders and vitamin deficiencies-folic acid and Vitamin B12 deficiency.

Patients with moderate and severe thrombocytopenia, are candidates for prolonged bleeding and definitely require platelet transfusion. However, minor surgery, involving soft tissues, can be performed with platelet counts as low as 30,000/µL.

Coagulation Abnormalities

Coagulopathies can be drug induced or may be seen in liver disease. Patients on long-term anticoagulation therapy are at increased risk of bleeding with trauma or surgical procedures. Warfarin, lowmolecular-weight heparin and dicumarol (coumadin) are the most commonly used anticoagulant drugs. Coumarin interferes with the vitamin K-dependent factors II, VII, IX, and X. Fractionated and unfractionated heparin enhances the action of antithrombin III, resulting in the deactivation of activated prothrombin and activated factors IX, X, XI, and plasmin. Moreover, it inhibits the transformation of fibrinogen to fibrin. Patients taking aspirin or aspirin-containing compounds are candidates for excessive bleeding as it irreversibly inhibits the enzyme cyclooxegenase which interferes with the homeostatic ability of existing circulating platelets. Nonsteroidal anti-inflammatory medications act reversibly on the cyclooxygenase enzyme, which interferes with platelet hemostatic function.

Treatment must be modified in accordance with the medications that the patient is taking and their impact on coagulation. In cases of acute bleeding or in preparation for major surgery, these anticoagulants may need to be discontinued temporarily. In liver disease, however, the most useful single test is measurement of the prothrombin time. This tends to be elevated in both acute hepatitis and in far-advanced cirrhotic disease. These patients may have a variety
of bleeding disorders depending on the extent of their liver disease. Since intestinal absorption of vitamin K can be impaired, Vitamin K and fresh frozen plasma infusion is administered for prolonged prothrombin time and partial thromboplastin time. Cryoprecipitate is used for replacement of factor VIII deficiency and replacement therapy for disseminated intravascular coagulation.

For patients taking warfarin, decision must be based on international normalized ratio (INR) which should be measured prior to surgical procedure. The optimal INR value for dental surgical procedures is 2.5. However, minor oral surgical procedures, such as biopsies, tooth extraction and periodontal surgery, can safely be done with an INR lower than 3.0 without altering the warfarin dose. A safe approach entails safe approach entails reduction of the coumarin dose 2–3 days before the procedure. However, stopping the use of these drugs exposes the patient to vascular problems, because of rebound thrombotic effect. Low-molecular weight heparin may be viewed as a less expensive and easier alternative substitute for coumarin in managing patients on anticoagulation therapy.

MANAGEMENT FOR PERIODONTAL PROCEDURES

Patients with bleeding disorder has higher incidence of dental caries and periodontal diseases because of avoidance of brushing due to fear of gingival bleeding, which exacerbates the problem. Thus, routine periodontal examination and oral prophylaxis must be performed to prevent inflammation of gingival tissues.

Supragingival scaling and polishing can be carried out initially along with oral hygiene instructions without the risk of significant bleeding. Whereas, patients who need deep cleaning or having heavy plaque and/or calculus accumulation, factor should always be given prior to dental procedures. Subgingival scaling must be done after the inflammation has subsided along with initial use of chlorhexidine mouthwash. In case of periodontal or periapical infection antibiotics must be prescribed prior to treatment. Local anesthesia is not contraindicated for hemophilia patients. However, the factor level must be raised to at least 50% prior to giving a mandibular block.

Periodontal surgery is considered as high-risk procedure and should only be considered were conservative treatment has failed and oral hygiene is good. It possesses a greater challenge to hemostasis than a simple extraction due to significant risk of blood loss. Blood loss of all kinds can be controlled locally with applying direct pressure, causing minimal trauma to tissues and using topical antifibrinolytic agents. Minimal trauma through meticulous handling of soft tissues, conservative flap design, minimizing flap elevation and primary surgical closure must be advocated. Application of pressure for 10 minutes with moistened gauze on the flap has been suggested.

Collagen, gelatin and cellulose products help in forming the platelet plug. Thrombin converts fibrinogen to fibrin and this contributes to the formation of the fibrin clot. A 10% solution of tranexamic acid or EACA (inhibits plasminogen) may be used to dampen the swab or as a mouthwash if the bleeding is difficult to stop. Fibrin glue contributes to the formation of the fibrin clot through thrombin, fibrinogen, fibronectin and aprotinin; thrombin converts fibrinogen to fibrin and this, fibronectin acts as a binding protein for the blood clot, and aprotinin delays the degradation of the
hemostatic clot. Fabrication of surgical splint for multiple extractions in patients is recommended, so that mechanical displacement of the clot in wound healing by secondary intention is prevented.

Patients must be instructed to bite on a moistened gauze, or gauze soaked with the hemostatic agent for at least 30 minutes, and preferably for an hour. If bleeding continues, electrocautery and laser are used to control bleeding in the soft tissues. Post operative use of antifibrinolytic mouthwash is highly recommended. The regimen may comprise rinsing with 10 ml of 4.8–5% tranexamic acid solution, four times a day, for 2 minutes for a period of 2–5 days. Care should be taken in prescribing medication which may affect coumarin bioavailability or metabolism. Clindamycin should be the antibiotic of choice in these patients, and a lower dose of acetaminophen for a short period of time is the regimen recommended for postoperative pain control.

**CONCLUSION**

In the last decade, Dentists are facing an ever-increasing number of conditions associated with abnormal hemostatic function. Management of patients with bleeding disorders can be carried out safely in a dental office. It is the duty of dental professional to consider the existence of a hemorrhagic disorder of which the patient may be unknown at times. Close collaboration between the dentist and the hematologist is essential as it may not be easy for dental practitioner to diagnose or differentiate between many bleeding disorders which can cause severe hemorrhage. Taking a detailed medical history, following the principles of hemostasis and implementing management protocol, contribute to the effective dental treatment of patients with bleeding disorders.

Table 1 - Types of common bleeding disorders

<table>
<thead>
<tr>
<th>Inherited</th>
<th>Vascular Disorder</th>
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<tbody>
<tr>
<td></td>
<td>Hereditary hemorrhagic telangiectasia</td>
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<td></td>
<td>Ehlers–Danlos syndrome</td>
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<table>
<thead>
<tr>
<th>Coagulation Disorder</th>
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</thead>
<tbody>
<tr>
<td>Hemophilia A</td>
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<tr>
<td>Hemophilia B</td>
</tr>
<tr>
<td>von Willebrand disease</td>
</tr>
<tr>
<td>Other factor deficiencies (rare)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Platelet Disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative disorder</td>
</tr>
<tr>
<td>Congenital thrombocytopenia</td>
</tr>
<tr>
<td>Qualitative disorder</td>
</tr>
<tr>
<td>Platelet receptor defect</td>
</tr>
<tr>
<td>Glanzmann thrombasthenia</td>
</tr>
<tr>
<td>Bernard Soulier syndrome</td>
</tr>
<tr>
<td>Platelet secretion defect</td>
</tr>
<tr>
<td>Gray platelet syndrome,</td>
</tr>
</tbody>
</table>
- Dense granule deficiency
- Wiscott–Aldrich syndrome

**Fibrinolytic Disorder**

### Acquired Vascular
- Scurvy
- Henoch-Schönlein purpura
- Haemolytic-uraemic syndrome
- Infection
- Drug reactions
- Steroid purpura
- Senile purpura

**Coagulation Disorder**
- Liver disease
- Vitamin K deficiency
- Anticoagulant and antiplatelet drugs
- Disseminated intravascular coagulation

**Platelet Disorder**

### Acquired thrombocytopenia

*Immune-mediated*
- Idiopathic
- Drug-induced
- Collagen vascular disease
- Sarcoidosis

*Non-immune-mediated*
- Disseminated intravascular coagulation
- Microangiopathic hemolytic anemia
- Leukemia
- Myelofibrosis

**Fibrinolytic Disorder**
- Liver disease
- Drugs
- Prostate cancer

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**Table 2 -** Classification and potential complication in patient with Hemophilia.\(^5,10\)
<table>
<thead>
<tr>
<th>Severity</th>
<th>Factor VIII level</th>
<th>Potential complication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>6% to 50%</td>
<td>bleeding during surgery or trauma</td>
</tr>
<tr>
<td>Moderate</td>
<td>1% to 5%</td>
<td>bleeding after mild injury</td>
</tr>
<tr>
<td>Severe</td>
<td>&lt; 1%</td>
<td>spontaneous bleeding</td>
</tr>
</tbody>
</table>

REFERENCES


14. Webster WP, McMillan CW, Lucas ON, and others. Dental management of


