Review Article

Bleeding disorders in dental care

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ABSTRACT

Initial recognition of bleeding disorders which may indicate the presence of systemic pathological process may occur in dental practice. Oral care providers must be aware of the impact of bleeding disorders on the management of dental patients. The present significant concerns to the dentist conducting invasive procedures as they prolong post-operative bleeding wound healing and increase the risk of infection. With appropriate management strategies, nearly, all bleeding disorder patients can benefit from the full range of dental procedures available to establish and maintain good oral health. Patient with bleeding disorders places a major challenge for dentists. Adequate understanding of the medical conditions is essential to reduce the risk of dangerous complications. Emphasis should be placed on providing appropriate replacement therapy before the dental procedure, selection of conservative treatment approaches, and use of local hemostatic measures to facilitate hemostasis. From this review, we can understand the types and management of bleeding disorders and its effects on the delivery of oral health care.

KEY WORDS: Bleeding disorders, Menorrhagia, Streptokinase, Thrombocytopenias, Von Willebrand disease

INTRODUCTION

Bleeding disorders are due to altered ability of blood vessels, platelets, and coagulation factors to maintain hemostasis. Most of the bleeding disorders are iatrogenic. These may be inherited due to genetic transmission or acquired secondary to diseases affecting vascular wall integrity, platelets, and coagulation factors or due to drugs, radiation, or chemotherapy.[1] Three factors of hemostasis are vascular, platelet, and coagulation phase followed by fibrinolytic phase which forms fibrin as clot.

Vascular phase results in vasoconstriction of arteries and veins at the site of injury, it also builds up extravascular pressure by blood loss from cut vessels and it lasts for seconds.[2,3]

Platelet phase – it also known as primary hemostasis, in which platelets interact with elements of the damaged vessel wall, leading to the initial formation of a "platelet plug."[2,3]

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Coagulation phase – it takes place more slowly than other phases where blood lost into surrounding area and coagulates through both extrinsic and common pathways. Fibrin secures the primary platelet plug, exceptionally in larger blood vessels where the platelet plug is inadequate only to block hemorrhage.[2,3]

Fibrinolytic phase – it activates simultaneously with the coagulation and functions to maintain fluidity of blood during coagulation, serves as clot lysis and antithrombotic agents are released.[2,3]

Coagulation cascade –development of blood clot is changeover from a soluble protein fibrinogen into insoluble fibrin under the response of a thrombin. The conversion of prothrombin to thrombin involves a series of plasma serine proteases that normally exist in inactive and pro-enzyme forms.[2,3]

Dentists may encounter patients with various types of bleeding disorders in their daily practice.[4] Clinical bleeding can be presented in two forms: the first can occur during surgery and the second can manifest several days after the procedure. In both situations, the clinician needs to take immediate action to control the hemorrhage and stabilize the patient.[5]

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Dental procedures are associated with post-operative bleeding. Procedures such as extractions, oral surgeries, and periodontal surgery are the most common invasive procedures.[6] To control hemostasis following an injury to blood vessel, a series of events is initiated as follows:

- Local vasoconstriction
- Adhesion and aggregation of platelets
- Activation of the clotting cascade to create a fibrin clot
- Activation of coagulation inhibitors to restrict coagulation to the site of the injury
- Fibrinolysis occurs later to restore vessel potency.[4]

Proper medical and dental reports of the patient are necessary before treatment, especially if an invasive dental procedure is planned. Many bleeding disorders, such as hemophilia, and von Willebrand disease run in a families; therefore, a family history of bleeding disorders should be carefully elicited.[7] This article is review onto understand causes of bleeding disorders prevailed during dental procedures.

TYPE OF BLEEDING DISORDERS

Congenital Coagulation Defects

Hemophilia A is due to the deficiency of clotting factor VIII. It is an inherited X-linked recessive trait found in 1:5000 in the male population. Symptoms may include delayed bleeding, epistaxis, spontaneous gingival bleeding, and hemarthrosis.[8] Severe bleeding is seen when factor VIII level is <1% of normal. Severe hemorrhage leads to joint synovitis and hemophilic arthropathies, intramuscular bleeds, and pseudotumors (encapsulated hemorrhagic cyst). Moderate bleeding is found when factor VIII levels are 1–5% of normal.[9] Treatment for hemophilia is by administration of an intravenous replacement of factor VIII or IX using purified plasma-derived concentrates or rather by recombinant factor concentrates. Desmopressin (DDAVP) is used to achieve a transient increase in factor VIII level through the release of endogenous factor VIII in patients with hemophilia A and von Willebrand disease.[10] Hemophilia B is due to the deficiency of factor IX (Christmas factor). It is managed by replacement therapy with highly purified, virally inactivated factor IX concentrates. Factor IX replacement treatment, prothrombin complex concentrates are used.[11,8] Von Willebrand disease is a unique disorder that was described originally by Erik von Willebrand, in 1926. It is an autosomal dominant trait with varying penetrance, defect is found in the factor VIII protein complex. It is classified as type I to type IV and may vary in severity. For mild condition, the use of DDAVP may be sufficient, but severe disease warrants factor VIII replacement.[10]

Rare Coagulation Factor Deficiencies

Rare clotting factor deficiencies are bleeding disorders in which one or more of the other clotting factors (i.e factors I, II, V, V+VIII, VII, X, XI, or XIII) is missing or not functioning properly. These disorders are inherited as autosomal recessive traits and unambiguous clinically in homozygotes or compound heterozygotes. Treatment for rare coagulation factor deficiencies is fresh-frozen plasma used as the source for others (e.g., Factor V).[6] Treatment for rare coagulation is fresh frozen plasm.[10]

Acquired Coagulation Abnormalities

Patients on eternal anticoagulant therapy with either warfarin or heparin are at increased liability of bleeding with trauma or surgical procedures. In liver diseases, the synthesis of clotting factors may be reduced due to parenchymal damage or obstruction.[6] Management benefits for hemostatic shortage in liver diseases[10] include Vitamin K and fresh-frozen plasma in fusion for prolonged prothrombin time and partial thromboplastin time; cryoprecipitate for replacement of factor VIII deficiency; and replacement therapy for disseminated intravascular coagulation. Drug doses frequently needed to be modified in these patients due to impaired liver function. Warfarin, low-molecular-weight heparin, and dicumarol are the commonly used anticoagulant drug.[6]

PLATELET DISORDERS

The large number of platelet disorder can be inherited and acquired and it is broadly categorized as defects of number (thrombocytopenia) or of function. Its classification is somewhat based on the platelet disorders which are characterized by both decreased number and function.[6] Thrombocytopenias are primarily managed acutely with transfusions of platelets to maintain the minimum level of 10,000–20,000/mm^3 necessary to prevent spontaneous hemorrhage.

Congenital Platelet Disorder

Congenital abnormalities of platelet function or production are rare. Glanzmann's thrombocytopenia is a qualitative disorder characterized by a deficiency in the platelet membrane glycoproteins IIa and IIIb. Clinical signs include bruising, epistaxis, gingival hemorrhage, and menorrhagia. Treatment of oral surgical bleeding involves platelet transfusion and use of antifibrinolytics and local hemostatic agents.[12,13]

Acquired Platelet Disorder

Idiopathic or immune thrombocytopenia purpura and thrombotic thrombocytopenia purpura clinical science are petechiae and purpura over the chest, neck, and limbs. Mucosal bleeding occurs in oral cavity and gastrointestinal tract. Thrombocytopenia is a component

of other hematologic diseases such as myelodysplastic disorder, aplastic anemia, and leukemia.[12] Alcohol can induce thrombocytopenia. Drug-induced platelet is also a part of thrombocytopenia, a large number of drugs attenuate platelet activity. The most common is aspirin, acetylates cyclooxygenase (COX) which blocks thromboxane A release from activated platelets. Other nonsteroidal anti-inflammatory drugs such as ibuprofen, naproxen, ketorolac, and indomethacin inhibit COX.[6]

Vascular Disorders

Vascular defects are rare and usually associated with mild bleeding confined to skin or mucosa. It relates diseases such as epithelium and connective tissue of blood vessels. Scurvy (Vitamin C deficiency) affects the formation of connective tissue and also perivascular connective tissue network and weakening of capillaries will lead to hemorrhage.[14,15] It can be treated with laser ablation and embolization.

Fibrinolytic Disorders

Disorders of fibrinolytic system can lead to hemorrhage when clot breakdown is enhanced or excessive clotting and thrombosis when clot breakdown mechanisms are retarded. They are primary fibrinolysis and reduced fibrinolysis may be due to plasminogen activators, prostate carcinoma is caused when there is rise in plasmin levels and fibrinolysis. Medications are streptokinase, urokinase, and tissue plasminogen activator which are used to accelerate clot lysis in patient with acute thromboembolism.[16]

LABORATORY TESTS

Quantitative

Normal platelet count – 150,000–440,000/mm^3
Thrombocytopenia – <150,000/mm^3
Bleeding time = 3–5 min
Clotting time = 4–10 min
Partial thromboplastin time = 25–45 s
Thrombin time = 9–13 s.

Qualitative

Ivy bleeding time = 1–6 min
Closure time from platelet function analyzer 100 = 60–120 s.[17]

DENTAL MANAGEMENT

Managing a patient with bleeding disorders is most important during dental treatment as it requires the infusions of clotting factor and medications to control bleeding. Based on the severity of condition, invasive procedures to be planned to minimize the hemostasis. Patient undergoing coagulation factors replacement or other antiplatelet drugs must be noticed and stopped for certain periods and then proceed with treatment.

Pain Management

Dental pain can be controlled with analgesics and especially, acetaminophen, codeine, and COX-2 inhibitors must be advised carefully after a consultant of physician. During invasive procedures, local anesthetic agent does not cause severe blood loss as it is combined with vasoconstrictors.[10] Nerve block techniques are contraindicated in coagulopathies patient so prophylaxis is provided. Patient can be treated with general anesthesia in case of factor replacement defects. Infiltrations, intraligamentary, intraosseous, or intrapulpal injections are still safer.[18]

Surgical Procedures

Extraction of tooth or other minor surgical procedures causes severe bleeding. Local hemostatic agents such as pressure packs, sutures, oxygen, surgical, bone wax, and other topical agents which are required during surgical treatments.[19] Patients undergoing warfarin therapy must be measured by international normalized ratio, if it is >3, treatment can be proceeded. Heparin taking patients can be treated in between dialysis as its short span is for 5 h. Uptake of antiplatelet drug should be stopped to lessen the increased risk of bleeding. Careful pre-operative planning and use of antifibrinolytic agents will reduce post-operative complications. DDAVP and tranexamic acid are primary alternatives.[10]

Periodontal Procedures

Healthy periodontal tissue is essential to prevent bleeding and tooth loss. Periodontal problems are more troublesome in patients who have bleeding disorders experience inflamed and hyperemic gingival tissues will be a source for the increased prospect of bleeding.[9] People will denied normal oral hygiene prophylaxis such as brushing of teeth and flossing. Patient undergoing factor replacement will require nerve blocks and periodontal packing; mouthguards will protect the surgical site from excessive bleeding. To achieve, hemostasis post-operative antifibrinolytic mouthwashes can be used. On combination of 30% trichloroacetic acid with tranexamic acid was used to delay the bleeding in moderate hemophilia. Extremely inflamed and bloated gingival tissues are treated priorly with chlorhexidine oral mouthwashes or by gross debridement with a cavitron or hand instruments to allow gingival shrinkage before deep scaling.[20]

Restorative Procedures

Usage of rubber dam, saliva ejectors, and high-speed suction can cause bleeding in gingival tissue or oral mucosae so it must be handled carefully. Endodontic therapy might require factor replacement therapy. Restorative procedure can be undergone routinely by providing care, taken to protect the mucosa. Chances of severe bleeding are caused due to the use of matrix bands or wooden wedges, it is controlled by the application of topical agents.[10]

Prosthodontic Therapy

Patient with bleeding disorders can use dentures as long as they are comfortable. Partial dentures are advised so that the periodontal health of remaining natural teeth is maintained. Replacement of teeth does not involve much bleeding; oral tissues should be handled carefully on prosthesis fabrication and trial stages. Trauma should be minimal to soft tissues on post-insertion process.[16]

Orthodontic Treatment

Orthodontic therapy can take place without much bleeding complications. Care should be taken on using appliances which do not impinge soft tissue and provide atraumatic oral hygiene.[10]

Oral Infections

Oral infections usually caused by streptococcus viridans, anaerobic Gram-positive cocci, and anaerobic Gram-negative rods. Antibiotic regimes will control all these groups. Penicillin is the first line drug regime to control oral infections. Metronidazole is combined with penicillin to treat aerobic and anaerobic bacteria present in oral cavity.[10]

CONCLUSION

During anticoagulant medications, patient should be reviewed during their dental procedure periodically to minimize the risk of thromboembolic complications. Dentist faces increasing number of problem related to inherited, acquired, and drug-related associated with abnormal hemostatic function. Hence, we must maintain clear and open communication with patient and hematologist to ensure the contemporary information on the severity and control of the patients' condition on and after dental procedures.

REFERENCES

1. Goswami A, Bora A, Kundu GK, Ghosh S, Goswam A. Bleeding disorders in dental practice: A diagnostic overview. J Int Clin Dent Res Organ 2014;6:14 3.
2. Little JW, Falace DA, Miller CS, Rhodus NL, editors. Dental Management of the Medically Compromised Patient. 8th ed. St. Louis: Mosby; 2012.
3. Morgan GE Jr., Mikhail MS, Murray MJ, editors. Clinical Anaesthesiology. 5th ed. New York: Lange; 2013.
4. Dalati MH, Kudsi Z, Koussayer LT, Dalati MF, Mawla MF. Bleeding disorders seen in the dental practice. Dent Update 2012;39:266-8, 270.
5. Vassilopoulos P, Palcanis K. Bleeding disorders and periodontology. Periodontol 2000 2007;44:211-23.
6. Israels S, Schwetz N, Boyar R, McNicol A. Bleeding disorders: Characterization, dental considerations and management. J Can Dent Assoc 2006;72:827.
7. Kudsi Z, Dalati MH, Sibai L, Koussayer LT. Management of bleeding disorders in the dental practice: Managing patients on anticoagulants. Dent Update 2012;39:358-60, 363.
8. Mansouritorghabeh H. Clinical and laboratory approaches to hemophilia a. Iran J Med Sci 2015;40:194-205.
9. Patton LL. Bleeding and clotting disorders. In: Burket's Oral Medicine: Diagnosis and Treatment. 10th ed. Hamilton (ON): BC Decker; 2003. p. 454-77.
10. Peyvandi F. Rare coagulation disorders: An emerging issue. Blood Transfus 2007;5:185-6.
11. Bolton-Maggs PH, Pasi KJ. Haemophilias A and B. Lancet 2003;361:1801-9.
12. Peyvandi F, Kaufman RJ, Seligsohn U, Salomon O, Bolton-Maggs PH, Spreafico M, *et al.* Rare bleeding disorders. Haemophilia 2006;12 Suppl 3:137-42.
13. Drachman JG. Inherited thrombocytopenia: When a low platelet count does not mean ITP. Blood 2004;103:390-8.
14. Geddis AE, Kaushansky K. Inherited thrombocytopenias: Toward a molecular understanding of disorders of platelet production. Curr Opin Pediatr 2004;16:15-22.
15. Flint SR, Keith O, Scully C. Hereditary hemorrhagic telangiectasia: Family study and review. Oral Surg Oral Med Oral Pathol 1988;66:440-4.
16. Stubbs M, Lloyd J. A protocol for the dental management of von willebrand's disease, haemophilia A and haemophilia B. Aust Dent J 2001;46:37-40.
17. Gupta A, Epstein JB, Cabay RJ. Bleeding disorders of importance in dental care and related patient management. J Can Dent Assoc 2007;73:77-83.
18. Patton LL. Bleeding and Clotting Disorders. Principles of Medicine. Ontario: Decker; 2003. p. 454-77.
19. Rakocz M, Mazar A, Varon D, Spierer S, Blinder D, Martinowitz U, *et al.* Dental extractions in patients with bleeding disorders. The use of fibrin glue. Oral Surg Oral Med Oral Pathol 1993;75:280-2.
20. Webster WP, Courtney RM. Diagnosis and treatment of periodontal disease in the hemophiliac. In: Proceedings, Dental Hemophilia Institute. U.S.A: The National Hemophilia Foundation; 1968.

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