Scientific Research Publishing

Health, 2022, 14, 1044-1058
https://www.scirp.org/journal/health
ISSN Online: 1949-5005
ISSN Print: 1949-4998

Guidelines for Patients with Bleeding Disorders Undergoing Dentalveolar Surgeries

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How to cite this paper: Amirova, M., Azim, S.A., Foroughiasl, P., Annamma, L., Alkhabuli, J., Nagiyeva, S. and Rahimova, R. (2022) Guidelines for Patients with Bleeding Disorders Undergoing Dentalveolar Surgeries. *Health*, **14**, 1044-1058.
https://doi.org/10.4236/health.2022.1410075

Received: September 18, 2022
Accepted: October 25, 2022
Published: October 28, 2022

Abstract

Dental practitioners must be well informed about the pathology, complications and treatment options associated with bleeding disorders patients. Prolongation of bleeding time can seriously complicate the patient's condition during and after surgery, especially if there is iron deficiency anemia or any other condition accompanied by a decrease in hematopoiesis. For this reason, the dentist surgeon must be aware about the presence of such diseases in advance, in order to prevent the development of bleeding and its undesirable consequences promptly. Blood loss becomes apparent when blood exits through a natural opening in the body, for instance the nose & mouth. In this article, common medical bleeding situations with the potential to compromise the successful outcome of dental surgical procedures have been presented. Bleeding disorders is a disease group, which can be classified as deficiencies of coagulation factors, platelet disorders, vascular disorders, fibrinolytic defects and so on. Fragile blood vessels can cause bleeding, petechiae, bruising, etc. In most cases, vascular disease does not cause serious blood loss, with the exception of hereditary hemorrhagic telangiectasia. In this paper, we discuss the most common hereditary diseases associated with a deficiency of plasma coagulation factors VIII and IX, the disease of platelet deficiency (Glansman disease), the prophylaxis of bleeding in this kind of patients, and the effect of drugs on coagulation processes as well.

Keywords

Coagulation Factors, Hemophilia, Platelet, Sedation

1. Introduction

1.1. Hemophilia as the Main Cause of Bleeding

Dental practitioners often face to the oral mucosal bleeding caused by a group of disorders due to deficiency or dysfunction of certain blood clotting factors. The main congenital disorders are hemophilia A and B resulting in severe hemorrhagic disorders. Hemophilia C, that occurs in both men and women, is an autosomal recessive/dominant disease with deficiency of blood factor XI. It appears mainly in the ashkenazi jews. Currently, factor XI deficient hemophilia is excluded from the classification of hemophilia due to significant differences in its manifestations from A and B variants. A & B types of hemophilia are X chromosome-linked congenital diseases caused by mutations in the factor VIII (FVIII) and factor IX (FIX) genes [1]. The hemophilia A prevalence is 1:5000 male, while frequency of hemophilia B is 1:30,000 [2]. Hemophilia is characterized by bleeding from multiple sites, excessive bleeding tendencies and prolonged clotting time. It may be classified into severe, moderate and mild based on the clotting factor level [1] [3] [4]. These factors participate in the intrinsic pathway of coagulation. The severity of disease is stipulated by factor plasma levels of 1% or less (in severe form), 2% to 5% (in moderate form), or 6% to 40% (in mild form) (**Table 1**). In non-severe hemophilia, bleeding mainly occurs after provocative events: trauma, surgery, tooth extraction.

Alternatives to nerve block in patients with bleeding disorders.

As inferior alveolar block in the pterygoid plexus can cause gross swelling, pain, dysphasia, respiratory obstruction and risk of death from asphyxia, infiltration and intraligamentary anesthesia are possible alternatives to nerve block in many cases, especially in hemophilia.

Minimum clotting factor levels of 20% to 30% are required for the commonly used blocks and regarding the type of local anesthetic agent used, there are no restrictions, although those with vasoconstrictors may require additional local hemostatis. A buccal infiltration, intraligamental, interosseous or intrapulpal injections can be used without any factor replacement [4].

Table 1. Matching of coagulation factor deficiency with bleeding severity in hemophiliacs.

Classification	Factor level %	Bleeding phenotype
Severe	1<	Bleed spontaneously without injury
Moderate	1 - 5	Bleed on minor injury
Mild	6 - 40	Bleed on major injury

1.2. Platelet Dysfunction as a Complicating Dental Surgery Factor

The next most common type of hereditary hemophilic disease is associated with platelet dysfunction. In norm, the platelets synthesize thromboxane A_2 (**Figure 1(A)**), which is one of the strongest vasoconstrictors, that provides vasoconstriction and aggregation of platelets ended by plug formation & stopping bleeding. Platelet margination precedes their aggregation and adhesion to vessel wall. Platelet activation is accompanied with the release of platelet clotting factors, which promote thrombin generation (**Figure 1(B)**) with all the ensuing consequences. For aggregation, platelets should also express glycoproteins IIb/IIIa called integrins, which act as the receptors for fibrinogen. After vessel injury, the platelet activation starts triggering the integrin receptors that attach to von Willebrand Factor (vWF) and/or fibrinogen. After activation, platelets extend pseudopods that provide their aggregation with further primary plug formation. The release of ADP (adenosine diphosphate) from granules facilitates interaction with receptors of the ADP family, thus facilitating further aggregation & increase thrombus size. Release of TxA_2 & ADP completes the aggregation process. Fibrin attachment by platelet pseudopodes completes clot formation. Thickening of a blood clot due to XIII factor [5].

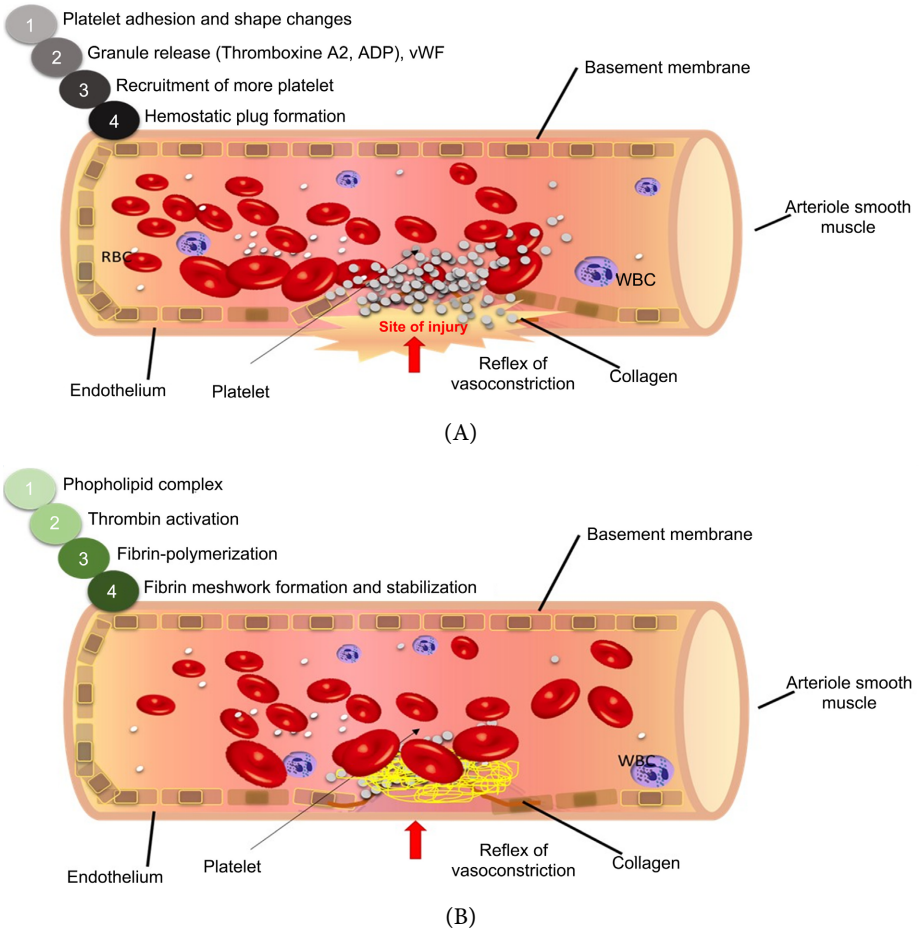

Figure 1. The role of platelets in plug formation.

In rare autosomal-recessive platelet function disorder (weak platelets) disease, thrombasthenia appears. In this disease a platelet function, particularly a primary aggregation defect with all agonists (except ristocetin) occurs. The severely decreased/modified platelet surface integrin receptor expression results in appearance of low or non-functional protein on the surface of platelet leading to bleed from the gums, severe hemorrhage and disabling. Patients with thrombasthenia are usually treated with platelet transfusions during bleeding. Disease is associated with mutations in the genes that encode integrin α_{IIb}. (*ITGA2B)* or *ITGB3*, which encodes β_3. In all these mutations platelet aggregation is absent or sharply diminished.

vWF sticks together blood cells and hence helps hemostasis. In patients with low and/or inactive vWF, bleeding occurs from the slightest damage. This congenital condition is called von Willebrand disease. Interestingly, the severity of bleeding may vary without correlation with subtypes of disease.

Unlike hemophilia, thrombasthenia cannot be classified as mild, moderate or severe bleedings. The variant type is diagnosed by the inability to bind fibrinogen due to the absence of platelet aggregation (**Table 2**). The study [6] demonstrated that there is no significant correlation between bleeding severity and different subtypes of IIb/IIIa integrin in this disease.

1.3. Vascular Diseases as Complicating Surgery Factors

Vascular diseases comprise a separate group of diseases complicating the dental surgery. Sometimes bleeding in the oral cavity is caused by vascular diseases. Normal endothelium regulates blood clotting, participates in the immune response, regulating the flow of substances into/from the vessels, is responsible for the blood composition [7]. However, nearly 200 million people worldwide are affected by peripheral vascular disease [8]. Severe metabolic disorders such as renal failure, diabetes mellitus, severe viral infections, oxidative stress can lead to predisposition to an inflammatory process resulting in bleeding. Free radicals may disrupt the topmost vasodilator NO balance, damage the vascular endothelium increasing its permeability, what opens the way for the penetration of toxins into the body. Smoking, infections, high consumption of glucose, heavy metals may increase free radicals/antioxidants ratio leading to suppression of NO synthesis resulting in impaired endothelial signaling, and subsequently, vessel disorders. In general, the endothelial function is not measured before the surgery;

Table 2. Classification of thrombasthenia.

Classification	Integrin IIb/IIIa fibrinogen binding ability, %	Number of receptors
type 1	0% to 5% of normal	Nearly absolute deficiency of fibrinogen receptors and/or vWF
type 2	6% to 25%	Reduced levels of receptors
Mild variant of disease	50% to 100%	Receptor levels close to normal

but we must bear in mind that in patients with vascular disease, the ability of blood vessels to expand and/or narrow in response in drug administration is changed. For this reason, competent dentists always collect an anamnesis about the diseases mentioned above before the operation.

2. Clinical Presentations in Hemorrhage and Laboratory Testing

Bleeding (hemorrhage) is characterized by a number of symptoms that a dental surgeon should recognize before proceeding with surgery. These include:

1) Acute bleeding incidents
2) Chronic synovitis
3) Hemophilic/hemorrhage arthropathy
4) Bleeding spontaneous and/or following trauma
5) Spontaneous intra-articular bleeding is the hallmark of hemophilia.

Regarding the frequency of joint damage in hemophilia, the hemophiliac knee is most commonly affected joint, followed by the ankle, elbow and hip joints.

Laboratory Testing

With regard to indicators of factor VIII and factor IX hemophilia, the measurement of prothrombin-related parameters is most often used. Screening test, for instance prothrombin time (PT) and partial thromboplastin time (PTT), can be done in patients with positive family history and suspected with bleeding disorders (Table 3). In both cases, the PTT is prolonged, while the duration of bleeding is within the normal range [9] [10].

Prothrombin time (PT) & partial thromboplastin time (PTT) are the routine tests to assess the risk of bleeding in hemophilia. When measuring PTT, clotting mainly occurs within 25 - 35 seconds. In the case of using blood thinners clotting takes up to 2.5 times longer [11].

3. Challenges of Oral Cavity Diseases Prevention

Dental problems prevention is a fundamental component of oral care. The need for treatment and the number of emergency visits will decrease, if an effective regimen is used. Obviously, it is in the best interest of bleeding disorder patient to limit his dental problems. Hence, solution to the problem of hemorrhages

Table 3. Laboratory testing in hemophiliacs with factor VIII and factor IX deficiency.

Factor VIII deficiency		Factor IX deficiency	
Test	**Result**	**Test**	**Result**
PT	Normal	PT	Normal
PTT	prolonged	PTT	prolonged
Bleeding time	Normal	Bleeding time	Normal
Factor VIII	low	Factor IX	low

starts with this first stage: prevention. The dental prevention based on a number of different factors, include:

1) Choose of the right toothbrush and toothpicks. Medium bristles toothbrush should be used, since using hard bristles can cause abrasion of the teeth and soft bristles are insufficient to remove plaque.

2) Dental caries and periodontal disease development can be prevented by utilizing universal cleaning aids, for example, floss, tape, and interdental brushes.

3) Brushing with a fluoride toothpaste twice daily.

4) Children under 7 years of age should use 1000 ppm fluoride toothpaste.

5) People over 7 years of age should use 1400 ppm fluoride toothpaste.

The inorganic crystalline of teeth is apatite (formula: $Ca_{10}(PO_4)_6(OH, F, Cl)_2$); the main type among them is hydroxy apatite with OH group connected to Ca & inorganic phosphate: $Ca_{10}(PO_4)_6(OH)_2$. When fluoride enters the vacancy in the apatite it forms structure $Ca_{10}(PO_4)_6(F)_2$, in which fluoride occupies a central position as calcium ion does. Fluoride even may replace OH ions, after which the crystal becomes more stable, less soluble, shortly-stronger. Fluor apatite is predominant in enamel. Along with these effects, in dental plaque fluoride suppresses development of such cariogenic bacteria as *Streptococcus mutans* [12], because it inhibits adhesion of bacteria on the enamel surface. Additionally, in period of crystal formation, fluoride availability improves crystallinity. Since dental caries is a process of enamel demineralization and re-mineralization, the effect of fluoride on the process promotes re-mineralization. Main part of fluoride deposited in the enamel occurs during the pre-eruptive enamel formation; but this process also constantly occurs during the post-eruptive maturation of the enamel. At the early time of tooth eruption, enamel is mineralized inadequate, ergo is loose enough, but then the so-called post-eruptive process, that takes approximately two years, completes the maturation of mineralization when fluoride continues to accumulate in the outer surfaces of the enamel. If fluoride is present in dental plaque when bacteria produce acids, fluoride moves with their acids downward into the tooth, which helps it adsorb on the surface of the crystals and protect them from dissolution by bacteria waste products. For this purpose, fluoride should be derived from the saliva or any fluoride-containing products and beverages. Fluoride exits in the nature only in combination with other elements. Small amounts of fluoride are found in fruits, vegetables, cereals. Sea foods & tea leaves are also rich in fluoride.

The following are Fluorine Additives:

- **Fluoride drops**
- **Fluoride tablets**
- **Topical application of fluoride using trays**
- **Fluoride mouth rinses which can be used on either a daily or a weekly basis**
- **Fluoridated water supplies**
- **Fodd processes with fluoridated water**

Fluoride supplements could be used, but are not advised if the water supply has a fluoride content of 1 - 1.5 ppm (part per million) or more. Otherwise, a dental fluorosis, a disease resulting in tooth enamel decay, may develop [13]. Fluorosis is mainly manifested when children brush their teeth with fluoride paste in the teeth-forming years, in particular 8 years or younger (the time when permanent teeth are being formed). Additionally, we should bear in mind, that with frequent use of fluoride supplements and fluoride paste, thyroid insufficiency may develop [14]. Kheradpisheh Z. *et al.* (2018) have found that fluoride impacts on hypophyseal TSH and thyroid T_3 hormones even in the concentration < 0.5 mg/L. The reason for this phenomenon is that the thyroid gland does not distinguish monovalent anions, such as fluorine, iodine, cyanides from each other. The preferred binding of the anion by this gland depends on its concentration in the blood: which anion levels is higher, that one will bind [15]. For this reason, when the concentration of fluoride in the blood rises, it replaces iodine ions in the composition of thyroid hormones, in particular thyroxine and triiodothyronine, with the subsequent manifestation of hypothyrosis symptoms. Thus, the use of fluoride supplements should be accompanied, firstly, by adding iodine to food (for example, with iodine fortified salt). The use of fluoride supplements also requires timely testing of the thyroid stimulant level, TSH of the pituitary gland.

4. Beneficial and Undesirable for Use in Coagulopathy Drugs

Desmopressin is the drug of choice in hemophilia, because it helps stop bleeding in patients with mild hemophilia A due to stimulation the release of von Willebrand's antigen from the thrombocytes and cells, that store it lining blood vessels. Sometimes the treatment with clotting factor concentrates is required: in these cases the prophylaxis is based on intravenous infusion of blood factors concentrate [16], mainly factor VIII (in hemophilia A), and less often: the factor IX (in hemophilia B), or both. The dentist may prescribe a higher dose of the infusion factor if the patient has not started treatment earlier and/or has not received a sufficient dose for treatment. If the bleeding is very severe, the dentist must be sure that it does not start again, in which case the transfusion infusion dose can also be increased.

Avoid remedies leading to bleeding.

The use of drugs resulting in bleeding should be avoided in hemophiliacs. The most common mistakes doctors make are the use of the following set of drugs.

Patients taking *oral anticoagulants* are at risk of postoperative complications, especially if the drug is displaced from its protein binding sites or in case of decrease its metabolism. Some of these drugs affect warfarin metabolism, so they should be avoided because they cause serious hemorrhages.

The following antimicrobials may make bleeding worse:

Cotrimoxazole, sulfonamides, quinolones, benzyl penicillin, chloramphenicol, doxycycline, isoniazid, neomycin, metronidazole. erythromycin, cephalosporin,

ampicillin plus clavulanic acid [17] [18].

Antifungal drugs resulting in bleeding disorders:

Azoles and Griseofulvin have been found in oral surgery patients with bleeding disorders. Even topical Miconazole gel could cause some problems [19].

Antiviral preparations requiring caution in hemophilia:

Saquinavir/Ritonavir, Mesylate should be avoided in hemophilia [20] due to their high hepatic toxicity, because liver is the main organ producing plasma clotting factors.

Danger of Liquid paraffin use in hemophiliacs:

Liquid paraffin leads to loss from the body ubiquinone derivatives, namely vitamin K, which are irreplaceable in the synthesis of prothrombin, proconvertin, Stuart-Prower & Christmas factors, resulting in increase the international normalized ratio (INR). The higher the INR, the slower the clotting of blood, which can be manifested by bleeding, therefore vitamin K rich diet can be required in high INR [21].

Impact of alcohol on hemostasis and drugs on warfarin:

Alcohol consumption can prevent the effect of an indirect anticoagulant warfarin, which interferes with vitamin K, and thus preventing blood clotting factors formation in the liver leading to bleeding. So, on the one hand, alcohol prevents anticoagulant activity of warfarin, but on the other hand it may have the converse effect on the liver metabolism [22]. Since the liver is the main site for vast majority of blood clotting factors synthesis, liver damage lowers their levels in the blood resulting in the prolongation of prothrombin time, which is why this effect of alcohol on coagulation process should be considered in patients prone to hemophilia. Additionally, alcohol consumption leads to thrombocytopenia and intracerebral hemorrhage [23]. Alcohol causes vasculopathy; the mechanism of progression of this pathology remains unexplored. Determination of markers indicates a disease of small vessels, which may be aggravated by impaired hemostasis [24].

In patients ingesting warfarin, co-trimoxazole significantly raises a risk of gastrointestinal tract hemorrhage, therefore they should be replaced with another medication before surgery.

Sedation with nitrous oxide diazepam analgesia can be used as alternative techniques to eliminate the need for anesthesia at hemorrhages:

Premedication with hypnotic, analgesic, or tranquilizing agents (**Table 4**) may be an aid to management useful for long surgical and operative procedures. This technique is an adjunct where raising the pain threshold or relaxing the patient is indicated. Medications may be administered orally, by suppository or by the intravenous route. Since intramuscular injections are contraindicated for the bleeding disorder patient due to formation of hematomas, an inhalation analgetic nitrous oxide can be used as an adjunct to allay mild pain sensation and apprehension without loss of consciousness.

For successful surgical intervention in patients with hemorrhages, it is necessary to determine the number of platelets per unit of blood volume in advance.

Table 4. Preoperative sedatives.

Sedative drug	Some effects
İnhalation analgetics	Nitrous oxide
Narcotics:	Codeine, Hydromorphone Meperidine, Morphine
Non-narcotics:	Aspirin and NSAIDs can interfere with platelet function resulting in gastric bleeding [18]. Cyclooxygenase inhibitors like rofecoxib, celecoxib appear not to have a significant effect on platelets or INR [18]. Paracetamol in excessive and prolonged administration can enhance warfarin by inhibiting its metabolism; 4 *tablets a day for a week significantly affect the INR* [18]. Acetaminophen, Pentazocine, Plain Propoxyphene

Note: NSAİDs—non-steroidal anti-inflammatory drugs; INR—the international normalized ratio.

The platelets provide hemostasis through three main processes: platelet activation, thrombocytes adhesion and aggregation. The main functions of platelets are listed below:

- Preservation the integrity of the capillaries;
- Form the initial plug in vessel injury;
- Elaborate a number of substances with different metabolic activities, such as serotonin, platelet factor 3, platelet factor 4 etc. [5];
- Contain thrombasthenin—a contractile protein involved in clot retraction and consolidation of a fibrin plug [25].

To combat bleeding against the background of platelet insufficiency, *platelet preparations* are used. The transfusion of viable, physiologically active platelets can be achieved with:

- Fresh blood
- Platelet-rich plasma (PRP): contains about 90% of the platelets from a fresh blood unit in about half of this volume. Many risks of isoimmunization, infection with blood—borne viruses and rarely, graft-versus-host disease may be caused by platelet infusions. Platelet infusions are less effective in immune destruction of platelet [8].

5. Relationship between Thrombocytopenia and Splenomegalia and Troubleshooting Bleeding

- A decrease in the absolute platelet count may occur for several reasons, but one of the most common reasons is splenomegalia. The spleen is an organ which can quickly distinguish matched (self) from non-matched (non-self) platelets. In splenomegalia, thrombocytopenia may be caused by increased platelet pooling in enlarged spleen. In hypersplenism, the spleen holds sometimes > 90% of the total platelet number. In transfusion of altered platelets, these platelets undergo spleen screening along with verification, and after this procedure platelets are held or collapsed here. For this reason in splenome-

galy, a post transfusion platelet count should be obtained before surgery [25], in order to avoid carrying out prolonged operations in the absence of the required volume of thrombocytes [26]. The recommended guidelines for platelet transfusion are listed below. By the way, platelets should be examined within 6 - 24 hours after collection [27].

- Recent (within 24 hours) platelet count < 10,000/mm^3 for prophylaxis.
- Recent (within 24 hours) platelet count < 50,000/mm^3 with demonstrated microvascular bleeding ("oozing") for a planned surgical/invasive procedure.
- Documented platelet dysfunction (e.g., prolonged bleeding time, greater than 15 minutes, abnormal Platelet function tests) with petechiae, purpura, microvascular bleeding ("oozing") for surgical/invasive procedure.
- When given prophylactically, half of platelets should be given just before the operation to control bleeding, and half at the end of the surgery to ease placement of sutures.

Theoretically, the patient's body surface area and blood volume are important metrics for determining the number of platelet units to be transfused [25]. Additional platelets can be transfused intraoperatively, if required, depending on the level of complication [25].

The best source of platelets is platelet concentrates. Platelet concentrates: have 50% of the platelets from a unit of fresh whole blood in a volume of only 25 ml [8].

6. Pain Control in Bleeding Disorder

It is always a challenging process for the physician and dental specialist to manage pain for patient with bleeding disorder. Before the development of replacement therapy, local anesthetics were rarely used for dental procedures.

If there is no better option and prophylaxis is provided, nerve-block anesthetic could be used in patients with coagulopathies, otherwise it is contraindicated because the anesthetic solution is deposited in a highly vascularized area, which carries a risk of hematoma formation [8] [28].

The morbidity caused by hematoma after local anesthetic injection is dependent on the anatomy of the injection site. Firm and confined tissue is less likely to develop bleeding complication, whereas hematoma can develop in the loose connective, non-fibrous, and highly vascularized tissue. The risk of hematoma can be reduced by using Gow Gate Technique in case of inferior alveolar nerve block.

General anesthesia is the most effective technique to manage patients of bleeding disorder. The intravenous route is safe as it does not cause bleeding problems and does not require infusion replacement of the deficient factor.

By using a short acting barbiturate, the intravenous route may be used to sustain an ultralight level of general anesthesia.

When inhalation for general anesthesia is administered, endotracheal intubation is sometimes indicated. Because of the possible trauma associated with in-

tubation, prophylactic factor replacement is mandatory in patients who requires an intubation. Oral intubations techniques, therefore is preferred. The surgeon must also be careful in prescribing analgesic due to some problems caused by certain agents. Analgesics containing aspirin and anti-inflammatory agents such as Phenylbutazone and Indomethacin are contraindicated because they potentiate bleeding disorder by altering platelet function. For dental pain it is important to overlook all analgesics which contain aspirin (such as the compound drugs Percodan and Empirin).

7. Manipulations during Surgery and in the Postoperative Period in Hemorrhage

The treatment plan should follow these guidelines:

- The first rule of a dentist who is faced with a bleeding patient is not to be afraid of bleeding. In hemorrhage, the patient does not bleed any faster than a non-hemorrhagic.
- A patient with hemorrhage has been bleeding for a long time due to a defect in the clotting mechanism. In general, no one of them will bleed to death on the spot.
- If multiple extractions are required, only one or two teeth should be extracted at one visit to ensure that hemostasis will not be disturbed [18].
- Avoid intramuscular injections for hemophiliacs who have not received replacement therapy.

A complete clinical and radiological examination helps the dentist to make an appropriate conclusion about the state of the patient's coagulation system and prepare for unexpected twists and turns during the operation [18]. Transfusion of platelet should be considered, if there is a risk of bleeding or in thrombocytopenic patients. In norm, human platelet count ranges 150,000 - 450,000/μl, severe thrombocytopenic patients have this count less than 50,000/μl; these patients are characterized by extensive and prolonged bleeding and definitely require platelet transfusion [8] [29]. In dental practice, both hereditary and acquired low platelet counts, less than 150×10^9/L, are often observed. Hereditary conditions include idiopathic thrombocytopenic purpura, acquired autoimmune, disseminated intravascular coagulation, post-viral conditions, B_{12} and/or folate deficiency. There is also increased destruction of the platelet membrane by drugs. Pregnant women are also at risk for thrombocytopenia. Significant bleeding symptoms appear mainly when the platelet count is even less than 10×10^9/L [30].

For major surgery, the desirable platelet count is 100,000/μl [31], and minor surgery causing only superficial wounds can be done with undue risk with platelet counts of 30,000/μl [30], while Forbes CD (1993) recommends it to be no less than 50,000/μl for minor surgeries [24]. According to *Henderson et al.* (2001), to control hemorrhage in tooth extraction sites by primarily closure, preferable count of platelets is 100,000/μl [28].

If the platelet levels are above 30×10^9/l, local anaesthetic block injections can be given.

Ideally, platelets count at least 100,000/μL [29] [32]. The platelet levels should be determined in the morning before surgery. Hemophiliacs who have been receiving blood products may be carrying the hepatitis (A, B, C) virus; due to this all instruments should be extremely sterile.

All hemophilia patients require long-term follow-up after tooth extraction [31] [32]. The difference is only in the duration and thoroughness of observation. After operation, the patient's physician and hematologist should be consulted to identify treatment required for prophylactic therapy.

- Patients with mild bleeding tendencies, supervision should be for few hours only, while those with severe conditions or a history of prolonged bleeding may require hemostatic cover and observation overnight in hospital.
- Discuss the requirements of the administration of coagulation factor or decompressing hemostatic drug desmopressin in the hemophiliacs. Desmopressin is good at that it is a synthetic analogue of vasopressin, but with no pressor activity [33].
- Discuss the use of oxidized cellulose (Surgical) or fibrin glue as local hemostatic agents.
- Infiltration anesthesia could be used with caution; block anesthesia must be used with extreme caution even with replacement therapy. Positive aspiration or a hematoma will require further treatment.
- Careful prescription of medications [34].
- Protect soft tissues.

A detailed history and investigations along with a sound knowledge of the complications that can occur due to any medical condition will help every dental practitioner to carry out dental procedures on a medically compromised patient without fear. Proper modification of the treatment plan along with good preparation for any emergency is equally essential.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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