CASE REPORT

Incidental Diagnosis of Christmas Disease in a 5-year-old Child: A Case Report

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Abstract

Case description: A 5-year-old boy presented with bleeding gums following a fall from the swing. Initial treatment at a private clinic involved clot removal and gauze application. Despite no prior history of abnormal bleeding, the child experienced delayed and continuous bleeding, prompting further evaluation. Blood tests revealed normal prothrombin time (PT) but abnormal activated partial thromboplastin time (APTT), indicating a coagulation disorder. Vitamin K was administered, but profuse bleeding recurred, leading to hospital admission. Further tests confirmed a diagnosis of mild hemophilia B with low factor IX levels. The patient received fresh frozen plasma (FFP) transfusion, which stopped the bleeding. Follow-up showed a clean injury site after intervention.

Conclusion and clinical significance: This case underscores the need for high suspicion, thorough investigation, and prompt management in bleeding disorders, especially since patients may be unaware of their condition until a bleeding episode occurs.

Keywords: Case report, *De novo* mutation, Hemophilia B, Oral bleeds evaluation, Rare bleeding disorders.

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Introduction

Hemophilia is the most common severe bleeding disorder in children, requiring appropriate care from early infancy to prevent lifelong disabilities. Hemophilia or other coagulation defects should be suspected in cases of unusual prolonged or delayed bleeding, or if there is a positive family history. In rare instances, these disorders may be diagnosed incidentally, even without a family history, due to *de novo* mutations.

A *de novo* mutation refers to a new alteration in a gene's deoxyribonucleic acid (DNA) sequence that arises in an individual for the first time, with no occurrence in prior generations. These mutations can lead to X-linked disorders such as hemophilia A and hemophilia B.[1]

The severity of hemophilia is usually based on the plasma levels of factors as above, but there can be phenotypic variations in presentation. For example, a severe factor deficiency may present with moderate bleeding manifestations.

Disorders of hemostasis can be categorized as fibrinolytic defects, vascular disorders, platelet disorders, or deficiencies in coagulation factors.[3] Within this category of disorders, hemophilia is clinically characterized by an extended time to coagulate and profuse deep bleeding into the muscles, mucosa, soft tissues, and weight-bearing joints.[2,4] Joint bleeding, also known as hemarthrosis, can cause a crippling arthropathy.[4,5]

There are several effects on general health as a result of its correlation with mortality and morbidity.[5,6] Certain clotting factors are aberrant in hemophilia, either in terms of quantity or composition.[7] A prolonged activated partial thromboplastin time (APTT) is the primary indicator of a considerable increase in bleeding time, which may arise from disruptions to the blood clotting cascade.

Hemophilia is a genetic, lifelong bleeding disorder connected to the X chromosome that affects roughly 1 in 5,000–30,000 newborns.[4,8] There are three subtypes of this disease:

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- Hemophilia A, which accounts for 80–90% of all instances (or 1:5,000 births), is characterized by female carriers.
- Hemophilia B, or Christmas disease, is far less prevalent (1:30,000 births).
- Hemophilia C, or Rosenthal syndrome, is extremely rare.[9]

Furthermore, Owren, a Norwegian physician, postulated a fourth kind of hemophilia in 1947.[10] This type of hemophilia is known as Owren's illness or parahemophilia, and is caused by a deficient factor V. It affects one child out of every million.[11] The coagulation mechanism factors VIII, also known as the antihemophilic factor, and IX, known as the plasma thromboplastin component, are deficient in A and B types, which are clinically indistinguishable.[4,7] A deficiency in factor XI is responsible for the C subtype.[9]

As such, no particular race or region is more susceptible to the illness than any other. The condition does not exhibit a well-known history, despite being inherited from parents to offspring; approximately one-third of cases are due to spontaneous or random mutations.[12,13] The degree of incapacity, the development of antibodies against factor VIII, the prevalence of hepatitis or other liver illnesses, or human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), all affect the prognosis of affected children.[7] In the dental office, delivering oral health care to children, including performing invasive procedures, can be safely achieved if specific precautions and safeguards are meticulously followed, as most dental surgical procedures invariably result in bleeding.[7,8,14]

The primary objective of this report is to elucidate the diagnostic process and therapeutic interventions administered to a young patient whose hemophilia was incidentally discovered following an episode of uncontrollable bleeding resulting from a minor orofacial injury. Within the context of dental care, particularly when treating pediatric patients, it is essential to underscore the importance of recognizing and effectively managing underlying bleeding disorders such as hemophilia. Through a comprehensive examination of the patient's case, including diagnostic assessments, treatment modalities, and adherence to safety protocols, this report aims to shed light on the crucial role of early detection and appropriate management in ensuring the safe delivery of oral healthcare to individuals with hemophilia.

Patient Information and Clinical Findings

A 5-year-old boy reported to the Department of Pediatric and Preventive Dentistry due to bleeding from a wound in the gums sustained from a fall from the swing 3 days before. The patient had visited a private clinic, and first-aid treatment was administered on the day of trauma. The next day, the parents noticed continued bleeding from the injured site along with the formation of a thick clot tag. The anxious parents visited another private practitioner and were later referred to our department for further treatment. The following day, the patient visited our outpatient department (day 1 of reporting to our OPD). On extraoral examination, lacerations were noted on the upper lip. Intraoral examination revealed a thick tag of clot hanging from the maxillary labial frenum area (Fig. 1A). The bleeding site was thoroughly cleaned, and the tag was removed with scissors (Fig. 1B), followed by the placement of gauze on the bleeding areas. Suturing of the lesion was not considered since the bleeding site was very close to the labial frenum. The patient was instructed to maintain oral hygiene (3 days post trauma).

Diagnostic Assessment

In view of prolonged oral bleeding, the patient was evaluated. Complete blood count showed normal hemoglobin, total counts, and normal platelet count and morphology. Bleeding time was normal. prothrombin time (PT) and APTT were prolonged. PT: 17 seconds (control: 13.5 seconds), APTT: 42 seconds (control: 27.4 seconds).

Vitamin K was started at 0.3 mg/kg/day per oral. The plan was to administer vitamin K for 3 days and repeat PT and APTT. Oral tranexamic acid for local application as well as per oral use was prescribed, and the child was sent home with no active bleeding.

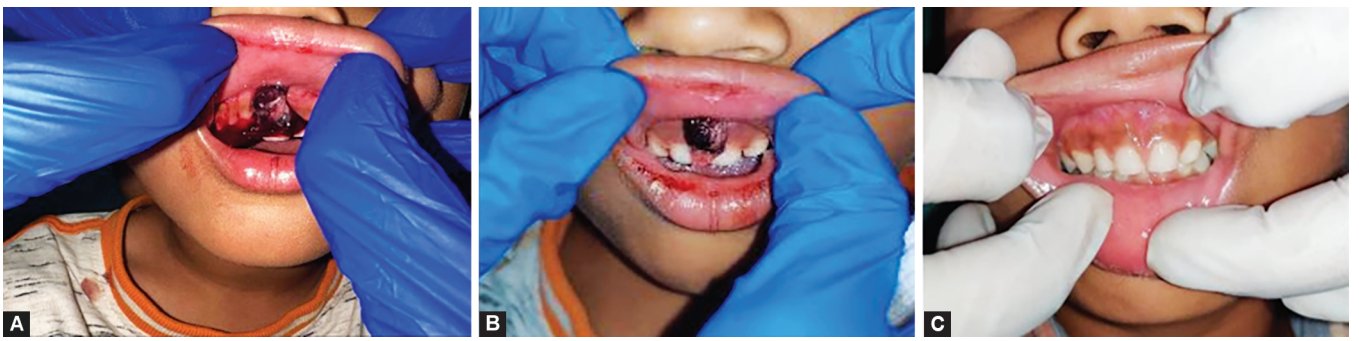
Two days later, the patient reported to the emergency ward of our hospital late at night with profuse recurrent bleeding from the injury site, where the clot tag had been removed and the area had been cleaned. In liaison with the pediatric department of our hospital and the pediatric hematologist, the patient was admitted to the pediatric ward for further management (5 days post trauma).

Therapeutic Intervention

Following admission, the patient was initially administered IV fluids at maintenance rates. Vitamin K was continued. The child was also continued on tranexamic acid for both local and per oral administration (15 mg/kg/dose three times a day). The child was initially kept nil per oral to prevent dislodgement of the clot and a further increase in bleeding. The patient was instructed to apply a 500 mg tranexamic acid tablet in powdered form to the local site three times daily.

Repeat PT and APTT showed a corrected PT of 13.1 seconds (control: 13.5 seconds) and a still prolonged APTT of 53.2 seconds (control: 27.4 seconds) (day 5 post trauma), with a normal thrombin time (TT) of 11.5 seconds (control: 15 seconds). Suspecting a coagulation disorder, most likely an intrinsic pathway defect, further investigations were carried out. Mixing studies showed a corrected APTT. Specific factor assays were conducted, revealing a Factor VIII assay of 133.9 IU/dL, which is normal (50–150 IU/dL), and a Factor IX assay of 13.2 IU/dL (50–150 IU/dL), indicating a deficiency characteristic of mild hemophilia B. The patient was transfused with fresh frozen plasma (FFP), which contains all coagulation factors, and the bleeding stopped. Factor IX concentrates would have been the first-choice treatment but were less readily available in the market and were expensive.

Tranexamic acid therapy was continued for 2 more days. The child had mild hemophilia without any fresh clots (7 days post trauma).



Figs 1A to C: (A) Thick tag of clot after 4 days post trauma; (B) Postdebridement of the injured site; (C) Complete healing observed after replacement therapy

Mutational Analysis

Factor IX deficiency results from various mutations in its gene. This child was the first reported case in his family. However, mutational analysis of the gene defect could not be performed due to parental consent and financial constraints. Ideally, mutation testing of the child, followed by family screening, should be conducted. Likewise, maternal screening for carrier status with factor IX levels would be the next approach, followed by genetic counseling.

There are currently 1,692 unique variants in the *F9* gene reported in the Factor IX Variant Database (by the Structural Immunology Group, University of London), accounting for 5,538 cases in the database.[15]

Follow-up and Outcomes

The patient was reassessed 1-week postdischarge, with a thorough examination of the previously injured area. The assessment confirmed that the site had healed adequately, showing no signs of fresh clot formation (Fig. 1C). The absence of new clots indicated successful resolution of the initial bleeding episode (17 days post trauma).

Discussion

Hemophilia is an X-linked genetic bleeding disorder marked by a deficiency in either coagulation factor VIII (FVIII), known as hemophilia A, or factor IX (FIX), known as hemophilia B.[14] Typically, hemophilia predominantly affects males who inherit a defective X chromosome from their mother, with female cases being quite uncommon.[16] The factor IX deficiency can arise from three distinct pathogenic mechanisms: inefficient activation, insufficient binding, and a reduced half-life of factor IX. Hemophilia B, also known as Christmas disease, results from a deficiency in factor IX and is diagnosed 10 times less frequently than hemophilia A.[17]

Hemarthroses and bleeding in soft tissues are typical manifestations of both hemophilia A and B. Bleeding in the brain, neck, and gastrointestinal tract can be life-threatening and requires urgent medical intervention.[18] The severity of hemophilia is correlated with plasma factor levels. Hemophilia is classified based on these levels into three categories: mild (5–40%), moderate (1–5%), and severe (<1%). A factor level of 50–100% is considered within the normal range. Patients with mild hemophilia typically do not experience spontaneous bleeding. Bleeding in these individuals usually occurs only in response to surgical procedures, dental extractions, or trauma. Those with moderate hemophilia exhibit excessive bleeding following minor surgery or trauma. In contrast, patients with severe hemophilia experience spontaneous bleeding into joints and muscles, as well as significant bleeding following trauma or surgical interventions (Table 1).[19]

Oral manifestations of hemophilia B include prolonged bleeding from the gums, especially following dental procedures or trauma. Gingival bleeding is a common symptom due to the rich vascular supply of the oral tissues and the frequent presence of inflammation or minor injuries in this area. Individuals with hemophilia B are at increased risk for spontaneous gingival hemorrhage, ecchymosis, and hematomas within the oral cavity. Delayed wound healing and postoperative bleeding are significant concerns in dental treatments. The use of factor IX replacement therapy and antifibrinolytic agents has been evidenced to mitigate these risks, allowing for safer dental management of hemophilia B patients. Comprehensive dental care and preventive strategies are essential to minimize oral health complications in this population.[20]

In this case, the patient appeared healthy and reported no medical issues, with no significant family history revealed through pedigree tracing. Despite this, genetic mapping was recommended to understand the inheritance pattern. However, the parents were reluctant and refused the genetic mapping test.

This case is the first of its kind, where hemophilia B, the rarer form of hemophilia, was incidentally diagnosed following dental soft tissue trauma that resulted in uncontrolled and prolonged bleeding.

Treatment of hemophilia B involves lifelong care. Managing bleeds is usually done with FFP transfusions. Factor IX concentrates would be the ideal choice for replacement therapy; however, they are not easily available and are expensive. Factor IX correction is given according to the percentage correction required for the type and severity of the bleed, based on body weight. The Hemophilia Federation Society provides easily accessible online guidelines that assist in the treatment of hemophilia, including the recommended doses of specific concentrates needed for different types of bleeds.[16]

Since the cloning of the *F9* gene, responsible for factor IX, in 1982, over 1,000 variants linked to hemophilia B (HB) have been identified. These discoveries have led to clearer genotype-phenotype correlations, enhancing our understanding of the disorder's fundamental traits. Advances in X-chromosome genetic testing have also improved our comprehension of how HB manifests in females.[21]

Gene therapy for factor IX mutation is plausible, as the factor IX gene is relatively smaller in size and contains 8 exons, compared to the factor VIII gene, which has 26 exons. Gene therapy for hemophilia B is a promising approach that aims to provide a long-term solution by correcting the underlying genetic defect. The therapy works by delivering a functional copy of the factor IX (FIX) gene to the patient's liver cells using an adeno-associated virus (AAV) vector. This allows the liver to produce FIX continuously, potentially reducing or eliminating the need for regular infusions. Clinical trials, such as those involving the FIX-Padua variant, have shown encouraging results with sustained increases in FIX levels, leading to fewer bleeding episodes. However, this treatment is not without risks, including possible immune responses that could limit its effectiveness and the challenge of re-treatment if the initial therapy does not succeed.[22]

Despite these challenges, gene therapy for hemophilia B represents a significant advancement, with ongoing research aimed at improving safety and expanding its use to younger patients who are currently excluded due to their liver development. As these

Table 1: Clinical classification of individuals with hemophilia A and hemophilia B[2]

Moderate hemophilia	*Mild hemophilia*	*Severe hemophilia*
Baseline factor level: 1–5%	Baseline factor level: 5–40%	Baseline factor level: <1%
May bleed with slight injury	Bleeding only with severe injury, surgery, or invasive procedures	Spontaneous bleeding
May bleed as often as once per month	May rarely or never have a bleed	Often bleed 1–2 times a week
May have joint bleeding	Rare bleeding from the joint	Characterized by joint bleeding (hemarthrosis)

therapies progress through clinical trials, they offer the potential to revolutionize care for patients with hemophilia B by providing a more durable and effective treatment option compared to traditional factor replacement therapies.[22]

Conclusion

Hemophilia is one of the most prevalent bleeding disorders in the world, with varied clinical manifestations posing a significant challenge to pediatric dentists, as routine dental treatment can result in potentially fatal conditions. Pediatric dentists should always pay close attention to and be aware of the potential risks of bleeding disorders.

Informed Consent

Written consent was obtained as per the department protocol.

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References

1. Mohiuddin M, Kooy RF, Pearson CE. De novo mutations, genetic mosaicism and human disease. Front Genet 2022;13:983668. DOI: 10.3389/fgene.2022.983668
2. Dhawan A, Sandhu S, Kaur T, et al. Hemophilia A—an incidental finding in a patient with facial trauma. Indian J Comprehensive Dent Care 2011;1(1).
3. Shastry SP, Kaul R, Baroudi K, et al. Hemophilia A: dental considerations and management. J Int Soc Prev Community Dent 2014;4(suppl 3):S147.
4. Smith JA. Hemophilia: what the oral and maxillofacial surgeon needs to know. Oral Maxillofac Surg Clin North Am 2016;28(4):481.
5. Rayen R, Hariharan VS, Elavazhagan N, et al. Dental management of hemophiliac child under general anesthesia. J Indian Soc Pedod Prev Dent 2011;29(1):74.
6. Noor N, Maxood A, Mumtaz R. Dental management of haemophilic pediatric patients. Pakistan Oral Dent J 2012;32(1):66.
7. Gómez-Moreno G, Cutando-Soriano A, Arana C, et al. Hereditary blood coagulation disorders: management and dental treatment. J Dent Res 2005;84(11):978.
8. Brewer A, Correa ME. Guidelines for dental management of patients with inherited bleeding disorders. World Federation of Hemophilia Dental Committee. 2016;40.
9. El-Batawi HY. Minimizing the risk of perioperative bleeding in a child with hemophilia A during dental rehabilitation under general anesthesia: a case report. Int J Clin Pediatr Dent 2013;6(3):217.
10. Owren PA. Parahemophilia: haemorrhagic diathesis due to absence of a previously unknown clotting factor. Lancet 1947;249(6449):446.
11. Nagaveni NB, Arekal S, Poornima P, et al. Dental health in children with congenital bleeding disorders in and around Davangere: a case-control study. J Indian Soc Pedod Prev Dent 2016;34(1):76.
12. Lee CA. Hemophilia and Hemophilia B. In: Inherited Bleeding Disorders in Women. 2009. pp. 34-41.
13. Mansouritorghabeh H. Clinical and laboratory approaches to hemophilia A. Iranian J Med Sci 2015;40(3):194.
14. Ljung RCR, Knobe K. How to manage invasive procedures in children with hemophilia. Br J Haematol 2012;157(5):519.
15. Xu Z, Spencer HJ, Harris VA, et al. An updated interactive database for 1692 genetic variants in coagulation factor IX provides detailed insights into hemophilia B. J Thromb Haemost 2023;21(5):1164.
16. Srivastava A, Santagostino E, Dougall A, et al. WFH guidelines for the management of hemophilia. Haemophilia 2020;26:1.
17. Pezeshkpoor B, Oldenburg J, Pavlova A. Insights into the molecular genetics of hemophilia A and hemophilia B: the relevance of genetic testing in routine clinical practice. Hämostaseologie 2022;42(6):390.
18. Mahlangu J, Dolan G, Dougall A, et al. Treatment of specific hemorrhages. In: Srivastava A, et al., eds. Guidelines for the Management of Hemophilia, 3rd ed. Canada: WFH; 2020. p. 96-106.
19. Castaman G, Matino D. Hemophilia A and B: molecular and clinical similarities and differences. Haematologica 2019;104(9):1702.
20. Zaliuniene R, Peciuliene V, Brukiene V, et al. Hemophilia and oral health. Stomatologija 2014;16(4):127.
21. Miller CH. The clinical genetics of hemophilia B (factor IX deficiency). In: The Application of Clinical Genetics. 2021. p. 445-454.
22. Miesbach W, Klamroth R, Oldenburg J, et al. Gene therapy for hemophilia—opportunities and risks. Dtsch Arztebl Int 2022;119:887.