Managing oral bleeding in children with hereditary bleeding disorders: case series and a review of literature

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Abstract

Bleeding disorders are mostly of genetic or hereditary origin in children. Dental consultations sought by patients with bleeding disorders may follow trauma, dental infections or may be insidious. The present report is on five cases managed at the Paedodontic unit of the Child Dental Health Clinic of the Lagos University Teaching Hospital. The report gives a review of some of the challenges faced in the dental management of patients with hereditary bleeding disorders and the treatment options for the different oral presentations. Four of these patients had haemophilia A and the other had von Willebrand disease. All the patients presented with bleeding gingivae secondary to either physiologic processes of eruption, infective or traumatic dental conditions. The management of the patients was comprehensive with a multidisciplinary approach. The prevention of traumatic and infective dental conditions is an important part of oral health care in individuals with hereditary bleeding disorders. This would reduce the need for treatment and should reduce the number of emergency visits.

Key words: Haemophilia, von Willebrand disease, gingival bleeding, dental management

Introduction

The blood is in a dynamic equilibrium between fluidity and coagulation. This haemostatic mechanism is complex involving local reactions of the blood vessels, platelet activities and the interaction of specific coagulation factors circulating in the blood. Abnormal bleeding can occur when haemostasis is disturbed. The disturbance may be in primary haemostasis which will result in bleeding from the skin or mucosal surfaces and development of petechiae and purpura, while defects into secondary haemostasis are more severe with bleeding in muscles and joints.

Haemophilia is a sex-linked recessive inherited bleeding disorder and occurs almost exclusively in males. It is classified into haemophilia A, a deficiency in coagulation factor VIII (Anti Haemophilic Factor) which accounts for 75-80% of all inherited bleeding disorders, while haemophilia B is a deficiency in coagulation factor IX (Christmas disease) which accounts for 15% of all inherited bleeding disorders[1,2]. An haemophiliac does not bleed more intensely than a normal person, but for a much longer amount of time [3,4]. A positive family history is always significant; however, 33% of haemophiliacs have a negative history as a result of mutations [3,5].

von Willebrand disease is a hereditary bleeding disorder resulting from an abnormality of the von Williebrand factor that is found in the plasma, platelets, megakaryocytes and endothelial cells[2]. It is usually inherited as an autosomal dominant trait, with both males and females affected.

Incidence and severity

Haemophilia A occurs in 1:5-10,000 male births while haemophilia B occurs in 1: 34-50,000. The number of affected haemophilic individuals worldwide is estimated to be about 400,000, while about 0.006% of Americans have been reported to have haemophilia. Three thousand individuals have been estimated to have haemophilia A and B in Canada, while about 50,000 of Indians [7] are estimated to have severe haemophilia. The severity varies depending on the plasma activity of factors VIII and IX into mild, moderate or severe if the plasma concentration is between 5-40%, 1-5% and less than 1% respectively[4,6]. The normal levels for factor VIII and IX range from 55% to 100%. The incidence of von Williebrand disease is 1 in every 1000 individuals in the United States and United Kingdom [7].

Clinical features

There could be bleeding in the oral cavity following physiological processes such as exfoliation of a primary tooth, gingivitis as a result of inadequate plaque control and dental procedures such as scaling, the administration of inferior dental nerve block local anaesthesia, exodontias

or other surgical procedures. Oral bleeding can be very persistent and troublesome due to fibrinolytic substances in the saliva [8]. Other clinical conditions frequently manifested by haemophilia include easy bruising in early childhood, spontaneous bleeding into joints and muscles (haemarthrosis) occurs in 70-80% of haemophiliacs [6].
In von Willebrand disease there could be clinical spontaneous gingival haemorrhage. The impaired formation of the platelet plug may also result in bleeding from the skin and mucosa, bruising, epistaxis and prolonged bleeding after surgical procedures and menorrhagia. This is a contrast to deficiency in factors VIII and IX in haemophilia, in which defects in secondary haemostasis lead to bleeding that tends to be more deep seated in muscles and joints [1,2,9].

Dental management
In Dentistry there are several treatment protocols that provide a remarkable reduction in the number of bleeding episodes following oral procedures using oral antifibrinolytic agents, systemic haemostatic replacement therapy and local haemostatic agents[10]. Patients with mild and moderate haemophilia A can often be managed on an outpatient basis. Replacement therapy or 1 Desamino-8, D Arginine Vasopressin (DDAVP) which stimulates the release of Factor VIII two-three fold [5,6,11]. may be used for such patients. Administration of DDAVP is associated with activation of fibrinolysis and concomitant use of a fibrinolytic inhibitor such as Tranexamic acid (TA) or Epsilon Amino Caproic Acid (EACA) is necessary. Antifibrinolytic agents also reduce requirement for replacement of Factor VIII[7].
In the management of von Williebrand disease, Factor VIII concentrates are not usually effective but DDAVP is used in combination with EACA and TA. Patient with severe von Williebrand disease will require Fresh Frozen Plasma (FFP) or Cryoprecipitate replacement [7,9].
Genetic counseling is an important part of management of haemophilia. Prenatal diagnosis can help in preparing families and planning for deliveries since assisted delivery may lead to excessive bleeding [5].

Case Series

The diagnoses of the hereditary bleeding disorders were made in the Departments of Paediatrics and Haematology at Lagos University Teaching Hospital (LUTH) before the patients were referred to the Dental Clinic.

Case 1

C1, a 6 year old male presented at the Children Emergency (CHER) with bleeding related to maxillary incisors (51, 52, 61 & 62). He was subsequently referred to the Child Dental Health Clinic for management of his oral condition.
The past medical history revealed he was diagnosed just after circumcision at birth because of excessive bleeding as mild Haemophilia A. A blood assay carried out 3 years later confirmed moderate haemophilia A. C1 presented to the paediatricians with several bleeding episodes including formation of "blood bag" as a result of bleeding from the last 2 toes, cerebral haemorrhage and thrombosis. He was managed with factor VIII injection on these occasions while minor self inflicted injuries were managed with cold compress.
Oral examination at the CDH clinic revealed mobility of 51, 52, 61 & 62. Radiographic examination showed resorbed roots of the central incisors and about 50% resorbed roots of the lateral incisors. A diagnosis of bleeding gingivae secondary to exfoliating 51, 52, 61 & 62 was made.
Extractions of the mobile teeth were carried out after factor VIII replacement therapy and an antifibrinolytic agent Tranexamic acid were administered.

Case 2

C2, a 5½ year old boy, a known haemophiliac of very mild severity was referred from the Paediatric Outpatient Clinic to the Child Dental Health clinic at the Lagos University Teaching Hospital with bleeding (slow ooze) from the gingiva of three days duration. The bleeding was related to exfoliating mandibular primary right central incisor (81). **(Figure 1)**.
The past medical conditions include the first trauma; post circumcision bleeding due to premature plastibel contraction two weeks after birth. He presented at the Children emergency Ward at 27 months with bleeding from the gingiva related to an erupting maxillary primary molar (55). The mother was reassured by the paedodontist and paediatrician and Desmopressin and Tranexamic acid was administered. At 39 months there was bleeding into the forehead between the eyes. He has had several incidents of haemathrosis, peri orbital haematoma, bruises and moderate to severe bleeding episodes related to trauma. Ice packs were used on the haematoma when he had incidents of 'domestic' trauma. Adrenaline, Desmopressin injections and Fresh Frozen Plasma (FFP) were used in managing the conditions as day cases.
On examination the antimere was also mobile and a periapical radiograph showed resorbed roots of the mandibular central incisors (71 &81)**(Figure 2).** The diagnosis was bleeding gingiva secondary to exfoliating (81). Two of the three doses of recombinant factor VIII were given 12 hours prior to exodontia and the last dose was given 12 hours after the procedure. Desmopressin injection was also given **(Figure 3)**. The patient was managed by Paediatricians, Haematologists and Paediatric dentist. Exodontias of the mobile teeth were done using topical local anaesthetic agent **(Figure 4).** Haematologists and Paediatric dentists. Other significant finding was a swollen (left) wrist and palm (hand) due to haemarthrosis secondary to trauma incurred while playing. C1 and C2 are siblings.

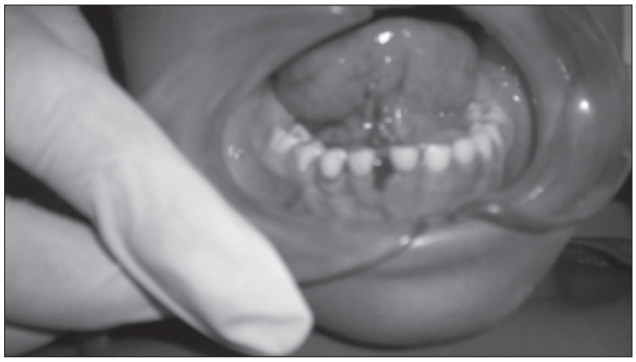

Figure 1: Case 2 at presentation: bleeding from gingiva 81

Case 3

C3, a 5 year old female, presented at the Child Dental Health Clinic LUTH with a bleeding socket of 4 days duration, secondary to a trauma (fall) which led to the avulsion of the mandibular primary incisor (81) .The patient was tachypnoeic, weak and pale. There was no history of loss of consciousness. Mother attempted to control bleeding with pressure packs but the effect was minimal.
She was a known moderate haemophilic female patient who was confirmed to have an extreme case of lyonisation. She presented 3 years earlier at the children emergency room (CHER) and was admitted for gingival bleeding and swelling (haematoma), facial asymmetry with a lifting of the alar of the left nostril, as a result of an enlarged premaxilla and mobility of the maxillary primary incisors(61, 62). Occlusal radiograph taken showed a radioluscency related to periapical region of (61-63). Other significant findings were swollen elbows, wrists and palm (hands) due to haemarthrosis. She was managed then by the paediatricians, haematologists and paediatricdentists by administering factor replacement and EACA. The haematoma and maxillary swelling resolved subsequently (within a week).
Oral examination showed an empty socket which was further confirmed by a periapical radiograph. The radiographic examination showed an empty socket 81 and an intact root of 71. Haematological investigation showed a PCV of 13%. Patient was admitted at the children emergency ward, transfused with 1 pint of fresh whole blood and 1.5ml Lasix was administered pre-and-post transfusion and Desmopressin was given. The following day 3 doses of FFP were administered 12 hourly. The PCV on the 3rd day of admission was 30% and haemostasis was achieved. The patient was subsequently discharged.

Figure 2: Radiograph at presentation

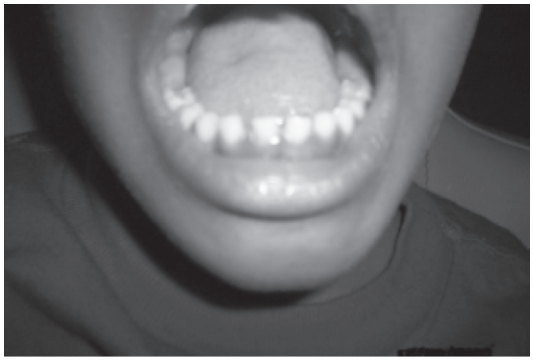

Figure 3: Case 2 after two doses of Factor VIII

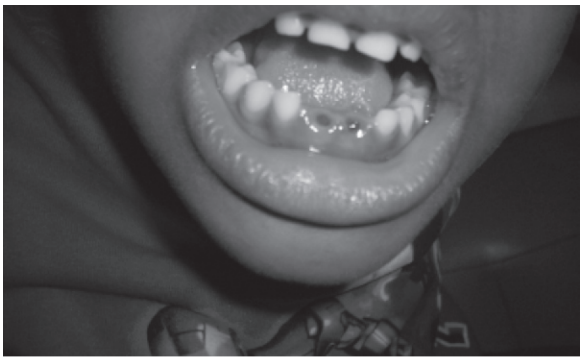

Figure 4: Case 2: two hours post treatment (exodontia of 81 & 71)

Case 4

C4, a 9 year old known male haemophiliac of moderate severity presented at the Child Dental Health Clinic of LUTH with localized bleeding related to a grossly carious molar (36), which was tender to percussion. A diagnosis of apical periodontitis was made. The treatment plan was to extract the tooth under factor VIII cover and use antifibrinolytic agent. The patient was pale, and haematological investigation showed Hb concentration of 5.5g/dl. Patient was admitted at the children emergency and was transfused with whole blood. Desmopressin and FFP were administered prior to exodontia which was carried out under intraligamentary local anaesthesia administration. Patient was discharged 24 hours post operatively later and was uneventful thereafter.

Case 5

C5, a 6 year old male with von Williebrand disease presented at the Child Dental Health Clinic LUTH for routine check up. On examination there was generalized inflammation of the gingiva and dental caries on the labial surface of the primary canine(73). Treatment plan included counseling on diet, emphasis on maintenance of oral hygiene and regular quarterly dental visits. Scaling and polishing was done and there was gingival bleeding which had to be controlled with pressure pack for about 25 minutes. Haemostasis was achieved and the carious cavity was restored with glass ionomer cement (GIC). Three months later, the patient presented with complaints of bleeding from the gingiva related to an erupting maxillary first molar (26). On examination there was slow oozing of blood, accumulation of dental plaque in the maxillary left quadrant, localized gingivitis and a pericoronal flap around the erupting tooth. The treatment included oral hygiene instruction, scaling of the maxillary left quadrant and the use of warm saline mouth wash emphasized.
A year later the patient attended the clinic for routine check up with accumulation of plaque in the posterior segments and also complained of spontaneous bleeding and bleeding during tooth brush. The diagnosis was generalized chronic marginal gingivitis as a result of poor plaque control. He claimed he was not brushing his teeth because of the hard texture of his tooth brush. Scaling was done and the parent advised to procure a soft textured tooth brush.

Discussion

Haemophilia is a chronic, painful and sometimes life threatening condition. It could be a burden financially and it restricts normal activities. There could be burn out and a distraction for members of the family as was reported in the Russian royal family. In the early 20th century Nicholas and Alexandra were preoccupied by the health problems of their son Alexei who had haemophilia at a time when Russia was in turmoil [8,12].

The degree of severity varies between haemophiliacs but tends to be consistent within the same family [7]. The siblings (C1 & C2) in this report had moderate and very mild haemophilia respectively when factor assay was done to diagnose the bleeding disorder. However, they both presented with bleeding during exfoliation of primary incisors.

Tooth exfoliation and eruption are normal physiologic processes that take place in human dentition. These processes are usually achieved without exposure of the surrounding connective tissue and without haemorrhage i.e. uneventful, but occasionally there may be a small bleed into the follicle [11]. The bleeding is attributed to hyperplasia of gingival tissue around the exfoliating tooth. The bleeding related to exfoliating primary teeth could not be controlled with pressure or ice as recommended by World Federation of Hemophilia, Canada[6] and Cawson and Odell[3]. However the bleeding was controlled using factor replacement or DDAVP and antifibrinolytic prior to exodontia.

Dental neglect which subsequently leads to frequent extractions, hazards of local anaesthetic administration (Inferior dental nerve and lingual nerve block), risk of hepatitis B, liver disease and HIV infection, trauma and surgery, aggravation of bleeding by drugs and factor VIII inhibitors have been reported to be the challenges encountered in dental management of haemophiliacs. Although Kumar et al[8] had summarized the challenges in the management of a haemophilia dental patient to include dental neglect; the challenges encountered in the management of these patients reported include the fear of bleeding which led to their late /delayed presentation for treatment, irregular routine dental visits and inadequate plaque control.

Haemophilia is an X linked recessive disorder and it is usually expressed in the males. Females are usually carriers but females could be mild haemophiliacs when there is lyonisation; inactivation of the X chromosomes. Female haemophiliacs have been reported in the past[13]. In this report, C3 was diagnosed with moderate haemophilia as a result of extreme lyonisation. There was no known history of haemophilia in the family. She may be one of the 33% haemophiliacs with a negative family history as a result of mutations [3,5]

It has been reported that mild and moderate haemophiliacs can be managed in the dental clinic as out patients, but two of the cases in this report had to be admitted on the wards because of their general health condition. They were co managed by the haematologist and paediatrician to raise their PCV and Hb concentration which were low because they had bled significantly before reporting at the dental clinic. The physical and psychological complications of haemophilia can be prevented or treated by involving other specialties such as rheumatologist, orthopaedic surgeon, social worker, physiotherapist, geneticist, hepatologist occupational health and infectious disease specialist [5,6].

The standard protocol for dental procedures in haemophilia includes the general management of factor replacement prophylaxis or on- demand factor replacement and the specific dental procedures. The dental procedures used in treating patients with haemophilia do not differ significantly from those used for unaffected individuals[2,8]. Most mild and moderate haemophilic patients can receive outpatient dental care routinely. They were all managed with on demand factor replacement[5,8] and two of the cases had to be admitted and managed as in-hospital patient as earlier discussed.

Although all but one patient came to the dental clinic with dental health problems, it is pertinent to mention that routine checks are advocated for all patients' especially those with bleeding disorders before dental problems arise. These routine dental checkups are necessary for prevention and early intervention prior to the development of dental problems. Good oral hygiene practices and healthy dietary habits will be encouraged in these visits and this will enhance the general health of oral tissues [14].

Prevention of trauma in those who have this condition is extremely important and medications containing Non Steroidal Anti Inflammatory Drugs (NSAIDS) should not be prescribed. Iatrogenic injuries can be avoided when carrying out procedures in the oral cavity by careful use of saliva ejectors, care in placement of intra oral radiographs and isolation with rubber dam provides retraction of gingiva improves visibility and protects the soft tissue during restorative procedures.

Routine scaling and polishing would not cause excessive bleeding, if carried out carefully. The scaling and polishing of the patient with von Willebrand disease was not carried out with factor VIII cover. Removable prosthesis is unlikely to cause any problems; fixed and removable orthodontic appliances may be used along with regular preventive advice and hygiene therapy but care must be taken to avoid sharp edges in appliances, wires etc[10,15]. Patton and Webster [1] suggested the use of properly managed fixed appliance over removable appliance.

C4 had extraction done instead of pulp therapy as a result of dental caries because he presented late and the broken down tooth was not restorable. It has been documented that when possible tooth extraction should be avoided and endodontic procedures such as pulpotomy, pulpectomy and root canal therapy are highly indicated in primary and permanent dentitions. Endodontic procedures are low risk for patients with haemophilia. Calcium hydroxide and formaldehyde containing substances may be used for controlling bleeding during endodontic procedures [10].

Inferior dental block injection technique has been reported to have up to 80% chance of causing haematomas for haemophiliacs treated without factor cover [9]. Since most procedures in dentistry require the use of local anaesthetic (LA) agent for the control of pain, several other techniques of administering LA that do not require a factor cover should be used. Such techniques include the buccal infiltration, intra papillary, intraligamentary and intra osseous injection techniques. However, if regional blocks (inferior dental block) and lingual infiltrations are used, it has to be done under a factor cover because of the risk of

haemorrhage; which could compromise the airway. On some rare occasions submucosal LA infiltrations have caused widespread haematoma formation [6,9].

Conclusion

The prevention of dental problems is an important part of oral care in these hereditary bleeding disorders. This would reduce the need for treatment and should reduce the number of emergency visits. Prevention includes cleaning the teeth with soft/ medium textured tooth brush and fluoride toothpaste and with interdental cleaning aids such as floss. Topical and systemic Fluoride application, healthy dietary habits and regular dental visits are other preventive measures. Other preventive measures in maintaining a good oral health include prevention of traumatic injuries by care givers supervising the children when playing, early intervention of malocclusion such as proclined incisors (class II div 1 malocclusion) and incompetent lips.
Thorough knowledge and systematic approach is mandatory for any dental health professional raring to handle bleeding disorders, absence of which can lead to disastrous outcome.

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