

# Clinical Management of Glanzmann's Thrombasthenia: A Case Report

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## Abstract

Glanzmann's thrombasthenia (GT) is a rare, genetically inherited platelet disorder in which the platelet glycoprotein IIb/IIIa (GP IIb/IIIa) complex is either deficient or, dysfunctional. The incidence is about 1 in 1,000,000. This case report deals with a 4 year-old girl diagnosed with GT presenting with dental caries and periapical lesions in the primary mandibular first molars. To provide the best care, an interdisciplinary approach was followed by a team consisting of pediatric dentists, pediatricians and anesthesiologists. Complete oral rehabilitation was planned under general anesthesia which included extractions, multiple esthetic restorations and space maintainers with the utmost care to prevent unwarranted bleeding.

**Key Words:** Glanzmann's Thrombasthenia; Platelet Disorder; Complete Oral Rehabilitation

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## INTRODUCTION

Glanzmann's Thrombasthenia (GT) is a rare genetic platelet disorder, with an incidence of 1 in 1 million, in which the platelet glycoprotein IIb/IIIa (GP IIb/IIIa) complex is affected. It is either deficient or, dysfunctional [1]. It is usually seen in populations with an increased consanguinity with an autosomal recessive pattern of inheritance. An acquired variant of GT has also been reported in which autoantibodies to the glycoprotein complex interfere with normal functioning [2].

The pathology behind GT can be explained based on the glycoprotein complex formed. There is a deficiency or dysfunction of GPIIb

and GPIIIa in GT (a qualitative disorder of platelets). These glycoproteins bind to fibrinogen when activated. This step is inhibited and thus no platelet aggregation occurs, manifesting clinically as prolonged bleeding [3].

George et al [4] divided GT patients into 3 groups: Type I, type II and variants. Type I patients have less than 5% GPIIb-IIIa; type II have 5-20% of the normal amount of the glycoprotein and patients of the variant category have half normal to normal amounts. Type I is the most common; however, little correlation exists between the severity of disease and the subtypes [4].



**Fig 1.** Physical examination-Ecchymotic patches

The recurrent features seen in Glanzmann's thrombasthenia include purpura, epistaxis, gingival hemorrhage, and menorrhagia as well as prolonged bleeding after dental extractions and surgical procedures [4]. The hematologic evaluation exhibits a prolonged bleeding time with a normal platelet count and morphology. A deficient clot retraction and impaired platelet aggregation by ADP, epinephrine and collagen occur with normal aggregation towards ristocetin; these are characteristic and constant features seen in Glanzmann's thrombasthenia [5]. It is of utmost importance to maintain oral health and provide adequate dental care to these children at all times as untreated lesions e.g. an abscess can lead to complications such as bleeding, which is both unpredictable and life threatening. Dental treatment when performed should ensure minimal trauma to the tissues, ensuring no bleeding at all if possible. The differential diagnosis for this condition includes Bernard Soulier syndrome and Von Willebrand's disease. The Bernard Soulier syndrome is an adhesion disorder unlike GT being an aggregation disorder. Whereas, the possibility of Von Willebrand's disease can be eliminated if the Willebrand's factor levels are normal [6].

### CASE REPORT

A 4 year-old girl reported to the Department of Pedodontics and Preventive Dentistry at A.

B. Shetty Memorial Institute of Dental Sciences, Mangalore, India with a swelling in the gums (limited to gingiva) on the lower left side of her jaw.

It had been present for a period of ten days. The swelling was associated with pain and uncontrollable bleeding. The bleeding began two days prior to the child's visit to the dental operatory, for which a physician was consulted and tranexamic acid was administered immediately as nasal drops.

Her medical history revealed a subgaleal hematoma after trauma to the occipital region at the age of two, and uncontrolled bleeding for 3 consecutive days. Furthermore, an injury to the anterior faucial pillar of the tonsil at the age of three resulted in continuous bleeding and led to an increased suspicion of a bleeding disorder. There was no history of consanguineous marriages in the family. The child's diet history revealed a cariogenic dietary pattern, with inadequate oral hygiene measures.

On general physical examination, ecchymosis on the trunk as well as the upper and lower limbs was observed (Fig 1). Intraoral examination revealed a periapical abscess in the left lower primary molar (Fig 2) with a deep carious lesion in the contralateral tooth. Dentinal caries were present in the primary maxillary incisors (Fig 2) and molars along with primary mandibular second molars (Fig 2). The right and left primary mandibular first molars had deep carious lesions causing coronal destruction, radicular resorption and furcation radiolucencies (Fig 3). Individual intraoral periapical radiographs were obtained with foam coated over the X ray holder to prevent injury to the mucosa. This was the child's first dental experience.

The child belonged to the uncooperative group (Frankel's behavior rating scale-definitely negative) [7] and repeated attempts to achieve the desired behavior with usual nonpharmacological techniques failed. Hence, treatment under general anesthesia was considered the best option for this child.



Fig 2 a.b.c. Intraoral examination

In addition, the need for repeated lengthy dental appointments and her medical condition warranted transfusions; which further justified treatment under general anesthesia.

A detailed hematological investigation revealed the following values as shown in Table 1: Factor VIII (100%), IX (80%), XII (87%) and fibrinogen (277 mg %) were found to be within normal levels, with borderline low levels of factor IX. Normal platelet counts, prolonged bleeding times, and abnormal platelet aggregation along with clinical signs and history of frequent superficial bruises and prolonged mucocutaneous bleeding led to the diagnosis of Glanzmann's thrombasthenia. To provide the best care, an interdisciplinary approach was pursued with a team consisting of pediatric dentists, pediatricians and anesthesiologists. Complete oral rehabilitation was planned under general anesthesia with all considerations required for an interdisciplinary approach.

#### Management:

The treatment was divided into 2 phases, namely, the medical phase and the dental phase. The bleeding time was recorded prior to the procedure and was not within the normal limits (Table 1).

Reckoning the patient's past medical history, the pediatricians recommended 1 unit of platelet transfusion 2 hours preoperatively and 1 unit postoperatively as blood loss was anticipated.

Special caution was taken during nasal intubation to prevent bleeding from the end vessels present in the nasal epithelium. A smaller size intubation tube was slowly inserted by the anesthetist with utmost care.

#### Treatment performed:

The dental phase consisted of multiple esthetic restorations for the anterior teeth with strip crown and restorative procedures for posterior decayed teeth.

Table 1. Laboratory examination results

Criteria	Patient values	Normal values (As per American Academy of pediatrics)
Hemoglobin level	11.6g/dl	11.5-13 g/dl
Leukocytes	12,100/cu mm	5,500-15,500/cu mm
Platelets	2,97,000/cu mm	2,50,000-5,50,000/cu mm
Prothrombin time	10.4sec	11-15 sec
Active partial thromboplastin time	42.9sec	42-54 sec
Bleeding time (by ivy technique)	>15 min	2-9 min
Platelet aggregometry	Shown aggregation followed by disaggregation with normal doses of ristocetin, absent response to collagen, ADP, epinephrine and arachidonic acid	
Clot retraction	Absent	



Fig 3. IOPAR of the right mandibular first molar region



Fig 4. Bonded space maintainers in place

Glass ionomer cements (GC, Type IX) and posterior composite resin (3M, ESPE) were the materials of choice for the restorative procedures. The local anesthetic used for the surgical procedure was lignocaine 2% with adrenaline; which was administered via infiltration technique prior to the extractions of the primary mandibular first molars.

Local measures taken to prevent any inadvertent bleeding from the soft tissues included wrapping of the bite block in cotton, careful positioning of the mouth mirror and other instruments used, avoiding nerve blocks, using the infiltration technique with insulin syringes and prevention of hematoma.

During the procedure there was bleeding from the extraction sockets; which were brought under control with the help of gauze soaked in tranexamic acid solution and pastes made of tranexamic acid tablets mixed with water; which were placed repeatedly into the socket. A total of 4 tablets and 3 vials were used as per the recommendations of the pediatrician so as to not exceed the maximum permissible dose (recommended dose in children 50-100 mg/kg) [8]. The patient was advised to maintain "Nothing Per Oral" (NPO) for 24 hours to prevent any injury to the extraction socket.

Brushing and rinsing was not recommended for 24 hours, but gentle use of wet gauze was advised for hygiene. The patient was asked to refrain from consumption of hard and fibrous food, and have only pureed food/soups/tender coconut water for 2 days post-surgery.

To prevent dehydration, an IV line was maintained during the NPO status. An antibiotic prescription of Augmentin (amoxicillin + clavulanic acid, 30 mg/kg body weight) for 5 days and acetaminophen (15 mg/kg) were recommended. At 2 weeks post-procedure, the socket area was examined to confirm adequate healing, after which a bonded space maintainer was given for the first primary molar in the right quadrant, followed by the same in the left quadrant for the contralateral tooth the next week. At the end of 3- and 6-month follow ups, the space maintainers were intact in the oral cavity.

## DISCUSSION

GT is a rare, autosomal recessive, hemorrhagic disorder characterized by prolonged bleeding time, defective aggregation of platelets and impaired clot retraction. The common features of GT are bruising, epistaxis, gingival hemorrhage and menorrhagia [3]. Bruising typically occurs after minor trauma. Typical laboratory tests of patients with Glanzmann's thrombasthenia show prolonged bleeding time, decreased or absent clot retraction, and abnormal platelet aggregation responses to physiologic stimuli; all of which stood true for this patient. The uncontrolled bleeding episodes from the abscess in the oral cavity and ecchymotic patches further confirmed the medical condition in this child.

However, there were no reports of individuals with tendency to prolonged and spontaneous

bleeding and hemorrhage, nor consanguineous marriages in her family. The role of the dentist begins with preventive therapy, educating the patient to maintain a good oral hygiene and to prevent inadvertent bleeding from the oral cavity after dental treatment. Platelet transfusion is essential prior to any dental procedure that would involve the risk of hemorrhage [3]. The administration of platelets in these patients is to control bleeding and to make up for the excessive loss of blood [4]. Every transfusion increases the possibility of the alloimmunization, thus increasing the susceptibility to a massive hemorrhage [9]. Bearing these consequences in mind and the severity of the condition in this child, 1 unit was transfused prior to the procedure to prevent excessive bleeding.

The bleeding time values assessed prior to the procedure (after administration of platelets) by Ivy technique was within normal limits (3mins). In spite of this and taking prudent local preventive measures against any inadvertent bleeding, post-extraction bleeding was difficult to control.

The tooth colored restorations were used as good isolation was possible during the procedures under general anesthesia. The extractions of the mandibular first molars were advised because of the resorbing roots, thus questioning the efficacy of a radicular pulp therapy. Adequate tooth material in the anterior teeth justified the use of strip crowns for maximum esthetics.

#### **Space management:**

Due to early extraction of the primary first molars, space loss was of concern in this child in the lower arch to maintain a mesial step molar relation on both sides. (Fig 4): Conventional space maintainers such as a band and loop appliance would cause trauma to the tissues during the banding procedure promoting a bleeding episode, hence, a fiber reinforced composite resin space maintainer (Ribbond) was preferred. The parents were advised about

the importance of space maintenance at this age to prevent further malocclusions in this child. A space maintainer was bonded after surgery, once healing was adequate [10]. The child was introduced to one space maintainer at a time to check for compliance with the same.

#### **Complication management:**

The bleeding disorder was responsive only to Tranexamic acid. Hence this was the drug of choice used throughout the procedure to control the bleeding episodes pre and post-extractions (dose-50-100 mg/kg body weight), since the action of local pressure or local hemostatics like cellulose, Oxycel or collagen to control the bleeding would be limited in this child. The gauze pieces soaked in tranexamic acid /paste were always tied to floss for easy retrieval with constant lubrication of the lips to prevent any trauma and hence bleeding. One unit platelets was also administered postoperatively to compensate for the blood loss that occurred.

Whole blood transfusion was not advised by the consultant pediatrician as the child showed no signs of shock post operatively.

#### **Home care measures:**

The child was advised to consume only foods of soft texture with limited temperature variations in order to avoid any bleeding episodes from the socket areas post operatively. Wet gauze cleansing was recommended to maintain oral hygiene and to prevent clot dislodgement for a day after the procedure. The oral health of these children is usually neglected due to the severity of the medical condition. But the bleeding occurring due to gingival inflammation or infection (as in this child) can be life-threatening. Hence, strict oral hygiene measures like brushing twice daily with a soft tooth brush and fluoridated toothpaste with parental supervision, diet counseling sessions and regular dental checkups were advocated

and repeatedly reminded to the parent and the child alike.

The recall schedule for this child was every 2 weeks initially, followed by once in 3 months and then once in 6 months, stressing the importance of maintaining oral hygiene at all appointments.

As the appointments progressed, efforts taken by the child and parent were significantly visible with better oral hygiene scores. From a dental view point, diagnosing and differentiating between bleeding disorders may not be easy. But a team of specialists which includes a pediatrician and a hematologist can work in collaboration in the best interest of the child. A thorough medical history and hematological consult are mandatory along with adequate precautions taken prior to the procedure for a successful treatment. Post-treatment instructions and frequent motivation will prevent further complications.

## CONCLUSION

From a dental view point, diagnosing and differentiating between bleeding disorders may not be easy. But a team of specialists which includes a pediatrician and a hematologist can work in collaboration in the best interest of the child. A thorough medical history and hematological consult are mandatory along with adequate precautions taken prior to the procedure for a successful treatment. Post-treatment instructions and frequent motivation will prevent further complications.

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