CASE REPORT

Dysfibrinogenemia with Subgaleal Hematoma: An Unusual Presentation

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Introduction

Dysfibrinogenemia is a rare familial disorder characterized by abnormal fibrinogen, which results in defective fibrin clot formation. Dysfibrinogenemia can be congenital or acquired. It is inherited as an autosomal dominant trait with high levels of penetrance. It can diverge in severity from asymptomatic to abnormal clinical bleeding and thrombotic tendency [1]. Subgaleal hematoma is a very unusual presentation in dysfibrinogenemia.

Case Report

A 5 year old male child was admitted to our hospital with the chief complaint of gradual increase in head size for last 1 month (Fig. 1) which was not associated with any history of trauma. There was no significant birth or family history. No history of jaundice, liver disease or anticoagulant therapy was elicited. Two years back, there was a history of fall (from 2 feet high cot), which resulted in hospital admission elsewhere. NCCT head revealed extra dural hematoma (Fig. 2). Prothrombin time (PT), Activated Partial Thromboplastin time (APTT) and Thrombin time (TT) were found to be deranged, however, the platelet count was within normal limits. After administration of FFP, craniotomy with evacuation of hematoma was performed and patient was referred to the concerned speciality for further management.

On inspection, the patient was emaciated with very thin built. He was having very large head with maximum diameter of 62 cm. An old scar mark was present over left temporo-parietal region along with black crusts and oozing points were visible over left fronto-temporal region. Overlying skin of scalp was tense and shiny. Patient was not able to hold his head. Consciousness and orientation of the patient was preserved and no sign of neurological deficit was noted. Pupils were normal in size and were reacting normally to light. His cardiovascular and abdominal examination was unremarkable.

On investigations, the patient was found to be severely anaemic with haemoglobin level of 3.2 g/dL, MCV 69.5 fL, MCH 19.5 pg, MCHC 29.7 g/dL and normal platelet count (3.2 lacs/microL). Liver function tests were found to be within normal limits (Total bilirubin 0.7 mg/dL, Direct bilirubin 0.3 mg/dL, Indirect bilirubin 0.4 mg/dL, AST 34U/L, ALT 28U/L and alkaline phosphatase 52U/L). NCCT head of the patient showed subgaleal fluid collection with intact underlying skull bones. Small subacute extradural hematoma was noted over left parietal region. Rest of the brain parenchyma was found to be within normal limits. No features of hydrocephalus were seen. Coagulation profile showed prolonged PT (test—>1 min, normal range 12.8–14.8 s), APTT (test—>1 min, normal range 28–32 s) and TT (test—29 s, normal range 20–24 s). Coagulation profile of the patient was found to be deranged on more than one occasion; however these tests could not be repeated on recovery. Plasma fibrinogen level (as estimated by dry clot weight method) was found to be low normal. Activity/antigen ratio for fibrinogen could not be done in this case. Factor VIII—C level (test—100 %, normal range 50–150 %) turned out to be within normal limits. D-dimer of the patient was done by Latex Agglutination method and came out to be within normal limits.

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Fig. 1 Photograph of the patient showing massive enlargement of head size

Fig. 2 NCCT head showing extradural hematoma

Fig. 3 Photograph of the patient during post-operative recovery

(150 mg/L). A detailed history of both parents and sibling was taken and they were found to be asymptomatic. Coagulation profile of the family could not be done.

Patient was transfused with multiple units of packed red cells and fresh frozen plasma over 10 days. Supplementation of vitamin K was given. Patient was optimized for surgery after achieving the hematocrit of 30 % and normal coagulation profile [PT 17.8 s (12.4 s) and APTT 37.8 s (28 s)]. Under all aseptic precautions, the collection was aspirated and 1300 mL of dark coloured altered blood was obtained. Post op recovery was found to be uneventful (Fig. 3).

Discussion

Congenital dysfibrinogenemia is an abnormality of fibrinogen molecule which includes defects in steps of fibrin formation and stabilization. In normal coagulation cascade, thrombin cleaves fibrinogen to release fibrinopeptide-A and fibrinopeptide-B [2]. The fibrin monomer thus formed, gets polymerized to form insoluble fibrin clot which is stabilized by factor XIIIa. Subsequent degradation of the clot takes place with concerted activity of plasminogen and its activator. Defects in any of these steps can lead to dysfibrinogenemia. Hence, its presentation is variable ranging from abnormal clinical bleeding, thrombotic tendency and defective wound healing to no clinically apparent disease. However, the most common defect occurs in polymerisation of the fibrin clot [3].

Congenital dysfibrinogenemia is inherited as an autosomal dominant [4]. Most of these patients are heterozygotes, few are homozygotes and rare are compound heterozygotes. About 40 % of these patients are asymptomatic, 45–50 % of these have bleeding disorder and remaining 10–15 % have thrombotic tendencies [1]. The bleeding associated with dysfibrinogenemia is generally mild and includes soft tissue haemorrhage, easy bruising and menorrhagia. Intraoperative and post-operative bleeding has also been reported but none were found to be life threatening.

Acquired dysfibrinogenemia occurs mainly in the patients with chronic liver disease. Other causes include hepatocellular carcinoma, obstructive biliary disease, and immune disorders (e.g., multiple myeloma and systemic lupus erythematosus) [5–9].

In our case, the patient has prolonged prothrombin time, activated partial thromboplastin time and thrombin time, with decreased fibrinogen level and normal factor VIII-C level. The laboratory results observed in this case are consistent with other studies of congenital dysfibrinogenemia [10]. Platelet count was found to be within normal

limits which helped to exclude the possibility of disseminated intravascular coagulation. Liver function test i.e. direct & indirect bilirubin and liver enzymes were within normal limits, excluding acquired dysfibrinogenemia. Since, the loss of blood has been insidious and gradual in onset, the serum bilirubin level was found to be preserved. Heparin intake can lead to the prolongation of PT, APTT and TT which can mimic dysfibrinogenemia. However no history of heparin intake was noted in this patient. Thus, keeping into consideration of all above findings, a diagnosis of congenital dysfibrinogenemia was given.

The TT is the most sensitive screening test which detects the rate of fibrin clot formation after adding a fixed concentration of thrombin, showing the amount and the quality of fibrinogen present in the sample [2]. The prolongation of TT in dysfibrinogenemia is due to the inhibition of fibrinopeptide-A and/or -B release or fibrin monomer polymerization by dysfibrinogens [11]. Alternating screening test is the reptilase time [12]. It measures the rate of fibrin clot formation after the addition of reptilase. Its mechanism of action differs from thrombin in that only fibrinopeptide-A, and not fibrinopeptide-B, is cleaved from fibrinogen [13].

The confirmatory test includes Fibrinogen Activity–Antigen Ratio. It is based on the principle of the measurement of function and performed by the Clauss method [12]. A fibrinogen activity–antigen ratio that is below the reference range is considered positive for the diagnosis. Other confirmatory test is thrombin time 1:1 mixing study [14]. Review articles regarding the diagnosis and the management of dysfibrinogenemia are available [15, 16].

Hence, in a young child with recurrent bleeding at unusual sites in absence of any significant trauma, altered coagulation profile (prolonged PT, APTT, TT and low normal fibrinogen levels), normal liver function tests, absence of history of heparin administration and normal platelet count, a possibility of rare disorder like congenital dysfibrinogenemia should be kept in differential diagnosis as these disorders are fatal and missed at times.

To the best of our knowledge, this is the first case of congenital dysfibrinogenemia associated with subgaleal hematoma and similar case has not been reported in literature so far.

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