TÜRK PEDİATRİ ARŞİVİ
TURKISH ARCHIVES of PEDIATRICS

Case Report

Spontaneous splenic rupture in a patient with congenital afibrinogenemia

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Abstract

Afibrinogenemia is a rare bleeding disorder which is observed with an incidence of 1:1 000 000. It is an autosomal recessive disease and occurs as a result of mutation in one of the three genes which code the three polypeptide chains of fibrinogen. Basic clinical findings include spontaneous bleeding, bleeding after minor trauma or due to surgery. Splenic rupture in afibrinogenemia has been reported only in 6 cases so far. In this article, we present a 15-year old congenital afibrinogenemia patient with spontaneous splenic rupture.
(Türk Ped Arş 2014; 49: 247-9)

Key words: Spleen rupture, congenital afibrinogenemia, bleeding disorder

Introduction

Afibrinogenemia is a rare bleeding disorder which is observed with an incidence of approximately 1:1 000 000 (1, 2). It is an autosomal recessive disease (1, 2). There is consanguineous marriage between many parents (2). Afibrinogenemia occurs as a result of mutation in one of the three genes (FGA, FGB, FGG) which code the three polypeptide chains of fibrinogen on the fourth chromosome (2, 3). These mutations disrupt the synthesis, intracellular interactions, release or stability of fibrinogen (2). In these patients, hemorrhagic diatesis is present from the childhood and the clinical picture of hemorrhage may range between minor hemorrhage and life-threatening hemorrhage (1). We found spontaneous splenic rupture which developed in a patient with congenital afibrinogenemia. We presented this case, since a limited number of similar cases have been reported in the literature and we wanted to emphasize our treatment approach.

Case

A 15-year old female patient presented to our emergency outpatient department with complaints of abdominal pain and malaise. In her history it was learned that she was born from the fourth pregnancy of the parents who were third degree relatives as the fourth living child, oozing of blood occured in the umblical site after birth, she was hospitalized for one week because of bleeding in the mouth after falling from the armchair at the age of 7 months, she had occasional gingival hemorrhages and long-term bleedings after finger cuts. The patient who presented to the Pediatric Hematology Outpatient clinic because of unstoppable gingival bleeding for the first time in 2006 was diagnosed with congenital afibrinogenemia with findings including a prothrombin time (>120 s) and an activated partial thromboplastin time (>120 s) which were too long to be measured and a fibrinogen level which was too low to be measured. During the investigations, the mother was found to have a fibrinogen level of 113 mg/dL, the father was found to have a fibrinogen level of 83 mg/dL and her older brother was found to have a fibrinogen level of 83 mg/dL (heterozygous). Our patient had a fibrinogen level which was too low to be measured. It was also learned that the first child of the family was lost at the age of five days because of uncontrollable umbilical bleeding. The son

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Received: 29.06.2012 **Accepted:** 14.12.2012

DOI:10.5152/tpa.2014.1070

of her paternal aunt was lost at the age of five years and the daughter of her paternal uncle was lost at the age of 2 years because of bleeding during the operation which was being performed because of hip dislocation.

The patient presented to the pediatric emergency department with complaints of abdominal pain, nausea and pain in the left shoulder and leg which had been lasting for one week. There was no history of trauma. On physical examination, there was tenderness on abdominal palpation. There was no defence and/or rebound tenderness. Examination of the systems was normal. Her laboratory tests were as follows: Hb: 9.1 g/dL, Hct: 28.1%, WBC: 12 200/mm^3, platelets: 366 000/mm^3, erythrocyte sedimentation rate: 3 mm/h, CRP <0.34 mg/dL, urea: 34 mg/dL, creatinine: 0.7 mg/dL, Na: 140 mmol/L, K: 4.4 mmol/L, Cl: 104 mmol/L, Ca: 8.6 mg/dL. On abdominal ultrasonography, a structure with dimensions of 64x59 mm compatible with abcess with a dense content was observed in the spleen and free fluid was observed in the abdomen; cefazolin, amikacin and ornidazole treatment was started with a prediagnosis of splenic abscess, but a probable hemorrhage could not be excluded, since she was being followed up with a diagnosis of bleeding disorder. Two days later, severe abdominal pain developed and abdominal tenderness, defence and rebound were found on physical examination. Abdominal ultrasonography revealed the same findings as the previous US examination. As a result of pediatric surgery consultation, monitoring was recommended considering acute abdomen. On the fifth day, marked pallor, tachycardia and hypotension were found and Hb was decreased to 5.4 g/dL. Since the platelet count measured simultaneously was 96 000/mm^3 and diffuse ecchymoses were present, disseminated intravascular coagulation was considered. The platelet count decreased up to 9 000/mm^3 in the follow-up. D-dimer values were not found to be high. Absence of increase in d-dimer levels was explained with absence of sufficient fibrinogen in the environment. On repeated abdominal US, the lesion found in the spleen could not be observed, but intraabdominal free fluid was found. With these findings intra-abdominal bleeding caused by spontaneous splenic rupture was considered and the patient was admitted to the pediatric intensive care unit for supportive treatment. Intravenous fluid, erythrocyte suspension and fresh frozen plasma transfusion was given to the patient. Fibrinogen concentrate was started to stop her bleeding. Tranexamic acid was also given to the patient who had hemorrhage in all sites where interventions were performed. After her bleeding was controlled, she was sent to pediatric surgery on the 12th day of hospitalization for splenectomy. Following splenectomy she was again admitted to the intensive care unit. After splenectomy, she had decreased oxygen saturation for four days, tachypnea and consolidation in the lower area of the left lung on lung graphy. With these findings pulmonary emboly was considered primarily (thrombosis related with fibrinogen treatment). However, further imaging could not be performed, since her poor general status continued. During this period, active bleeding continued from the wound site and from the site of the catheter placed before. In the follow-up, 15 units of eryhtrocyte suspension, 14 units fresh frozen plasma and 24 fibrinogen concentrates (1 g) were given. The patient was discharged on the 29th day of hospitalization.

Discussion

Fibrinogen transforms to fibrin with the effect of thrombin and has an important role in formation of coagulum (2). In addition, it is involved in primary hemostatis by binding glycoprotein IIb/IIIa on the surface of activated platelets and contributing to aggregation of platelets (2). In afibrinogenemia, prothrombin time, thrombin time and activated partial thromboplastin time are prolonged and there is no fibrinogen in the blood (2). While thrombin-induced and collagen-induced platelet aggregation are normal, platelet adhesion and ADP(adenosin diphosphate)-induced platelet aggregation are disrupted (2). In patients with afibrinogenemia, umbilical bleeding, soft tissue and mucosal bleedings, menorrhagia, gingival bleedings and bleeding in the mouth may be observed frequently (2, 3). Gastrointestinal and urinary tract bleedings are observed less frequently. Intracranial bleedings occur rarely (2). Although bleedings may occur after trauma and surgery, spontaneous bleedings are rare (3-5).

Splenic rupture is a rare finding in patients with afibrinogenemia (6-8). 6 cases have been reported in the literature until the present time (9). Splenic rupture is observed more commonly in congenital afibrinogenemia compared to the other congenital bleeding disorders. For example, altough hemophilia is a bleeding disorder which is observed with a 100-fold higher frequency compared to afibrinogenemia, the number of cases with splenic rupture are similar (9).

Bleeding attacks in patients with afibrinogenemia are treated with fibrinogen concentrates, cryoprecipitates and fresh frozen plasma (3, 10, 11). Fibrinogen concentrates are the main options, because they are virally inactivated, they can be infused with small volumes and have a low allergy risk (2). Cryoprecipitate and fresh frozen plasma are the other options, when fibrinogen concentrates are unavailable and only in urgent conditions (10, 11). Bleedings in previous periods were controlled with fresh frozen plasma in our patient. In treatment guidelines, the targeted fibrinogen level in patients with afibrinogenemia is recommended to be >1 g/L until hemostasis is provided and >0.5 g/L until the bleeding surface heals (6). Many clinicians aim to reach high fibrinogen levels to provide hemostasis, but this treatment approach increases the risk of thrombosis (2). It is known that patients with afibrinogenemia have a tendency to thrombosis as well as bleeding (2). In addition, use of antifibrinolytic drugs in combination with concentrates used in treatment are a cause of tendencey to thrombosis. Therefore, one should be care-

ful clinically when monitoring these patients (10, 11). In our patient, we thought that respiratory distress which lasted for four days after splenectomy could be related with pulmonary emboly. However, respiratory distress regressed in four days and we did not find it necessary to perform imaging methods including computerized thoracic tomography and/or ventilation-perfusion scintigraphy. Fibrin glues can be used in cases of regional bleedings, dental interventions and superficial wounds (10). Tranexamic acid can be used in mucosal bleedings. It may be given intravenously, orally or as mouth wash (10, 11). In our patient, tranexamic acid was primarily given intravenously and then orally during supportive treatment for bleeding. In terms of inexpensiveness and convenience, tranexamic acid is efficient in reducing the number and frequency of factor requirement in severe bleedings rather than being used only for local bleeding control in patients with these types of rare factor deficiencies.

The first-line treatment is fibrinogen concentrates in patients with afibrinogenemia with splenic rupture. However, pictures of recurrent splenic rupture and following severe intra-abdominal bleeding, hypotension and shock have been reported in these patients in the literature. Therefore, splenectomy should be performed, although bleeding is controlled with medical treatment in patients with congenital afibrinogenemia with splenic rupture, since the risk of recurrence is high (8, 9). In our patient, we decided to perform splenectomy, although the bleeding was controlled with medical treatment on the 9th day. Regular use of fibrinogen concentrates has been reported after life-threatening bleedings and during pregnancy (2, 10, 11). It was planned to administer protective treatment to our patient once a week after discharge.

Conclusively, spontaneous splenic rupture can be observed in patients with afibrinogenemia. Splenic rupture should be considered in patients who present with a picture of abdominal pain, acute abdomen and hypotension/shock. In treatment, suportive treatment and splenectomy is performed.

Informed Consent: Written informed consent was obtained from patient's parents.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - T.C.; Supervision - T.C.; Materials - B.C.A., N.Ö.; Data Collection and/or Processing - B.C.A., N.Ö.; Analysis and/or Interpretation - N.Ö., T.C.; Literature Review - B.C.A., N.Ö., A.T.; Writer - B.C.A., N.Ö.; Critical Review - T.C., M.E., O.F.Ş., H.Ç.; Other - R.Ö.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

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