Journal of Korean Medical Science
Vol. 2, No. 3, P 179-182. Sep. 1987

# A Case of Congenital Factor V Deficiency

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***A case of Factor V deficiency, the first case in Korea, is reported in a 9-year-old boy whose plasma concentration of Factor V was 6%. He complained of easy bruisability, prolonged bleeding from the mouth after minor trauma and hemarthrosis and flexion contracture of the right knee. His parents are heterozygous (maternal Factor V concentration 52%, paternal 40%).***

**Key Words:** *Factor V deficiency, Parahemophilia*

## INTRODUCTION

**Congenital** Factor V deficiency is a rare inherited disorder with variable hemorrhagic manifestations. The disorder was first described by Owren in 1947 and termed parahemophilia. Since then about 150 cases have been reported (Girolami et al., 1985). Because of the mildness of the clinical picture, many mild cases were probably not observed (Seeler, 1972).

Recently we experienced first in Korea a case of Factor V deficiency who was admitted to Seoul National University Children's Hospital due to the swelling of the right knee joint.

## CASE REPORT

A 9-year-old boy was admitted to the SNU Children's Hospital on January 13, 1987, because of the swelling of the right knee joint. Since 2 years of age, easy bruisability was noticed and three episodes of prolonged bleedings from the mouth after minor trauma occurred, but his parents neglected them. Twenty days prior to admission, he was injured his right knee by accident, thereafter painful swelling of the joint developed. Six days prior to admission, he visited J. Hospital where bloods in the joint were aspirated 3 times and 2 pints of fresh frozen plasma were transfused. And he was referred to us for further evaluation of the coagulopathy.

At 1 month of age, he received the surgical relief of the pyloric stenosis at J. University Hospital, but the bleeding tendency was not detected. There were neither family history of the bleeding tendency nor consanguinity.

Physical examination showed a moderately developed and nourished boy. The lungs were clear, and liver and spleen were not palpable. Previously operative scars were on the right upper quadrant of the abdomen. There was the swelling and flexion contracture of the right knee (Fig. 1 and 2). No bruise (ecchymosis) was detected on the skin.

Laboratory findings included normal blood cell counts, urinalysis, and liver function test. Anteroposterior films of the right knee showed the joint swelling but no bony changes. Results of coagulation studies are shown in Table 1. Factor V concentration was 6% in the patient, 52% in the mother, and 40% in the father. But that of the patient's younger brother was not checked.

During admission, any further bleeding did not develop, and Buck's traction was applied to his lower extremities, and so flexion contracture of the joint improved moderately. He was discharged on January 19, 1987.

## DISCUSSION

In 1947, Owren described a 29-year-old female

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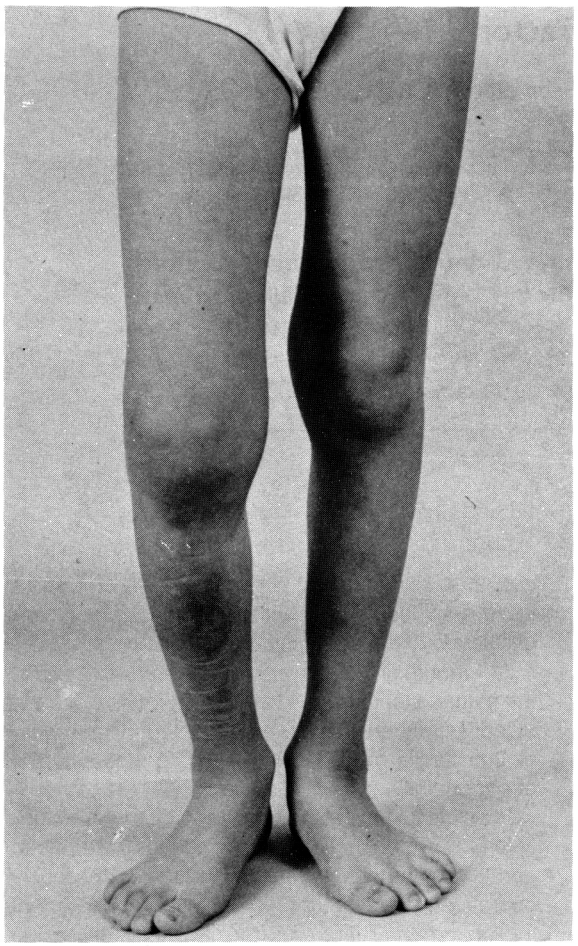

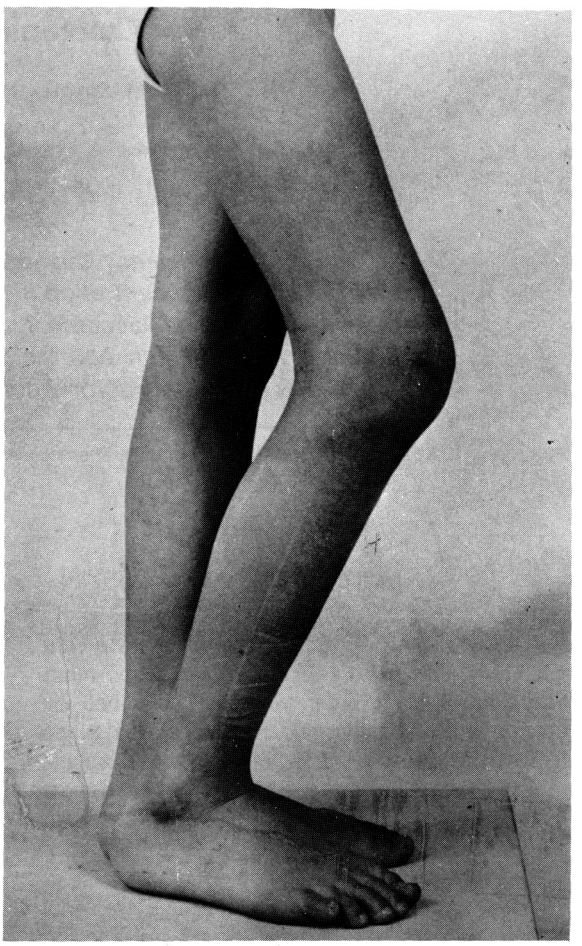

**Fig. 1 and 2.** Lower extremities of the patient with Factor V deficiency showing swelling and flexion contracture of the right knee.

with prolonged prothrombin time due to a previously unknown clotting factor. Owren called the new clotting element Factor V. At that time four clotting factors (fibrinogen, prothrombin, thromboplastin, and ionic calcium) were established.

Factor V, also called proaccelerin and labile factor, is synthesized in the liver. It is consumed in the clotting process like fibrinogen, prothrombin, and Factor VIII. Factor V has a catalytic subunit and a carrier subunit, and the half time for plasma disappearance of transfused Factor V activity has been variously reported to be 12-36 hours (Hilgartner and McMillan, 1984). Factor V is a cofactor for the Factor Xa-catalized activity of prothrombin to thrombin, and the complete prothrombinase is made up of Factor X, Factor V, ionic calcium, and platelet phospholipid (platelet factor 3) (Davie and Fujikawa, 1975). This complete complex catalyze thrombin formation at 300,000 times the rate achieved with Factor Xa alone (Miletich et al., 1978; Nesheim et al., 1979). Since Factor V acts as a cofactor in assembly of prothrombinase complex, it is considered that the clinical picture of Factor V deficiency is mild.

Congenital Factor V deficiency is transmitted as an autosomal recessive trait with intermediate amounts of Factor V in heterozygous plasma (between 35% and 50%) by specific assay (Hilgartner and McMillan, 1984). Our child's parents are probably obligatory heterozygotes. But in some cases heterozygotes were not demonstrated and some of the discre-

**Table 1.** Results of the coagulation studies in the patient with Factor V deficiency

| Coagulation studies | Results | Normal value |
|---|---|---|
| Platelet count ($X10^3/mm^3$) | 453 | 150-400 |
| Bleeding time (min.) | 2 | 1-4 |
| Prothrombin time (sec. (%)) | 36 (22) | 11-13 (80-100) |
| Activated Partial Thromboplastin time (sec.) | 110 | 28-38 |
| Factor VIII (%) | 80 | 60-140 |
| Factor IX (%) | 80 | 60-140 |
| Factor XI (%) | 100 | 60-140 |
| Fibrinogen (mg/dl) | 200 | 170-350 |
| Factor V (%) | 6 | 60-140 |
| Factor X (%) | 90 | 60-140 |

pancies may reflect the methodological differences of employing just the prothrombin time versus specific Factor V assays (Seeler, 1972).

Seeler (1972) reviewed 58 cases with Factor V deficiency and showed that hemorrhagic manifestations were noted in half of the patients during childhood and hemorrhage appeared rarely during the neonatal period. But Whitelaw et al. (1984) reported a case of Factor V deficiency with antenatal intracranial hemorrhage. Seeler (1972) showed that ecchymosis (bruising), epistaxis, oral hemorrhage, hemorrhage after minor lacerations, and menorrhagia were frequent, and in most instances history suggestive of hemorrhagic disorder was ignored until the surgical hemorrhage ensued. In our case, the bleeding tendency was not detected in the operation at 1 month of age, and it appeared first at 2 years of age. Hematuria, gastrointestinal hemorrhage, or hemarthrosis occurred in approximately 15 to 20 per cent of patients (Seeler, 1972). The severity of the disease appears to be related to whether or not the catalytic subunit of Factor V is present in the platelet, since up to 20% of Factor V is normally intraplatelet and Factor V is required on the platelet membrane (Tracy et al., 1982). It does not appear possible to predict the clinical severity knowing the Factor V level (Seeler, 1972). Tracy et al. (1984) described a bleeding diathesis associated with qualitative platelet Factor V deficiency (Factor V Quebec), which appeared to reflect their platelet, rather than their plasma, Factor V activity.

Congenital combined deficiency of Factor V and VIII is a hereditary bleeding disorder and its underlying cause is congenital deficiency of natural inhibitor of activated protein C which inhibits the thrombin activated forms of both Factor V and VIII (McMillan, 1984).

Reported congenital anomalies associated with Factor V deficiency are bilateral duplication of the genitourinary collecting system, duplication of the left renal vein, pelvis and ureter and patent ductus arteriosus, atrial septal defect, ventricular septal defect, epidermolysis bullosa, three siblings with syndactylism, and short stature (Seeler, 1972). In our case, congenital pyloric stenosis was associated.

In coagulation scheme Factor V is involved in common pathway, and so prothrombin time (PT) and partial thromboplastin time (PTT) are prolonged. The definite diagnosis can be made with a specific Factor V assay.

Bleeding episodes can be treated with fresh frozen plasma. The hemostatic level is approximately 25% and transfusion of 10ml of fresh frozen plasma should raise the plasma level by 15%. Treatment may be given once daily for 7 days at the time of an operative procedure and probably not more than once for a minor bleeding episode (Hilgartner and McMillan, 1984). Fratantoni (1972) reported that a girl with congenital Factor V deficiency developed circulating anticoagulant against transfused Factor V as a complication of the therapy.

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