

Tentative and Updated Classification of Factor X Variants

Recent studies from several laboratories seem to justify the proposal of a tentative updated classification of congenital factor X defects [2, 4, 11, 15].

Factor X deficiency was first described in 1956–1957 [1, 13, 17]. Since that time, several variants have been described. The factor X Friuli abnormality appears to be the most important and the most extensively studied [5–8].

Recently, a peculiar factor X defect with a normal partial thromboplastin time (PTT) was described both sporadically [2, 15] and on a congenital basis [11].

Factor X level, by extrinsic system, was 4.2% in the patient presented by Nora et al. [15], 2–3% in the patient seen by Bertina [2] and 26–34% in the family studied by us [11]. This indicates that the abnormality responsible for the peculiar activation pattern with a defect only in the extrinsic system may present itself in different forms, severe or moderate. Unfortunately, no immunological assay is reported for the patient by Nora et al. [15], and this makes a sure classification impossible [4, 8].

The patient presented by Bertina et al. [2] showed an antigen level of 50% of normal. Factor X Padua patients show a level of 100% of normal. It is important that abnormal factor X with peculiar activation pattern be recognized. The description of this peculiar type of factor X deficiency (abnormality limited to the extrinsic system) has considerably complicated the differential diagnosis of factor VII and X deficiencies and abnormalities. In the past it was thought that an abnormal RVV clotting time could discriminate between factor X and VII deficiency. This was demonstrated not to be true by us in 1969 [5] and 1970 [6]. Factor X Friuli in fact may be normally activated by RVV [5]. It has also to be remembered that a factor X abnormality with prolonged PTT and normal PT has been described [16]. The great heterogeneity of factor X defect is further emphasized by the recent discovery of an additional congenital factor X variant (factor Padua₂) [12]. In this variant, there is a discrepancy between the levels of factor X obtained by clotting assays and those seen by amidolytic assays. It

Table I. Behavior of factor X assays in congenital factor X abnormalities so far described

Condition	Tissue thromboplastins (extrinsic)	RVV cephalin (RVV)	Cephalin (intrinsic)	Chromogenic	Immunological assay
Classical factor X deficiency (Mr. Stuart) [1, 13]	low	low	low	low	low
Miss Prower defect [3]	low	low	low	?	normal
Factor X Friuli defect (Mrs. Minin) [6, 7, 9, 10]	low	normal	low	low	normal
Factor X Melbourne [16]	normal	normal	low	?	normal
Factor X Padua [11] (Leiden?)	low	normal	normal	low	normal
Factor X Padua ₂ [12]	low	low	low	lower than clotting assays	normal
Factor X Red [2]	low	low	low	?	variably reduced, but higher than clotting counterpart

may be useful to summarize in the following table (table 1) the factor X variants so far described.

Other variants may exist, as suggested by the description of another patient presented in a preliminary manner [14] and by other studies [4].

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