Coagulation factor deficiency in the extrinsic System (tissue-factor pathway)

Clotting-Guide
vom Labor zur Diagnose

Description:

Deficiency of factor VII, X, II or V.

The vitamin K-dependent factors VII, X and II are part of the common pathway of coagulation; factor V is not dependent on vitamin K.

Relevant reductions below 40% can lead to clinically significant bleeding, except for factor VII, where only values below 5% are clinically relevant.

Single factor deficiencies can be caused by mutations in the corresponding gene. in this case both sexes can be affected. Depending on the mutation, heterozygous (partial) deficiencies can occur, which usually have no clinical relevance and do not cause bleeding. Severe deficiency states with activities below 10% occur with homozygous and mixed heterozygous mutations and may be associated with bleeding.

Acquired single factor deficiencies are very rare and are caused by inhibitory autoantibodies. These usually occur in connection with other autoimmune diseases or malignancies. An inhibitor determination or plasma mixing studies are necessary to differentiate from congenital forms.

Treatment options:

If necessary, congenital factor deficiency is treated with prothrombin complex concentrates; in the case of factor X deficiency, a plasmatic factor X concentrate (Coagadex®) can also be used. There is also a plasmatic factor VII concentrate (FVII Immuno®). The dose depends on body weight and the desired target value. One unit of factor concentrate per kg of body weight raises the factor level by 1%, i.e. dosages of 30-40 U/kg are usually appropriate. The dosing intervals depend on the half-life of the missing factor (for factors II, V and X 1-2x daily doses, for factor VII 3-4x daily doses). Before each injection of the concentrate, a factor level determination should be carried out and the subsequent dosages and intervals should be adjusted afterwards.

The respective product information must be observed.

In the case of immunologically caused factor deficiency, immunosuppression is the main focus for the treatment of autoimmunity. Acute bleeding can perhaps be treated with high doses of an appropriate factor concentrate, or with recombinant activated factor VII concentrate (Novoseven®).

Surveillance:

Determination of the activity of the missing coagulation factor. In the case of longer-term substitution therapy, also determine in-vivo recovery and inhibitor titers, as allo-immunization can occur due to the factor concentrates.

In case of questions please contact a coagulation specialist.

References:
Thomas L, Laboratory and Diagnosis, 2023, Release 5: https://www.labor-und-diagnose.de/index.html
Parameter catalog of the Clinical Institute for Laboratory Medicine, Med.Univ.Wien and AKH Vienna: https://www.akhwien.at/default.aspx?pid=3982
List of services for clinical chemistry, Univ.Klinikum Ulm: https://www.uniklinik-ulm.de/zentrale-einrichtung-klinische-chemie/leistungskatalog.html