Anti-Xa activity

Clotting-Guide
vom Labor zur Diagnose

Description, significance:
This test measures the activity of substances in plasma that block clotting factor Xa. These are primarily heparins (low molecular weight heparins and unfractionated heparin), but also fondaparinux (Arixtra®), danaparoid (Orgaran®) and the direct oral factor Xa inhibitors rivaroxaban (Xarelto®), apixaban (Eliquis®) and edoxaban (Lixiana®)

The anti-Xa test is usually standardized for the determination of low molecular weight heparins. The other substances cause increased anti-Xa levels, but these are not dose-dependent. DOACs could cause very high anti-Xa levels even at low concentrations. To accurately measure these substances, the lab request must indicate which anticoagulant is used and when the last dose was administered. An appropriate sample dilution and calibration curve can then be used for the respective substances, therefore a specific measurement of the desired substance is possible.

The anti-Xa determination is carried out for the dosage of low molecular weight heparins in special situations (impaired kidney function, pregnancy, children, extreme over- or underweight). Here, the anti-Xa trough level should be measured (i.e. before the next dose). The peak anti-Xa level (4 hours after administration) should only be carried out in patients who are at high risk of bleeding (postoperative, severe thrombocytopenia, etc.).

The anti-Xa activity can also be used to detect possible DOAC therapy or to estimate possible residual DOAC activity in cases where the medical history is unknown. It is also suitable for checking patient compliance.

If the medication is unknown, elevated anti-Xa values can be clarified by neutralizing heparin (either in vivo by iv. administration of protamine or in vitro by adding heparinase to the sample). If the anti-Xa values then lower, this indicates heparin therapy; if they remain unchanged, this indicates DOAC therapy.

Reference range:
Without anticoagulation: < 0.1 U/mL

Increased values:
Therapeutic anticoagulation with heparins: trough level approx. 0.3-0.5 U/mL; peak level 0.8-1.0 U/mL, depending on indication
Prophylactic therapy with low molecular weight heparins: trough level <0.2 U/mL
There are only guideline values for the corresponding levels for rivaroxaban, edoxaban or apixaban, but these should not be understood as target levels to be aimed for. Because of the short half-life and the different elimination routes, the time between the last administration and the blood sample must also be taken into account.

Preanalytics:
The anti-Xa activity is automatically determined from citrate plasma. Care must be taken to collect blood accurately, avoid contamination, fill the blood tube correctly and mix well with the citrate. The blood sample must be sent to the laboratory as quickly as possible. It is mandatory to specify the anticoagulant used.

Influencing/disturbing factors:
Severe antithrombin deficiency; severe hemolysis; Therapy with direct thrombin inhibitors.

Measurement methods:
Automated chromogenic testing system

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