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HemNotes

Understanding Prothrombin Time (PT)/International Normalized Ratio (INR) assays offered at Hematology Labs, Shared Health Manitoba

- The prothrombin time (PT) and the derived measure of international normalized ratio (INR) are assays evaluating the extrinsic pathway and common pathway of coagulation.
- Reported INR results are specifically intended for assessing patients stabilized on long-term oral vitamin K anticoagulant therapy such as warfarin. INR is the result of the patient PT divided by mean normal PT, exponentially equalized by the ISI (International Sensitivity Index of the reagent/instrument combination). Therefore the INR should only be used to determine the appropriate dose of an oral vitamin K anticoagulant.
- INR is widely used in various models for end-stage-liver-disease e.g. the MELD scores [Model for End-stage Liver Disease] or the Child-Pugh score, a mathematical score that is used to prioritise patients for liver transplantation. The INR was designed to monitor patients on oral Vitamin K anticoagulants and not with liver disease. The variables that affect INR in patients with liver disease are different from those that affect the INR in patients on drugs such as warfarin. As a result INR in patients with liver disease needs to be interpreted with caution.
- PT is better choice than INR in assessing bleeding risk in certain medical conditions such as liver disease, sepsis, or inherited bleeding disorders or therapy with new oral anticoagulants.
- A normal PT does not exclude a significant underlying coagulopathy for instance the PT is normal in severe haemophilia A, B and factor XI deficiency.
- A shortened PT can be seen in patients following the administration of rVIIa (Niastase).
- Shared Health haematology laboratories continue to provide a 24h TAT for PT/ INR tests for routine monitoring patients on long term warfarin and other non-urgent uses. Routine requests are done by coagulation analyzers either on-site or transported offsite to a regional reference laboratory.
- To ensure that results are ready for review at scheduled appointments, please arrange the patient to have a blood test 24 hours prior to a clinic appointment.
- Sites that do not have coagulation analyzers on sites are provided with i-STAT, (Abbott Point of Care), a device for point of care testing for urgent INR. INR by i-STAT should only be used for urgent clinical scenarios (see below). The reporting ranges of INR results from i-STAT are defined for each of those sites during test validation. The i-STAT INR results correlates well with analyzer results for most patients at an INR value <=4 or lower as defined at each site. If i-STAT INR value is higher than the upper limit of the reportable range defined at the site, venous blood sample is required to send to regional reference lab to confirm the INR results. Simultaneous or closely sequential ordering of PT/INR and i-STAT INR are not beneficial.

- Urgent PT/INR by analyzer or urgent INR by i-STAT should be reserved for the following clinical scenarios only:

    a. To decide if a patient presenting to the ED with an ischemic stroke can receive thrombolytic therapy.
    b. To investigate active bleeding at critical situations where results are required urgently
    c. To decide if a patient anticoagulated with warfarin can undergo an emergent invasive procedure.
    d. When a rapid result would expedite clinical situations (i.e. to discharge patient new on warfarin)

- Both PT and INR are reported when PT and/or INR are ordered when tests are run by coagulation analysers. Only INR is reported when test is run by i-STAT.
- There is currently no readily available, routine laboratory test that can reliably monitor the anticoagulant effect of NOAC/DOACs (NOACs/DOACs = Non-vitamin K antagonist Oral AntiCoagulants, also known as Direct Oral AntiCoagulants) such as dabigatran, apixaban, edoxaban, and rivaroxaban in a manner similar to how the INR is used to monitor warfarin therapy or how the aPTT is used for intravenous (IV) unfractionated heparin (UFH) therapy; therefore, laboratory tests including PT/INR should NOT be used to monitor the anticoagulant effect of NOAC/DOACs.

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