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Position Statement

Subject:	**Point of Care Testing for the measurement of International Normalised Ratio (INR)**
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Warfarin

The anticoagulant warfarin affects the function of the coagulation cascade and helps inhibit the formation of blood clots (Vitamin K antagonist). Common indications for warfarin use include stroke prevention in atrial fibrillation, preventing thrombus formation in patients with mechanical heart valves and treatment of venous thromboembolism (deep vein thrombosis and pulmonary embolism).[1]

The INR (international normalised ratio) is used to monitor the effectiveness of warfarin and risk of bleeding during warfarin therapy. For most warfarin indications, the target INR is 2.0–3.0 (atrial fibrillation, venous thromboembolism and single mechanical heart valve excluding mitral). For mechanical mitral valve or combined mitral and aortic valves, the target INR is 2.5–3.5.[1] Maintaining the INR within a tight therapeutic range requires careful monitoring to ensure a balance between preventing clots and causing excessive bleeding.[2]

PoCT for INR

Point of Care (PoCT) INR testing enables the generation of results in minutes, leading to immediate dose adjustment (if necessary) for effective clinical decision making in a timely manner. It is also useful in rural or remote areas where access to laboratory testing is difficult. A change in warfarin dose will take several days to influence the INR, so repeat testing and monitoring is necessary.[3] Illness, some medications and a change in diet i.e food containing large amounts of vitamin K, can alter INR results, so it is important to review possible drug-nutrient interactions.[4]

The correct blood collection technique is also crucial to obtain an accurate PoCT INR result. The first drop of blood from a fingerprick should be used and if an insufficient sample is collected the first time, a different finger should be used to collect the sample when repeating the test.[5] The drop of blood must be applied to the test strip within 15 second of lancing the finger, as delayed application can lead to blood clotting and result in a falsely low INR result.[5]

The accuracy of PoCT INR is lower for INR values above 4 and as such, all results > 4.0 should be repeated by the laboratory.[6] If this isn't possible, a repeat PoCT INR test should be performed and a check that quality control results have been within the target range. For PoCT INR > 8.0, a venous sample should be sent to the lab for verification but appropriate treatment should be commenced (after repeat PoCT test confirms >8.0).[7]

Quality Control and External Quality Assurance

A minimum of one liquid quality control (QC) sample shall be tested each month unless a higher frequency is suggested by the manufacturer. QC testing for PoCT should be undertaken by the PoCT operator. All operators who at any time use the device should participate in the quality control program.[8]

In addition to the regular QC program, QC testing should also be undertaken when; the lot number of consumables changes, there is a new delivery of consumables, an operator lacks confidence in a patient result, the health care professional does not believe that the PoCT result fits the patient's clinical picture or if the device has been dropped.[8]

A form of external quality assurance should be undertaken for every PoCT device.

Limitations and Known Interferences of PoCT INR

- Poor blood flow due to poor capillary or venepuncture technique may cause erroneous results[9]
- Excessive squeezing should be avoided when obtaining a drop of blood, as that may accelerate blood clotting and give an INR that is falsely low[9]
- Anti-phospholipid antibodies (APA) or lupus antibodies may falsely prolong coagulation time[5]
- PoCT INR should not be used for snake bites[10]
- PoCT INR testing is of no benefit in monitoring NOAC drug doses i.e Dabigatran, Apixaban, Rivaroxaban[11]

References

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