APPOINTING CROSS-REACTIVITY OF BOTH OLD AND NEW ANTI-COAGULATION MEDICATION ON THE SYSMECS CS2100I.

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INTRODUCTION

To prevent venous thromboembolism new oral anti-coagulation medications have recently been approved as thromboprophylaxis after orthopaedic surgery. These direct anticoagulants (DOACs) comprise of Dabigatran a direct thrombin inhibitor and Rivaroxaban a direct factor Xa inhibitor. They have a rapid onset of action and can be applied in fixed doses with no need for routine coagulation monitoring.

Although DOACs have already shown efficacy in large-scale clinical trials, no direct comparison of Nadroparin versus DOACs after total knee arthroplasty (TKA) was conducted. Our hospital participated in a study comparing the anti-coagulant drugs Dabigatran, Rivaroxaban and Nadroparin (DARINA) in prevention of venous thromboembolism after TKA (1).

As there are no antidotes for DOACs to ward off bleedings, major safety concerns arose, therefore we established assays to monitor the effect of these drugs on our coagulation analyser Sysmex CS2100I.

Here we describe the discrepancy in cross-reactivity noticed using reagents of different origin one should be aware of when monitoring DOACs.

METHODS

Reagents suitable for measurement of a specific anticoagulants of Siemens were compared with reagents of Hyphen as the later is generally used in studies concerning DOACs.

RESULTS

• With-in run reproducibility of all assays revealed an acceptable coefficient of variation for all.
• In-between run, the HTI, DiXals and Hy Hep of Hyphen performed poorly as the mandatory variation coefficient was not met.
• As the PT and aPTT based clotting assays were not sensitive enough, it was decided to quantify Dabigatran with the DTI and to quantify Rivaroxaban with the Berhrn assay.

Figure 1: The presence of LMWH quantifying Rivaroxaban with the DiXal assay deviated significantly from the regular levels. The Berhrn was not significantly influenced by the presence of LMWH. The presence of Rivaroxaban quantifying Dabigatran by DTI did not influence the results. Quantifying Dabigatan in the presence of Rivaroxaban with the HTI assay had serious effect on the outcome. Quantifying LMWH in the presence of Rivaroxaban with either the Berhrn or Hy Hep test demonstrated a serious effect on the outcome of the assays as expected.

CONCLUSION & DISCUSSION

• Overall the chromogenic assays perform better than the calibrated clotting time assays on the Sysmex CS2100i.
• Based on our reproducibility results it was established that:
  • the presence of LMWH could be best determined with the Berhrn assay,
  • the presence of Dabigatan with the DTI assay,
  • the presence of Rivaroxaban with the Berhrn assay.
• In the hypothetical case that a person enters the hospital harbouring two anticoagulants or when the anticoagulants is unknown one should be aware of the influence of their presence on the respective clotting tests.