A systematic review and meta-analysis of performances of prototype and commercial DOAC Dipstick tests for detecting direct oral anticoagulants in patient urine samples – Increasing confidence for testing in emergency care

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INTRODUCTION

The DOAC Dipstick accurately determines the presence or absence of direct oral anticoagulants (DOACs). Several studies have investigated the performance of prototype and commercial dipsticks.

AIM

To compare the performance of prototype and commercial dipsticks in a systematic review and meta-analysis to analyze the robustness and consistency of the data collected in these different studies.

METHOD

The study was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. The sensitivity is defined as the proportion of true positive results in relation to the population treated with a DOAC (factor Xa or thrombin inhibitor) and the specificity as the proportion of true negative results in relation to the population of untreated controls (not treated with a factor Xa or thrombin inhibitor). Sensitivity and specificity of individual and pooled studies were analyzed using MetaDiSc. The sensitivities and specificities of prototype and commercial test strips were compared using Chi-squared test. If the presumptions of the Chi-squared test were not fulfilled, Fisher’s exact test was used alternatively.

RESULTS

Four of 1081 publications were considered eligible for inclusion; three reported results on prototype dipsticks (DXI n=558, DTI n=249) and one on commercial dipsticks (DXI n=451, DTI n=429) (Fig. 1).

There were no significant differences in sensitivity and specificity of DXI and DTI detection between prototype and commercial dipsticks (Fig. 2A and 2B). The pooled sensitivity and specificity was 0.968 (95%CI 0.956-0.978, p=0.1290, I² 47.1%) and 0.979 (95%CI 0.968-0.992, p=0.1965, I² 35.9%) respectively for detecting DXIs and 0.993 (95%CI 0.986-0.997, p<0.0001, I² 37.5%) and 0.993 (95%CI 0.986-0.997, p<0.0001, I² 0%) respectively for detecting DTIs.

Simulation down to 1% prevalence showed a very high negative predictive value of 0.999, indicating that the dipstick test may remain valid for detecting DOACs in patients’ urine with acute medical conditions, and a still high positive predictive value between 0.238 and 0.590 for type of DOAC probably depending upon population and renal function.

CONCLUSIONS

Detection of DXI and DTI in patient urine samples was not significantly different between prototype and commercial DOAC dipsticks.

This should increase confidence to use of the DOAC Dipstick in emergency patient care and other medical indications.

The simulation of the prevalence showed the very high NPV that is important in a general population and in patients when intake of DOACs is unknown.

CONFLICT OF INTEREST

No authors reported a COI for this investigation.

REFERENCES


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