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Role of the age adjusted D-dimer in suspected deep venous thrombosis
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Introduction: It is well established that a negative D-dimer will reliably rule out thromboembolism in selected low risk patients. Multiple modified D-dimer cutoffs have been suggested for older patients to improve diagnostic specificity. However, these approaches are better established for pulmonary embolism than for deep venous thrombosis (DVT). This study will evaluate the diagnostic performance of previously suggested D-dimer cutoffs for low risk DVT patients in the ED, and assess for a novel cutoff with improved performance. Methods: This health records review included patients >50 years with suspected DVT who were low-risk and had a D-dimer performed. Our analysis evaluated the diagnostic accuracy of D-dimer cutoffs of 500 and the age adjusted (age x 10) for patients >50 years; and 750, and 1,000 cutoffs for patients >60 years. 30-day outcome was a diagnosis of DVT. We also assessed the diagnostic accuracy for a novel cutoff (age x 12.5).

Results: 1,000 patients (mean age 68 years; 59% female) were included. Of these, 110 patients (11%) were diagnosed with DVT. The conventional cutoff of <500 µg/L demonstrated a sensitivity of 99.1% (95% CI 95.0-99.9) and a specificity of 36.4% (95% CI 33.2-39.7). For patients >60 years, the absolute cutoffs of 750 and 1,000 showed sensitivity of 98.7% (95% CI, 92.9, 99.9), and the specificity increased to 48.6% (95% CI, 44.5-52.8%) and 62.1% (95% CI, 58.1-66.1%) respectively. For all study patients, age adjusted D-dimer demonstrated a sensitivity of 99.1% (95% CI 95.0-99.9) and a specificity of 51.2% (95% CI, 47.9-54.6). A novel age adjusted cutoff (age x 12.5) for patients >50, demonstrated a sensitivity of 97.3% (95% CI 92.2-99.4) and a specificity of 61.2% (95% CI 58.0-64.5). When compared to conventional cutoff, the age adjusted cutoffs (age x 10 and age x 12.5) would have resulted in an absolute decrease in further investigations of 13.1% and 22.2%, respectively, with false negative rates of 0.1% and 0.3%.

Conclusion: Among older patients with suspected DVT and low clinical probability, the age adjusted D-dimer increases the proportion of patients among whom DVT can be ruled out. A novel cutoff (age x 12.5) demonstrated improved specificity. Further large scale prospective studies are needed to confirm this finding and to explore the cost savings of these approaches.

Keywords: acute myocardial infarction, morphine, mortality

Introduction: Point of care ultrasonography (PoCUS) is an established tool in the initial management of hypotensive patients in the emergency department (ED). It has been shown rule out certain shock etiologies, and improve diagnostic certainty, however evidence on benefit in the management of hypotensive patients is limited. We report the findings from our international multicenter RCT assessing the impact of a PoCUS protocol on diagnostic accuracy, as well as other key outcomes including mortality, which are reported elsewhere. Methods: Recruitment occurred at 4 North American and 3 Southern African sites. Screening at triage identified patients (SBP <100 mmHg or shock index >1) who were randomized to either PoCUS or control groups. Scans were performed by PoCUS-trained physicians. Demographics, clinical details and findings were collected prospectively. Initial and secondary diagnoses were recorded at 0 and 60 minutes, with ultrasound performed in the PoCUS group prior to secondary assessment. Final chart review was blinded to initial impressions and PoCUS findings. Categorical data was analyzed using Fishers two-tailed test. Our sample size was powered at 0.80 (α=0.05) for a moderate effect size. Results: 258 patients were enrolled with follow-up fully completed. Baseline comparisons confirmed effective randomization. The perceived shock category changed more frequently in the PoCUS group 20/127 (15.7%) vs. control 7/125 (5.6%); RR 2.81 (95% CI 1.23 to 6.42; p = 0.0134).

There was no significant difference in change of diagnostic impression between groups PoCUS 39/123 (31.7%) vs control 34/124 (27.4%); RR 1.16 (95% CI 0.786 to 1.70; p = 0.4879). There was no significant difference in the rate of correct category of shock between PoCUS (118/127; 93%) and control (113/122; 93%); RR 1.00 (95% CI 0.936 to 1.08; p = 1.00), or for correct diagnosis; PoCUS 90/127 (70%) vs control 86/122 (70%); RR 0.987 (95% CI 0.671 to 1.45; p = 1.00). Conclusion: This is the first RCT to compare PoCUS to standard care for undifferentiated hypotensive ED patients. We found that the use of PoCUS did change physicians’ perceived shock category. PoCUS did not improve diagnostic accuracy for category of shock or diagnosis.

Keywords: point of care ultrasound (PoCUS), hypotension, diagnosis

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