

ROLE OF THE AGE ADJUSTED D-DIMER IN SUSPECTED DEEP VENOUS THROMBOSIS



uOttawa

Sean Patrick, BSc¹; Peter Reardon, MD²; Monica Taljaard, PhD^{3,4}; Kednapa Thavorn, PhD^{3,4};
Muhammad Mukarram, MBBS, MPH⁴; Soo-Min Kim, BScH²; Gregoire Le Gal, MD, PhD⁵;
Venkatesh Thiruganasambandamoorthy, MD, MBBS, MSc^{1,2,3}

¹Faculty of Medicine, University of Ottawa; ²Department of Emergency Medicine, University of Ottawa; ³School of Epidemiology, Public Health and Preventative Medicine, University of Ottawa; ⁴Ottawa Hospital Research Institute, Ottawa; ⁵Thrombosis Program, Division of Hematology, Department of Medicine, University of Ottawa



Background

- A negative D-dimer is well known to reliably rule out thromboembolism in low risk patients¹
- Multiple D-dimer cutoffs have been suggested to improve diagnostic specificity; however, these approaches are better established for pulmonary embolism compared to deep vein thrombosis (DVT)

Objectives

1. Assess the diagnostic performance of previously suggested D-dimer cut-offs (<500ng/mL, 750ng/mL, 1000ng/mL, age x 10) for low risk patients in the emergency department (ED)
2. Assess the performance of a newly established D-dimer cut-off: age x 12.5

Methods

- This health records review included patients >50 years of age with suspected DVT who were low-risk and had a D-dimer performed in the ED
- The diagnostic accuracy of the age adjusted (age x 10) and absolute cutoff of 500ng/mL were evaluated for patients >50 years of age. The absolute cutoffs of 750ng/mL and 1,000ng/mL were examined for patients >60 years of age
- 30-day outcome was a diagnosis of DVT

Results

Table 1. Patient Characteristics

Characteristics	No. (%) (n=1000)
Women	591 (59.1)
Mean age	68.0 ± 12.1
Personal history of VTE	107 (10.7)
Active malignancy	80 (8.0)
Bedridden or major surgery	33 (3.3)
Estrogen use	10 (1.0)
Paralysis, paresis, immobilization	18 (1.8)
Personal history of coagulation disorders	5 (0.5)
Antiplatelet	240 (24.0)

Table 2. Performance Calculations for the Different D-dimer Cutoffs

D-Dimer Cutoffs	Sens, % (95% CI)	Spec, % (95% CI)	NPV, % (95% CI)	PPV, % (95% CI)
500ng/mL*	99.1 (95.0 - 99.9)	36.4 (33.2 - 39.7)	99.7 (97.9 - 99.9)	16.2 (15.5 - 16.9)
750ng/mL [†]	98.7 (92.9 - 99.9)	48.6 (44.5 - 52.8)	99.7 (97.6 - 99.9)	19.9 (18.7 - 21.3)
1000ng/mL [†]	98.7 (92.9 - 99.8)	62.1 (58.1 - 66.1)	99.7 (98.1 - 99.9)	25.3 (23.3 - 27.3)
Age x 10*	99.1 (95.0 - 99.9)	51.2 (47.9 - 54.6)	99.8 (98.5 - 99.9)	20.1 (18.9 - 21.2)
Age x 12.5*	97.3 (92.2 - 99.4)	61.2 (57.9 - 64.5)	99.5 (98.4 - 99.8)	23.7 (22.1 - 25.3)

*The absolute D-dimer cutoff of 500ng/mL, the age x 10 cutoff, and the age x 12.5 cutoff were calculated for patients >50 years of age

[†]The absolute cutoffs 750 and 1000ng/mL were calculated for patients >60 years of age
Sens = sensitivity, Spec = specificity, NPV = negative predictive value, PPV = positive predictive value

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
- The novel cutoff (age x 12.5) demonstrated improved specificity
- Cost savings in the ED will be analyzed using the newly developed cut-off
- Future large scale prospective studies are needed to confirm these findings and to explore the cost savings of these approaches

Acknowledgements

The authors would like to thank Dr. Ronald Booth

References

1. Schutgens REG. Combination of a Normal D-Dimer Concentration and a Non-High Pretest Clinical Probability Score Is a Safe Strategy to Exclude Deep Venous Thrombosis. *Circulation*. 2003;107(4):593-597.

Contact Information

Dr. Venkatesh
Thiruganasambandamoorthy
Clinical Epidemiology Unit, F6
1053 Carling Avenue, Ottawa, ON,
K1Y4E9; vthirug@ohri.ca