

Role Of D Dimer Test In Evaluating DVT In Fracture And Post Operative Orthopaedic Patients

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Abstract

During blood coagulation, fibrinogen is converted to fibrin by activation of thrombin. The resulting fibrin monomers polymerize to form soluble gel of non cross linked fibrin. This fibrin gel is then converted to cross linked fibrin by thrombin activated factor XIII to form an insoluble fibrin clot. Production of plasmin, the major clot lysing enzyme, is triggered when a fibrin clot is formed 1.

Commonly suggested that the D-Dimer assay is valuable for acute thrombus and thus may be able to differentiate it from chronic clot². However in orthopaedics D-Dimer have generally yielded disappointing results because of the overwhelming effect of surgery or trauma itself both of them leading to positive D Dimer result.

D-Dimer value is positive (value >200) most of times in patients with fractured bones or operative patients because of continuous clot formation and its degradation with plasmin leading to FDP in blood.

Fibrinogen and fibrin are both cleaved by the lytic enzyme plasmin to yield degradation products, but only degradation products from cross linked fibrin contain D-Dimer. Therefore cross linked fibrin degradation products are a specific marker of fibrinolysis⁴.

Monoclonal antibodies have been harvested against D-Dimer neo antigen and these are specific for cross linked fibrin derivatives containing the D-Dimer configuration.

PATIENTS

A total of 500 patients over a period of 18 months (July 2012 – December 2013) were taken up for study

LIMITATION OF D-DIMER TESTS

It is not sufficiently specific as its levels can be elevated in conditions which have a reactive fibrinolysis such as surgery, trauma, liver disease, sepsis, sickle cell disease, inflammation, malignancy, and pregnancy⁴.

Kilic et al: in their study demonstrated a D-Dimer test sensitivity of 95.3% and specificity of 22% and negative predictive value of 81.8%. The study also negated the possibility of D-Dimer levels reflecting clot burden.

Bradley M et al, in their study reported D-Dimer test sensitivity of 97.7 %, negative predictive value of 98%, and specificity of 48.9% and positive predictive value of 48.8 %⁸.

Neale et al, reported D-Dimer sensitivity and negative

predictive value of 90.2% and 92.2% respectively in comparison to venography⁴.

-Dimer assay can be reliably used to diagnose DVT in asymptomatic, rehabilitation in patients. The reported sensitivity and negative predictive value are 95.2% and 96.2% respectively. The specificity and positive predictive value were low at 55.3% and 48.7% respectively¹²⁸.

Subramanian R et al calculated the D-Dimer sensitivity, specificity, negative predictive value and positive predictive value as 8%, 55.51%, 94.44% and 35.12 % respectively⁶.

As a result of its high negative predictive value but low positive predictive value a positive D-Dimer result is not useful to confirm the diagnosis of venous Thromboembolism rather its potential value is to exclude DVT⁵.

Several studies have suggested that its high negative predictive value of D-Dimer test can be used as a part of DVT diagnostic algorithm⁷.

The Gold Standard remains contrast venography, which is not feasible in all cases⁹

- Cut off value for significant D-Dimer in our study was 200 IU. The value of D-Dimer more than 200 IU was taken as positive and a value of less than 200 IU was taken as negative. The sensitivity of D-Dimer in the study was found to be 86 % and specificity of 41%, negative predictive value of 77%. P value was found to be 0.32. It was not statistically significant.
- In conclusion we do not recommend regular use of D Dimer to diagnose DVT especially in trauma and operative patients.

References

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