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Research Letter

Homan's sign for deep vein thrombosis: A grain of salt?

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Sir,

Deep venous thrombosis (DVT) is a common medical problem with potentially fatal consequences. Development of thrombi in proximal or distal veins is a characteristic feature of DVT. Such emboli can travel from the lower limbs to the lungs resulting in pulmonary embolism. Symptoms of pulmonary embolism include tachypnea, chest pain and at times sudden death. Therefore it is essential that physicians have a high index of suspicion for the signs of DVT.

Though DVT may be clinically silent, few clinical signs have been described to rule it out. Pain or discomfort in calf, development of edema and distension of limb veins preclude development of DVT. Perhaps for the diagnosis of DVT, no sign is more famous than the Homan's Sign.[1]

Elicitation of the Homan's sign involves forced dorsiflexion of the respective ankle in the suspected limb.

However, the sign is not very reliable and often non-invasive diagnostic modalities are necessary to confirm the diagnosis of DVT. Such modalities include ultrasonography and venography of the affected limb.

The utility and use of the Homan's sign has gradually waned down over the course of time. Here we attempt to chronicle the history and the clinical significance of the Homan's sign.

The pathophysiology of the sign has been explained as follows. Passive, abrupt and forced ankle dorsiflexion in concert with superadded knee flexion causes mechanical traction on the posterior tibial vein. This traction stimulates the pain sensitive structures in the lower limb.[2,3]

Differential diagnosis of conditions that demonstrate a positive Homan's sign include intervertebral disc herniation, ruptured Baker's cyst, neurogenic claudication, gastrocnemius spasm, and cellulitis.[4]

Another interesting phenomenon is seen in women who after chronically wearing high heels start wearing flat shoes. In these women, sometimes due to mechanical traction in the lower limb, a positive Homan's sign can be demonstrated.[5,6]

Significance of the Homan's sign

Several studies have been conducted to ascertain the predictive value of Homan's sign for DVT.[7–13]

In one study involving control subjects and patients with lower limb thrombosis, phlebography was used to evaluate certain clinical parameters, one of which was Homan's sign. The results showed that all the clinical signs were inconsistent. Homan's sign was seen in only 1/3rd of patients with actual thrombosis. On the other hand, it was seen in 21% of subjects without thrombosis as well.[10]

Curiously, one study demonstrated that in patients with clinically suspected DVT, Homan's sign was more common in patients having a negative venogram than in patients having a positive result.[12]

Thus, after numerous studies, researchers and clinicians have reasonably come to the conclusion that Homan's sign is neither sensitive nor specific for the diagnosis of DVT.

Reliable tests for diagnosing DVT

DVT is a serious condition with potentially fatal outcomes. As the efficacy of clinical examination in ruling out DVT is fairly low, numerous diagnostic techniques using both non-invasive and invasive instruments have been developed.

Impedance plethysmography calculates electrical impedance in the leg. Reduced impedance correlates with venous occlusion and thrombosis. It is particularly helpful in diagnosing proximal vein thrombi.[14]

Compression ultrasonography is used to ascertain leg vein compressibility. Healthy veins are compressible while thrombosed veins demonstrate reduced compressibility. On comparison, compression ultrasonography has been shown to be slightly more reliable than impedance plethysmography for diagnosis of DVT.

Venography is an invasive test and is extremely accurate for diagnosing DVT in proximal as well as distal veins. It has been linked with causing DVT in 3% of patients.[15]

An important study was conducted to ascertain the pretest probability of DVT using a clinical evaluation model. This model categorizes patients into low-risk and high-risk pretest probability groups.[16]

Conclusion

DVT is a fairly important and common condition affecting numerous patients across the globe. Since the complications of DVT are potentially fatal, its reliable diagnostic modality is of utmost importance. A simple clinical exam and the Homan's sign have low sensitivity and specificity in diagnosing DVT; they can be of value if used in addition to more accurate diagnostic procedures like ultrasonography and venography. Homan's sign though unreliable holds great historical importance and has been momentous in our quest over the decades in achieving better diagnostic modalities for DVT. Thus it continues to be practiced in

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medical colleges and private physician clinics across the world because of its easy technique and simple demonstrability.

Conflicts of interest

None.

Disclosures

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