

## Frequency of proven risk factors for deep vein thrombosis in clinical patients: Results of a study on patients being treated at a tertiary care hospital in Rawalpindi, Pakistan

Quratulain Zamir,<sup>1</sup> Aun Raza Shah,<sup>2</sup> Ahsin Mansoor Bhatti,<sup>3</sup> Abdul Ali Wajid<sup>4</sup>

### Abstract

**Objective:** To enlist the dominant risk factors predisposing patients to deep venous thrombosis.

**Methods:** The prospective study was conducted in surgical and medical departments of Combined Military Hospital, Rawalpindi, and Fauji Foundation, Islamabad, from January 2012 to December 2013. Patients having deep venous thrombosis of lower extremities by duplex scan were enrolled. After taking their detailed personal and biochemical history, frequency of risk factors was noted and graded accordingly.

**Results:** Of the total 120 patients, 71(59%) were males. Overall, left leg was involved in 53(44%), right leg in 34(28%) and both legs in 33(28%). Of the total, 68(57%) patients were >40 years of age. Immobility was the main cause of deep venous thrombosis in 18(15%), followed by surgical interventions in 10(8%). Pregnancy and post-partum thrombosis was the major cause in 9(8%) women. Only 6(5%) patients had natural predisposition to deep venous thrombosis.

**Conclusion:** Immobility was an independent and important risk factor for deep venous thrombosis. Thromboprophylaxis is not routinely provided in most health centres in Pakistan, exposing patients to the risk.

**Keywords:** DVT, Thromboprophylaxis, Varicose veins. (JPMA 65: 110; 2015)

### Introduction

Blood inside the vessels usually does not clot normally due to the body's natural defence system against clotting i.e. thrombomodulin, anti-thrombin III, protein C, protein S, smooth walls of the vessels and regular smooth flow of blood. Virchow in 1920s explained that blood clots inside the vessels leading to thrombus formation due to three factors which are known as the Virchows Triad, i.e. changes in the blood vessel endothelium, changes in the blood flow, and changes in the composition of the blood chemistry. Any change in the defence mechanism leads to deep venous thrombosis (DVT).<sup>1</sup>

The signs and symptoms of DVT include erythema of the limb or area at which the clot occludes the vessel, localised pain, oedematous swelling, prominent veins (non-varicose) and palpable veins etc.<sup>2</sup>

Literature search on DVT risk factors highlights increasing age, immobilisation, active rheumatologic disease, acute myocardial infarction (AMI), arterial insufficiency, cancer,

central catheters, hormone therapy, congestive heart failure, cerebrovascular accidents, infection, surgical procedures, inflammatory bowel disease, nephritic syndrome, obesity, paresis of legs, severe respiratory diseases, thrombophilias and varices/chronic venous insufficiency.<sup>3</sup>

The number of people affected by DVT, according to the Centre of Disease Control (CDC) ranges from 60,000 to 100,000 each year in the United States alone.<sup>4</sup> The SMART study concluded that DVT prevalence and mortality rate is also not low in the Asian countries.<sup>5</sup>

Less work has been done so far in Pakistan on conditions involving DVT or embolism.<sup>6</sup> Owing to the complications, pain and agony the patient passes through, it is recommended to prevent the risk factors as much as possible. The present study was conducted to determine the dominating risk factors to help in the prognosis of the disease.

### Patients and Methods

The prospective study was conducted in surgical and medical departments of Combined Military Hospital (CMH), Rawalpindi, and Fauji Foundation, Islamabad, from January 2012 to December 2013. Patients having DVT of lower extremities by duplex scan<sup>7</sup> between 15 and 70 years of age were enrolled in the study and their personal and biochemical history was utilised to collect data.

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<sup>1</sup>Final Year Medical Student, National University of Science and Technology, Army Medical College, Rawalpindi, <sup>2</sup>Shifa International Hospital, Islamabad, <sup>3,4</sup>Combined Military Hospital, Rawalpindi, Pakistan.

**Correspondence:** Quratulain Zamir. Email: qurat\_aini@hotmail.com

Written informed consent was taken from all patients in connection with the use of their diagnostic reports for study purposes. Patients with chronic DVT of more than three months were excluded and so were those with unclear duplex reports or two contradictory reports.

Risk factors like immobility  $\geq 3h$ , spontaneous, history of thrombosis, multiple risk factors, history of surgery, history of carcinoma, history of pregnancy/post-partum, Factor 5 deficiency, severe respiratory infection, history of chronic venous insufficiency, protein C deficiency, combined factor deficiency, history of chronic heart failure, history of rheumatologic disease, history of varicose veins, history of chicken pox were considered in line with national and international literature review.<sup>8-11</sup>

Descriptive statistics were used to analyse the data. Frequency of risk factors was noted and graded accordingly.

**Results**

Of the total 120 patients, 71(59%) were males and 49(41%) were females. Overall, left leg was involved in 53(44%), right leg in 34(28%) and both legs in 33(28%) (Figure).

Of the total, 68(57%) patients were >40 years of age. Immobility due to any reason — professional duty as in the case of guards or drivers, long-distance travel or history of hospital admission — was the main cause of DVT in 18(15%) patients, followed by surgical interventions in 10(8%). Pregnancy and post-partum thrombosis was the major cause in 9(8%) women (Table).

Overall, 14(12%) patients had no risk factor or family history of DVT but still had the disease for unknown reasons. Biochemical tests revealed that 6(5%) patients had natural predisposition to DVT due to Factor 5 Leiden deficiency, signifying the role of genetics in DVT.

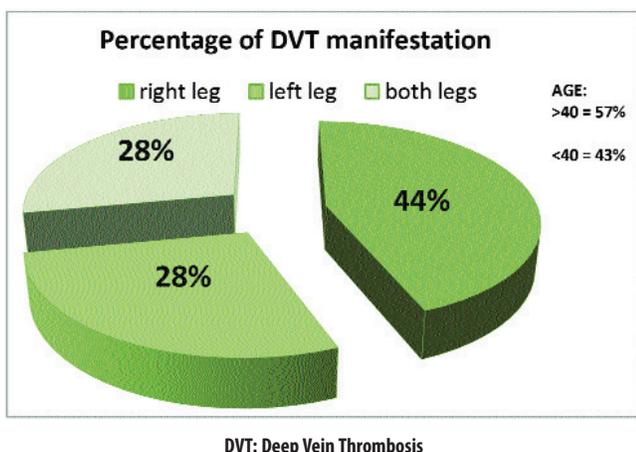


Figure: Site of thrombosis.

Table: Risk factors causing.

Risk Factor	Frequency	Percentage
Immobility $\geq 3h$	18	15
Spontaneous	14	12
History of thrombosis	12	10
Multiple risk factors	12	10
History of surgery	10	8
History of Carcinoma	9	8
History of Pregnancy/post-partum	9	8
Factor 5 deficiency	6	5
Severe respiratory infection	5	4
History of Chronic venous insufficiency	5	4
Protein C deficiency	4	3
Combined factor deficiency	4	3
History of Chronic Heart Failure	4	3
History of Rheumatologic disease	4	3
History of Varicose veins	3	3
History of Chicken pox	1	1

There were 12(10%) patients with multiple risk factors, making it practically impossible to pin down the basic cause behind DVT.

**Discussion**

The study identified the common DVT risk factors in the study area. Immobility was found to be the major cause. As immobility is not well-defined in terms of duration, with different studies showing different time periods, we suggest that any immobility more than 3 hours to one day with complete absence of walking, excluding the sleep time, will be considered significant as a predisposing factor for DVT which is in agreement with other studies.<sup>12-14</sup>

Surgical interventions were the 4th most common risk factor in our study after spontaneous occurrence of DVT. This factor has contributions from intravenous catheters used during surgeries and immobility caused as a result of hospital stay aggravating the disease. Clinical trials concluded that surgical patients if left without any prophylaxis may develop DVT while those undergoing physical activity and therapeutic treatment did not develop DVT post-operatively signifying surgery as a risk factor.<sup>15,16</sup>

Cancer is known to cause hyper-coagulability states and certain carcinogenic substances also induce thrombosis. Chemotherapy is also said to be a factor in cancers causing DVT. In our study, history of all sorts of malignancies ranked among one of the significant factors, which, again, is in line with literature.<sup>17</sup>

Thrombophilias are hereditary disorders of natural anti-coagulation factors such as ATIII, protein C, protein S and Factor 5 Leiden. In our study these factors were found to be important predisposing factors. Contrary to other

studies,<sup>18,19</sup> Factor 5 deficiency was a more dominant risk factor.

In women, pregnancy and post-partum were the common causes of DVT as also mentioned in other studies.<sup>20</sup>

Studies have also shown that the incidence of DVT increases exponentially with aging, predominantly >40. It is not clear if the reasons for these are changes in the clotting mechanism or the presence of thrombogenic comorbidities.<sup>12</sup> Our study produced similar results.

Other risk factors, like congestive heart failure, varicose veins, chronic venous insufficiency, rheumatologic disease and multiple risk factors were in agreement with literature.<sup>12</sup> However, respiratory diseases were found less influential in causing DVT in our study contrary to an earlier study.<sup>21</sup>

In developing countries like Pakistan thromboprophylaxis is not routinely provided in most health centres because of which a lot of patients lose their lives.<sup>22</sup> Our findings suggest major improvement in that direction.

The study had limited number of subjects and, as such, it is unable to conclude the risk factors more authoritatively. We are in the process of modifying the study by adding the site of thrombus in the legs and suggestions of the treatments and prophylactic methods.

## Conclusion

Preventive medicine has a greater role than curative medicine across the world. Routine follow-up and preventive measures may reduce the number of casualties if we understand the risks and are willing to adopt preventive steps.

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