INTRODUCTION

Swelling of one or both lower limb/s is a common presenting symptom. Deep venous thrombosis in the leg characteristically causes pain, swelling, redness, and tenderness. Often, however, there are only a few symptoms and DVT cannot be excluded without appropriate investigations.
Majority of ambulatory patients with clinically suspected venous thrombosis have another cause for their symptoms.

**The most likely simulating conditions include:**
- Ruptured Baker's cyst.
- Cellulitis.
- A muscle tear.
- A muscle cramp.
- A muscle haematoma.
- A muscle infarction.
- External venous compression.
- Superficial thrombophlebitis.
- Postphlebitic syndrome.
- Hypoalbuminaemia.

Deep vein thrombosis can result in grave complications; however, early diagnosis and management can prevent these.

**The complications of DVT include:**
1. Pulmonary embolism.
2. Post-phlebitic syndrome.

Usually there are three factors, which promote venous thrombosis, called Virchow's triad, which includes:
1) Stasis or turbulence of blood flow
2) Endothelial injury and
3) Blood hypercoagulability. Most patients have one or more well-recognized risk factors.

**The most common risk factors are:**
Any surgical procedure requiring 30 minutes or more of general anaesthesia, Postpartum period, Trauma, and Immobility, as well as serious illness, including congestive heart failure, stroke, malignancy, and inflammatory bowel disease.

**The common risk factors in outpatients include:**
Hospital admission within the past 6 months, malignancy, pregnancy; use of estrogens, presence of anti-phospholipid antibody, and familial thrombophilia.

**Less common associations** are paroxysmal nocturnal hemoglobinuria, nephrotic syndrome, and polycythemia vera.

**RESEARCH METHODOLOGY**
In this study we had 50 patients with clinically suspected deep vein thrombosis, admitted in Medical wards of Khyber Teaching Hospital. All cases were selected according to inclusion and exclusion criteria as given below. The clinical data of each case was recorded separately in a proforma. In each case Doppler was performed on the whole length of lower limb/s. The clinical features of Doppler positive cases, having deep vein thrombosis, were compared to the Doppler negative cases. The diagnosis of deep vein thrombosis was suspected on the basis of present and past history and thorough clinical examination. The final diagnosis was established with the help of Colour Flow Doppler Ultrasonography.

The results were validated by improvement in the clinical condition after the anticoagulant therapy.

**Inclusion Criteria**
This included:
1. Any patient presenting with swelling and pain alone or with redness, and or tenderness of lower limb/s.

**EXCLUSION CRITERIA**
This included:
1. Swelling of lower extremities alone without other features of deep vein thrombosis.
2. Recent history of trauma.
4. Any patient with abdominopelvic masses pressing on the pelvic vessels (including pregnancy).
5. Patients with skin diseases.

**RESULTS**
Out of all 50 cases, 25 patients had deep vein thrombosis and 2 cases had post-thrombotic sequelae. 23 patients although had some of the features of DVT but non-had DVT. The distribution of clinical features in colour flow doppler proven cases of DVT is shown in Table No: 1. This table declares that there are two and a half times greater chance of DVT in patients who present with all four classical features.

In the remaining 25 patients where DVT could not be established on colour flow doppler, the distribution of clinical features in these cases are represented in Table No: 2 which shows that the classical features of DVT are sufficiently specific to DVT and when present should prompt investigations for its early diagnosis and management.

The risk factors seen in this study are shown in Table No: 3. Postpartum period was the leading risk factor in this study.
Table 1: Distribution of Clinical features in Patients with C.F. Doppler +ve studies for DVT

<table>
<thead>
<tr>
<th>C.F. Doppler</th>
<th>CLINICAL FEATURES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>i.e. DVT established on C.F. Doppler.</td>
<td>Swelling + Pain alone</td>
<td>Swelling + Pain + Redness &amp; OR Tenderness</td>
</tr>
<tr>
<td>25 cases (50%)</td>
<td>07 cases (14%)</td>
<td>15 cases (36%)</td>
</tr>
</tbody>
</table>

Table 2: Distribution of Clinical features in Patients with C.F. Doppler -ve studies for DVT

<table>
<thead>
<tr>
<th>C.F. Doppler</th>
<th>CLINICAL FEATURES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>i.e. DVT established on C.F. Doppler.</td>
<td>Swelling + Pain alone</td>
<td>Swelling + Pain + Redness &amp; OR Tenderness</td>
</tr>
<tr>
<td>25 cases (50%)</td>
<td>23 cases (46%)</td>
<td>02 cases (04%)</td>
</tr>
</tbody>
</table>

Table: 3. Percentage of Major risk factors for DVT.

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>No. of cases</th>
<th>Percent- age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post- Partum</td>
<td>7</td>
<td>26%</td>
</tr>
<tr>
<td>Cor pulmonale</td>
<td>3</td>
<td>11%</td>
</tr>
<tr>
<td>Congestive Cardiac failure</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>Immobilization (old age)</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>Gastroenteritis (shock)</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Nephrotic Syndrome</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Past Hx. of deep vein thrombosis</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Spontaneous</td>
<td>10</td>
<td>37%</td>
</tr>
</tbody>
</table>

DISCUSSION

Deep vein thrombosis is an important cause of morbidity and mortality. Venous thrombosis of the lower limb is a source of more than 95% of pulmonary embolism and approximately 40% of patients with DVT have a pulmonary embolism, although most of these are clinically silent. Since there is a poor correlation between symptoms and signs and presence of thrombosis, therefore, early and appropriate management requires continuation by objective methods; Screening investigations include D-dimer tests, plethysmographic techniques and for a definitive diagnosis Venography or ultra-sonography is required.

Most thrombi are clinically silent when they are first detected by objective methods. This is probably because they don’t obstruct the vein completely and patent collateral circulation also plays an important role in it. As a rule of thumb, for every 100 outpatients with suspected DVT 16 will have a proximal DVT and 4 will have a distal DVT.

In this study, colour flow Doppler studies were positive for deep vein thrombosis in 50% of the patients where 36% had all the four classical features (swelling, pain, redness and tenderness) while 14% had only swelling & pain as the presenting complaints.

In the study, the major group affected by DVT is post-partum females. The reason for this (in our set-up) is probably ignorance, poverty, social and financial problems. Majority of our general public restrict their females to their homes and many women do not step out of bed in the early postpartum period. Therefore, to overcome this problem, emphasis should be given on education, awareness, good ante-natal services and postpartum care with persuasion for an early mobility.

A diagnosis of suspected DVT must be confirmed by a sensitive and specific test. The best-evaluated tests are ascending venography, duplex ultrasound and impedance plethysmography, having sensitivity of 100%, 97%, 92% respectively, and specificity of 100%, 97%, 95% respectively.

Ascending Venography, using contrast medium, is the most reliable method for diagnosing DVT. However, it is relatively more invasive, requires exposure to radiation and is not free from risks.

Non-invasive tests, such as Colour Flow Doppler Ultrasound. Duplex Ultrasound And Impedance Plethysmography, have largely replaced the ascending venography for detection of deep vein thrombosis.

Impedance Plethysmography has been reported to bear a sensitivity of 30-70% and specificity of 68-98% by Kristo et al, 1994.

Colour Flow Duplex Sonography is a new technique which combines compression ultrasound with doppler information and colour flow imaging. The colour flow duplex sonography has simplified the examination and reduced the examination time to 15-20 minutes for the whole limb. Various studies have shown promising results. In a comparative study by Mani and Regan et al, 1995 duplex ultrasound gave overall accuracies of 99% and 90 % for above and below knee venous thrombosis respectively.
Colour Flow Doppler is a technique in which Doppler signals are encoded in colour image, thus, direct visualisation of intravascular flow is possible. It is easy to perform. Spontaneous flow is evident in the femoropopliteal segment, whilst proximal half vein flow can only be appreciated with the aid of distal compression. Eccentric thrombus and partially recanalised thrombus can also be shown. Overall, the sensitivity and specificity for detection of lower limb venous thrombosis including calf vein assessment were 93% and 100% respectively. The differences in sensitivity and specificity between MR-venography and color Doppler sonography are not statistically significant. Color Doppler sonography has a 100% specificity in detecting the extension of deep venous thrombosis. This offers the clinician the most reliable and accurate information short of venography and in some cases surpassing it. All patients understudy, underwent ultrasound examination by colour flow Doppler Sonography technique. 25 patients had deep vein thrombosis and 2 patients were diagnosed as having post thrombotic sequelae.

The results were validated by improvement in the clinical condition of the patients after instituting anticoagulant therapy. The sensitivity & specificity of colour flow Doppler was 100%.

CONCLUSION

Deep vein thrombosis is a clinical condition that can end in a life threatening state, "the Pulmonary Embolism" which can be prevented by a timely diagnosis of DVT. All the four characteristic features (swelling, pain, redness and tenderness) of DVT, when present, increase the probability of its early diagnosis and hence provide a chance to embark a prompt management to escape the complications. Colour flow Doppler Sonography, the non-invasive technique, alone is enough to diagnose DVT as it has got a high sensitivity and specificity. This offers a clinician the most reliable and accurate method just short of Venography.

REFERENCES

3. Clive Tovey and Suzanne Wyatt. Diagnosis, investigation, and management of deep vein thrombosis, BMJ May 2003; 326: 1180-1184.31

Address for correspondence:
Dr. Muhammad Zahid,
Khyber Teaching Hospital,
Peshawar.