Dural sinus thrombosis (DST) is an uncommon form of venous thrombo-embolism. It is characterized by the presence of blood clot in dural or cortical veins of brain. DST is disease of younger population with an incidence of 3-4 cases per million according to studies in Canada, USA and Brazil. The incidence of DST in Pakistan is 10-15% annually. In Iran, its prevalence is estimated to be 12.1 per million people.

Dural Sinus Thrombosis accounts for 0.5-3.0% of all types of stroke. DST is predominant in women (75%) as compared to males with a ratio of 3:1. A random survey of tertiary care hospital of KPK concluded that almost 60% of patient suffering from DST were in the 3rd to 4th decade of life and 54% were women in child bearing age.

DST has multi factorial etiology. It may be associated with congenital and acquired risk factors. In developed countries, congenital thrombophilia is the most frequently associated risk factor. Acquired risk factors include malignancy, central nervous infections, head trauma, systemic vasculitis, pregnancy and puerperium. In developing countries like Pakistan, India, Sri Lanka and Iran, pregnancy and purpeurium are the most dominant prothrombotic conditions leading to DST.

In our country, post partum DST is more common. The exact pathogenesis is unclear but it seems that hypercoagulable state is the key feature in development of DST during pregnancy and puerperium.

During pregnancy, specially in 3rd trimester different changes occur in coagulation system such as increase platelet adhesion and enhanced coagulation factors which lead to hypercoagulable state resulting in the developing of DST. In our community, bad obstetrical practice by unqualified people results in blood loss and local trauma during delivery. Also immobility and prolonged bed rest during puerperium results in venous stasis which along with dehydration further aggravate the prothrombotic state. All this leads to thrombosis.

There is scarcity of information and studies regarding post partum DST in Pakistan. We have attempted to find the different manifestations of DST in puerperium at a tertiary care hospital of KPK.
DST who were admitted in Medical and Obstetrics and Gynecology units of the hospital were enrolled. DST was confirmed by neuroimaging (MRI Brain and MR Venography). Detailed history, clinical examination and baseline investigations were carried out in all our subjects. Fundoscopy and CSF analysis was performed in all patients. All the necessary information was collected on a predesigned proforma meeting the objectives of the study. Informed consent was taken from all participants. Our study was approved by the hospital committee. Findings were analyzed by SPSS software version 22.

RESULTS

Clinical manifestations of the 35 confirmed post partum DST cases were studied. The age of the patients was in the range of 15-40 years. Majority of the patients were in the age group 21-30 years (71.4%) with mean age of 26±2 years. Most of our patients had low socio-economic status (44.4%) and were illiterate. Among the enrolled 35 patients, 14 patients (40%) belonged to Peshawar while the remaining were referred from rural areas.

As far as the obstetrical history is concerned, post partum DST was predominantly seen in primi-gravidas (37.14%). 11 patients (30.6%) had home delivery by local Dais and Lady Health Visitors while 14 (38.9%) had hospital instrumental delivery and %). 10 patients (27.8%) had Caesarean Section at district hospital or tertiary care hospital.

In 03 patients (8.3%) there was past medical history of DST. Detailed enquiry revealed non-compliance with previous medications.

Fever and headache were the most common presenting complaints followed by seizures, visual disturbances and focal neurological deficits as delineated in Table 1.

Neuroimaging revealed hemorrhagic infarcts in 25 cases (69.4%). While non-hemorrhagic infarct was seen in 10 cases (27.8%).

Transverse sinus was the most common sinus involved by thrombosis among studied patients (47.2%). This was followed by superior sagittal, sigmoid and cavernous sinus (28.5%, 20.0% and 2.8% respectively) as shown in Table 02.

DISCUSSION

DST is a life threatening entity that needs prompt diagnosis and treatment. In developing countries purperium and infectious diseases are most common etiological factor as compared to the western population. Post partum DST is attributed to hypercoaguable state of pregnancy. In our country, there is local custom of immobility and prolonged bed rest, high protein and fat diet and low water intake following delivery. This could further aggravate the hyper viscosity.

Most of the patients in our study were in age range of 21-30 years. This is in accordance with an Indian study conducted by Narayan and his colleagues in Hyderabad between 2002 and 2010 demonstrating mean age of 26±2 years at the time of presentation. Similarly in an Iranian study of 1122 patients, similar age groups has been revealed. Majority of our study patients were illiterate and belonged to low socio-economic status. Withholding fluid intake especially in hot summer season and poor hygienic health exercises play an important role in the development of DST. Restricting water in the post partum period is a common tradition in our society. There are certain spiritual faiths and superstitions behind this kind of act. For example, some people have trust that less water intake by mother during purperium results in more strengthening of the breast milk for the baby. Others linked this to less bleeding during labor and delivery. Aaron et, al also demonstrated dehydration as a result of less water intake in the post partum period in the causation of post partum DST.

In our study, DST was more encountered in multiparous women. Most of these women with multi-

<table>
<thead>
<tr>
<th>Sr. no</th>
<th>Symptoms</th>
<th>Number of Patients(n)</th>
<th>Percent-age (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Headache</td>
<td>25</td>
<td>71.4</td>
</tr>
<tr>
<td>2.</td>
<td>Fever</td>
<td>22</td>
<td>62.9</td>
</tr>
<tr>
<td>3.</td>
<td>Visual symptoms</td>
<td>16</td>
<td>45.7</td>
</tr>
<tr>
<td>4.</td>
<td>Focal weakness</td>
<td>10</td>
<td>28.5</td>
</tr>
<tr>
<td>5.</td>
<td>Vomiting</td>
<td>09</td>
<td>25.7</td>
</tr>
<tr>
<td>6.</td>
<td>Seizures</td>
<td>07</td>
<td>20.0</td>
</tr>
<tr>
<td>7.</td>
<td>Vertigo</td>
<td>04</td>
<td>11.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sr. no</th>
<th>Cerebral Sinus</th>
<th>Number(n)</th>
<th>Percent-age(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Transverse sinus</td>
<td>17</td>
<td>47.2</td>
</tr>
<tr>
<td>2.</td>
<td>Superior sagittal sinus</td>
<td>10</td>
<td>28.5</td>
</tr>
<tr>
<td>3.</td>
<td>Sigmoid sinus</td>
<td>07</td>
<td>20.0</td>
</tr>
<tr>
<td>4.</td>
<td>Cavernous sinus</td>
<td>01</td>
<td>2.80</td>
</tr>
</tbody>
</table>
ple pregnancies had bad obstetrical history including spontaneous abortion and still birth. Kupferminc and his colleagues in their research on genetic thrombophilia screen pointed out that concealed thrombosis was present in 71% of patients who had suffered from different kinds of obstetrical complications.\textsuperscript{20} There is also link of thrombophilic gene polymorphism in women with unexplained late fetal loss. Martinelli also disclosed the same in his study.\textsuperscript{21}

In our study, 27.8% deliveries were by Caesarian Section. Caesarian delivery is an unconventional risk factor for DST.\textsuperscript{22} Following any surgery, Protein C level can decrease\textsuperscript{23}. Also there is a pregnancy associated resistance to activated protein C\textsuperscript{24,25}.

DST is a multi causative condition characterized by temperamental clinical presentations. Patient age, location and extension of thrombosis and the cost of underlying disease play an important role in such inconsistencies.\textsuperscript{26} In our study the most frequent symptom were headache (71.4%) and fever (62.9%). Diffuse, isolated and bilateral headache was reported. Saponek and his colleagues has shown 90% frequency of headache in their study\textsuperscript{27}. The mechanism of headache is local inflammation, venous wall distention and blood leakage over the brain surface, irritating the dural sensitive fibres.\textsuperscript{28}

Seizures were seen in 07 of our confirmed DST patients (20.0%). Both focal and generalized tonic clonic fits were observed. Kalita and Inacio have figured out that 44.3% of patients may have seizures in early stages of disease.\textsuperscript{29}

Focal neurological deficits were observed in 10 patients (28.5 percent) in our study. This sequelae is comparable to those reported in previous studies.\textsuperscript{30,31} Guenther and Arauz described that focal sensory and motor deficits are very common in DST and may be suggestive of location site, especially when associated with cranial nerve palsy.\textsuperscript{32}

As far as the location of the thrombus is concerned, we found in our patients that transverse sinus was more commonly involved followed by superior sagittal sinus (47.2%, 28.57% respectively). The International Study on Cerebral Vein and Dural Sinus Thrombosis (ISCVT) determined the frequency of the sites of cerebral venous thrombosis which is in agreement with our study. It discloses that the involvement of Transverse Sinus is eighty six percent (86%), Superior Sagittal Sinus is sixty two percent (62%) and that of straight Sinus is eighteen percent (18%).\textsuperscript{33}

CONCLUSION

It is concluded from our study that post partum DST is a potentially fatal disease which is sometimes misdiagnosed resulting in catastrophe. Public awareness, training of health care providers and revision of health policies is the need of the day.

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