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DURAL SINUS THROMBOSIS - A LOCAL EXPERIENCE AT SHIFA INTERNATIONAL HOSPITAL, ISLAMABAD, PAKISTAN

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ABSTRACT

Introduction: Dural sinus thrombosis (DST) is not a rare disorder. A high index of suspicion is needed to make the diagnosis. A number of causes of DST have been reported. Dural sinus thrombosis carries significant morbidity and mortality. **Objective:** To describe the presentation, causes and outcomes of dural sinus thrombosis (DST) in Shifa International Hospital (SIH), Islamabad. **Materials & Methods:** An observational chart review was conducted on patients admitted to SIH between June 2009 and June 2011 with the diagnosis of DST. A standard structured questionnaire was completed for every patient. **Results:** A total of 31 patients were seen, majority of whom were females 17 (54.8%). Mean age was 36.5 ± 19.9 (range 8 months to 78 years). Most common presenting complaints were headache, seizures, hemiparesis, visual disturbance, and altered sensorium. Homocysteine was elevated in 11 patients, protein S deficiency was seen in 9, antithrombin III deficiency in 5, and protein C deficiency in 2. Increased white cell count was seen in 15 and anemia in 13 patients. Magnetic resonance venogram was done in 19 patients. Most common site of thrombosis was superior sagittal sinus in 23 patients; followed by transverse sinus in 22; and sigmoid sinus in 20. On admission 17 patients had modified a Rankin scale (mRS) score of ≤ 3 , whereas 21 patients had a mRS score of ≤ 3 on discharge. Two patients died, whereas 8 patients were discharged with mRS of 4 or 5. No recurrence of symptoms had been reported in immediate follow-up of 24 patients and 5 were lost to follow-up. **Conclusions:** DST is more common in women. Elevated homocysteine was the commonest cause in our patients. Increased white cell count and anemia were frequently seen.

Keywords: Dural sinus thrombosis, presentation, etiology, outcome, Pakistan

INTRODUCTION

Dural Sinus Thrombosis (DST) has been recognized for almost two hundred years¹. Dural Sinus Thrombosis accounts for 0.5-1% of all strokes and is one of the commonest causes of stroke in the young². DST has broad spectrum of clinical presentation that makes it challenging, so a high index of suspicion is needed to reach the diagnosis. DST can affect all age groups but it is usually seen in young and middle aged adults. The incidence in adults is about 2 to 4/million/year and in children incidence is 6.7/million/year^{1,3,4}. In younger age group it is seen commonly in females with a female to male ratio of 3:15 and it is mainly because of gender-specific risk factors like pregnancy, puerperium, use of oral contraceptive pills etc⁶. In almost 30% of cases no obvious cause can be found^{7,8}. In the recent past increased awareness, improved imaging techniques and effective treatment has improved the

outcomes in DST patients⁹.

OBJECTIVE

This study was conducted to find out the commonest causes, course and pattern of the disease, response to the treatment and prognosis of patients with DST seen at Shifa International Hospital, Islamabad, Pakistan.

MATERIALS & METHODS

This was an observational chart review. Institutional review Board (IRB) approved the study. All patients admitted between June 2009 and June 2011 with the diagnosis of dural sinus thrombosis were included in the study. The patients were identified through

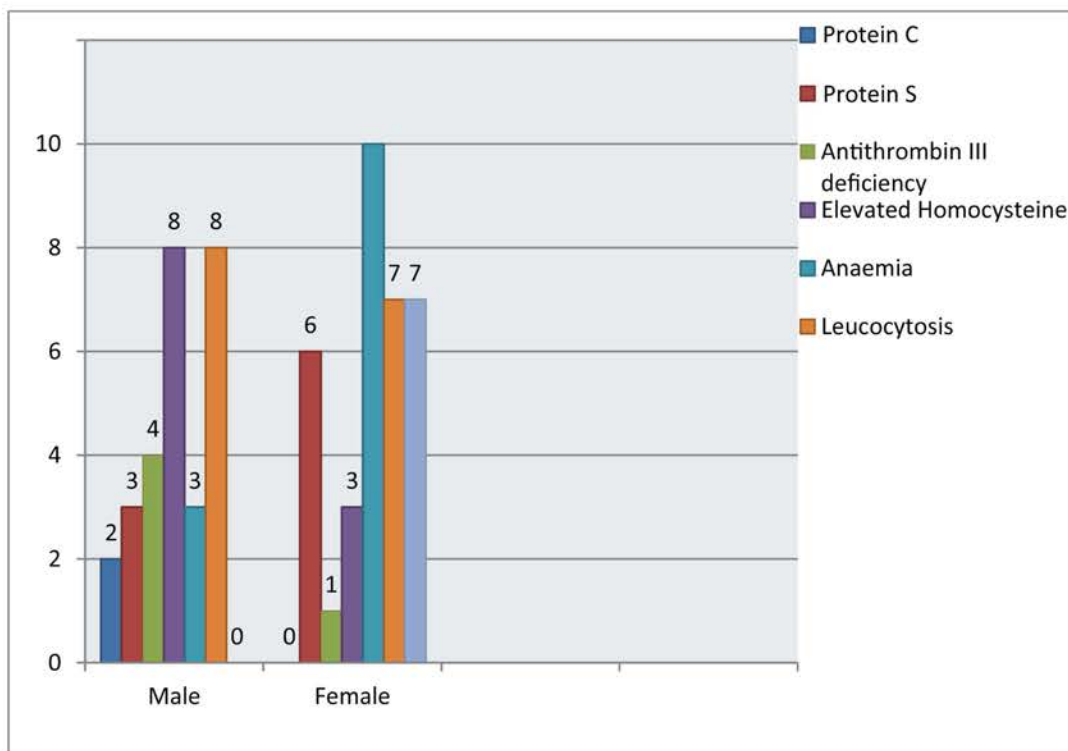


Figure 1: Frequency of various risk factors according to gender

neurology division records. For every patient a structured data collection form was completed. Patients were followed at 1 month, 6 months, 1 year and 2 year interval and the outcomes were assessed using modified Rankin Scale (mRS).

RESULTS

Thirty one patients were seen during the study period. Seventeen were females (54.8%) and fourteen (45.1%) were males. Mean age was 36.5 ± 19.9 years (range 8 months - 78 years). Mean age in females was slightly younger at 32.3 years, and in males was 38.2 years. Twenty four patients (77.4%) out of thirty one were less than 45 years of age, four (12.9%) were between 45 to 60 years of age and 3 (9.6%) were > 60 years of age. Most common clinical presentations seen in our patients are described in table 1. Frequency of various risk factors according to gender is shown in figure 1. CT scan of brain was done in twenty four (77.4%) patients, magnetic resonance venogram (MRV), and magnetic resonance imaging (MRI) of brain were done in nineteen (61.2%) patients. The most common sites of thrombosis were superior sagittal sinus thrombosis in nine patients (64.3%), transverse sinus thrombosis seen in eight patients (57.1%) and sigmoid sinus thrombosis seen in six

patients (42.8%). Multiple sinuses were involved in twenty four patients (77.4%). Mean time from onset of symptoms to diagnosis was 7 days. All of the patients initially received anticoagulation with enoxaparin 1mg/kg body weight twice a day subcutaneously followed by oral anticoagulant, warfarin, with a target INR of 2 to 3. Anticoagulation was continued for 6 months in patients with no obvious hypercoagulable state, whereas anticoagulation is continued indefinitely in patients with hypercoagulable states. Mean stay in hospital was 10 days.

Outcomes were assessed using modified Rankin scale (mRS) score. On admission seventeen patients (54.8%) had a modified Rankin scale (mRS) score of ≤ 3 , whereas twenty one patients (67.7%) had a mRS score of ≤ 3 on discharge. Functional outcomes in patients at discharge and follow up are shown in table 2. Twenty four patients (77.4%) patients came for follow up; none of them developed recurrence of symptoms, whereas five patients (16.1%) were lost to follow up. Longest follow-up was up to 2 years. Two patients (6.4%) died during hospitalization who had extensive DST and hemorrhage. Follow up neuroimaging was done in twelve (38.7%) patients that mostly showed partial recanalization or complete interval resolution of DST.

Table 1: Demographic features and common clinical presentations

	Frequency	Percentage
Gender		
Male	14	45.1%
Female	17	54.8%
Age		
Mean Age	36.5 ± 19.9 years	
Mean Age (Males)	38.2 years	
Mean Age (Females)	32.3 years	
Presenting complains		
Headache	21	67.7%
Seizures	15	48.3%
Hemiparesis	13	41.9%
Visual Impairment	08	25.8%
Vomiting	07	22.5%
Altered consciousness	05	16.1%
Fever	03	9.6%
Vertigo	01	3.2%
Imbalance	01	3.2%

Table 2: Functional outcome (modified Rankin scale) score in patients at discharge and follow up

mRS	0 - 2	3	4	5	6	Total
On admission	12	2	12	5	0	31
On discharge	16	3	9	1	2	31
1 month follow up	4	1	4	1	-	10
6 month follow up	6	1	-	1	-	8
1 year follow up	3	1	-	-	-	4
2 year follow up	1	1	-	-	-	2
No follow up	-	-	-	-	-	5

DISCUSSION

Dural sinus thrombosis is an uncommon, less recognized vascular disorder of the brain. It is seen more commonly in women than in men^{6,10}. These increased numbers in females are attributed to some risk factors that are associated with gender, like pregnancy, puerperium, and use of oral contraceptive pills. The overall prognosis of DST among these patients is favorable regardless of the treatment used¹¹. DST is not infrequent in children, we had 2 children in our series, one was 8 month old baby girl and second one was six year old boy. One child had headache, whereas the other had hemiparesis and seizures. Protein S was deficient in both, while male child had protein C and antithrombin III deficiency as well. Both made good recovery, and are now independent in age-related activities of their daily lives. Three (9.6%) out of thirty one, were in older age group; all of them had seizures and hemiparesis as their presenting complains.

Various studies have shown that commonest sites of thrombosis are superior sagittal sinus, transverse and sigmoid sinuses, and approximately in one third of cases, multiple sinuses are involved¹². Our study showed similar results with highest involvement of superior sagittal sinus, however, involvement of multiple sinuses was more common in our series, with twenty four (77.4%) patients having involvement of multiple sinuses.

The clinical presentation of patients is quite variable ranging from headache, seizures, focal neurological deficits, altered consciousness, coma and death. Headache is usually the commonest presentation seen in almost 80% of DST patients^{2, 7, 9, 13, 14, 15} as was seen in our patients as well. Seizures are also very commonly seen in DST patients. In our series, seizures were the second most common presenting symptom seen in almost half of our patients.

Diagnosis of dural sinus thrombosis is no more a challenge because of availability of advanced non-invasive neuroimaging techniques. MRI and MRV are excellent imaging methods to diagnose dural sinus thrombosis and are considered the techniques of choice. MRV is the non-invasive method, as CT-venogram (CTV) requires use of contrast medium that has its own hazards^{3, 16}.

Development of DST in the postpartum period is generally thought to be due to hypercoagulable state of pregnancy¹⁷. Postpartum development of DST was not uncommon in our study.

Anemia has been frequently seen in association with dural sinus thrombosis^{18,19} however, exact mechanism which leads to DST in these patients is not clearly understood. In our series, thirteen (41.9%) patients were found to have anemia, however, several of them had other hypercoagulable risk factors.

Recently published EFNS guidelines and the results of The International Study on Cerebral Vein and Dural Sinus Thrombosis (ISCVT) suggests that anticoagulation with intravenous unfractionated heparin or subcutaneous low molecular weight heparin (LMWH) is the first line treatment of dural sinus thrombosis¹. All of our patients received subcutaneous LMWH, followed by oral anticoagulation with warfarin. None of our patients underwent thrombolysis.

Prior studies have revealed that more than 80% of patients will have good neurological outcome⁹. Our patients also had improvement in their mRS with time as shown in table 2. Mortality with DST has been reported in up to 6-15 % of cases⁹. Mortality in our study was 6.4%, with no recurrence of symptoms in the 24 patients who were seen in follow-up of up to two years.

CONCLUSION

During the past decade, increased awareness, early recognition, improved neuro-imaging techniques, and more effective treatment have improved the prognosis. This small series of our patients also show similar findings, however, there is need for longitudinal, possibly multi-center studies to understand pattern and prognosis of DST in our patient population.

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