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Original Research Article

Transverse sinus stenosis distribution in refractory chronic headache patients in Pelni hospital

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ABSTRACT

Background: Transverse sinus stenosis (TSS) is a common finding on MRI of patients with refractory chronic headaches. Bilateral TSS with severity >50% was found in almost all (93%) patients with idiopathic intracranial hypertension (IIH). IIH can lead to papilledema and result in loss of visual function. This study aimed to determine the prevalence of TSS in patients with refractory chronic headache at Pelni hospital, Jakarta.
Methods: This was a descriptive analytical study and conducted at Pelni hospital, Jakarta from January to June 2021, with a sample of patients suffering from refractory chronic headaches. Data were analyzed using SPSS version 24.
Results: There were 70 subjects, with a mean age of 52.97±13.29, the majority aged <60 years (65.7%), with the male sex being more dominant (62.9%). There were 39 people (55.7%) with TSS; as many as 37 with (52.9%) left TSS and 2 (2.8%) with right TSS. Bivariate analysis with Chi square showed no relationship between age and sex with the presence of TSS in patients with refractory chronic headache (p=0.798 and p=0.487).
Conclusions: TSS was associated with the incidence of IIH. However, this finding has not yet been proven to be significant. This study also did not find a correlation between age and gender with the incidence of TSS.

Keywords: Transverse sinus stenosis, Refractory chronic headache, Idiopathic intracranial hypertension

INTRODUCTION

TSS is a common feature of MRI findings in patients with chronic headache symptoms, both migraine and tension type headaches.[1] Refractory chronic headache is a term used to describe persistent headaches that are difficult to treat or fail to respond to standard or aggressive therapy. Headaches can be primary (idiopathic) or secondary. Secondary headaches can be a sign of underlying disease, both intracranial and extracranial. Common causes of secondary headaches include infection, trauma or cerebrovascular disorders.[2,3]

TSS is a common finding in patients with IIH and often contributes to intracranial hypertension by increasing venous pressure when the stenosis is bilateral and severe enough to impair cerebral circulation. IIH is a collection of symptoms characterized by an isolated increase in intracranial pressure of unknown cause and is responsible for papilledema leading to visual loss in almost 25% of cases of IIH. Although the exact cause of IIH is unknown, endovascular stenting is the treatment of choice in patients with IIH.[4]

IIH as a condition of idiopathic intracranial hypertension is common especially in young women, those with excess body mass index, older men with obstructive sleep apnea and patients with various endocrine problems. The main symptoms of IIH are headache, stiffness and discomfort in the shoulder and back area. The main concern of an

inadequately treated IIH is papilledema which leads to progressive and irreversible loss of vision.[5] Various MRI findings associated with IIH include empty sella, optic nerve dilatation, vascular distension and protrusion of the optic papilla which range from 6-66% in IIH patients, in contrast to findings with MRV sequences showing >50% bilateral TSS seen in 93% of patients with IIH.[1,5]

Digital subtraction angiography (DSA) is a diagnostic tool with high accuracy in detecting abnormalities in the cerebrovascular system, although this examination includes invasive neurovascular technique. DSA is the standard diagnostic modality for neurovascular diseases including occlusion, aneurysm, stenosis and others.[6]

This study aimed to determine the distribution of TSS in patients suffering from refractory chronic headaches based on DSA examination. This study also examined the demographic characteristics of patients with TSS.

METHODS

This was a descriptive analytical study and the data were taken primarily from the medical records of chronic headache patients undergoing DSA. This study was conducted from January to June 2021 at Pelni hospital Jakarta with a total of 70 patients who met the inclusion and exclusion criteria. The inclusion criteria in this study were patients aged 18 years, had refractory chronic headaches, hemodynamically stable conditions, had no contraindications for DSA and signed a consent letter. Exclusion criteria in this study included patients with contraindications to DSA such as kidney failure and unable to give consent of the action. DSA procedure in this study used a single-plane DSA engine. Access was taken through the femoral artery using a 5-7 French catheter with heparinized saline infusion and angiography using wire guides, vertebral markers, JR and headhunters as a guide in catheterization.

The data that were collected were demographic data including age, gender and imaging data for the presence or absence of stenosis and the location of the stenosis. The data was processed using SPSS version 24 for windows. We analyzed the data using the Chi square test.

RESULTS

There were 70 patients with refractory chronic headaches who underwent the DSA procedure and met the inclusion criteria in this study. The mean age of patients was 52.97±13.29 years with range of age from 18 to 78 years. There were more patients aged <60 years (65.7%) than 60 years (34.3%). The majority of respondents in this study were male (62.9%). From a total of 70 patients with refractory chronic headache, there were more than half of the patients, in exactly 39 people with transverse sinus stenosis (55.7%). The majority position of transverse sinus stenosis was on the left (37 people; 52.9%) and only a little on the right side (2 people; 2.8%). The results of this study could be seen in Table 1.

Table 1: Characteristics of subjects.

Characteristics	N	%
Gender		
Male	44	62,9
Female	26	37.1
Age (mean±SD)	52.97±13.29	
Classification of age (years)		
≥60	24	34.3
<60	46	65.7
Stenoses		
Yes	39	55.7
Right	2	2.8
Left	37	52.9
No	31	44.3

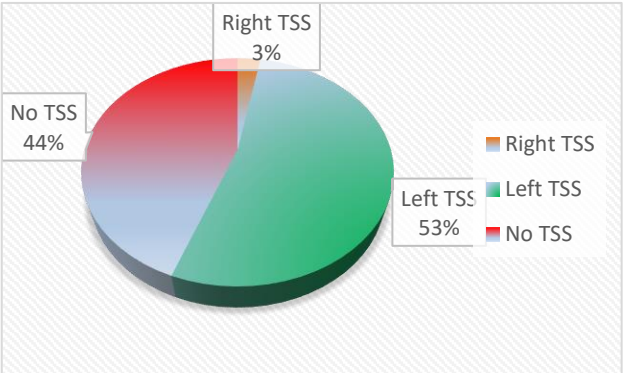

Figure 1: Frequency of TSS in the population.

Figure 2: TSS in cerebral angiogram.

Table 2: The relationship of gender and age with TSS.

Risks	TSS		Total	P value*
	Yes	No		
	N (%)	N (%)		
Gender				
Male	24 (54.5)	20 (45.5)	44 (100.0)	0.798
Female	15 (57.7)	11 (42.3)	26 (100.0)	
Classification of age (years)				
≥60	12 (50.0)	12 (50.0)	24 (100.0)	0.487
<60	27 (58.7)	19 (41.3)	46 (100.0)	

Note: *Pearson Chi square.

We also analyzed the data using Chi square to assess whether there was a risk of age and gender for TSS. The results showed that there was no significant relationship between the two variables as indicated by a p>0.05 both based on age and gender for the presence of transverse sinus stenosis (Table 2).

DISCUSSION

The dural sinuses were venous channels lined by endothelium that were formed by opposing layers of dura. They were valveless, trabeculated and provide the major drainage pathway for the cranial cavity. The major dural sinuses included the superior sagittal sinus, inferior sagittal sinus, straight sinus, occipital sinus, transverse sinuses, petrosal sinuses, sigmoid sinuses, sphenoparietal sinuses and cavernous sinuses.[7] The transverse sinus was originated from the torcular Herophili, which was the connection of the superior sagital sinus, straight sinus and occipital sinus. The right transverse sinus was a continuation of the superior sagittal sinus, drained blood from the superficial structures of the brain, and was usually larger than the left transverse sinus, while the left transverse sinus was a continuation of the straight sinus.[8]

Transverse sinus stenosis occurred due to the narrowing of the veins, which could be caused by mostly the widening of the arachnoid granulations, which were valves that normally appeared on the walls of the venous sinuses and played a role in facilitating cerebrospinal fluid from the brain into the bloodstream. Two conditions were associated with transverse sinus stenosis, pulsatile tinnitus and IIH.[7]

IIH was characterized by an idiopathic increase in intracranial pressure (without an underlying cause) that had symptoms of headache and could lead to loss of vision. The IIH usually appeared at the peak of the age of 20-40 years and was associated with obesity and female gender.[9] There were more males than females in this study (62.9%). Research by Durst et al 2016 showed that there were more men (52%) than women (48%) from 355 chronic headache patients.[10] The role of gender, in this case, was still not very clear, this was reinforced by the existence of a study that linked transgender patients from female to male and vice versa male-to-female transgender patients with IIH. This transgender patient received exogenous hormonal drugs, both testosterone/estradiol, which later showed symptoms of headache accompanied by visual disturbances.[11] Thus, the role of hormones in this case was still unclear and it could not be concluded which hormones increased the patient's risk of developing IIH.

The mean age of the subjects in this study was 52.97±13.29 years with the most was below 60 years (65.7%). In line with a previous study by Durst et al 2016 with 355 general population patients who underwent CT angiography, the mean age of the patients was 57.4±17.6 years.[10] Zayit et al 2008 reported that 23 of 200 patients with IIH had an average age of 51.4 years. The incidence of IIH in patients aged >40 years was usually associated and might be exacerbated by the presence of systemic hypertension, although in previous studies there was no correlation between hypertension and the incidence of IIH, so the pathomechanism itself was also still unclear.[12]

There were 55.7% of patients with refractory chronic headaches who were examined by DSA had TSS in this study. Durst et al 2016 reported unilateral right (51%), left unilateral (17%) and bilateral (32%) TSS from 355 patients.[10] While another study revealed different results, Simone et al 2011 reported that from 98 patients with refractory chronic headache, 48 (48.9%) had bilateral transverse sinus stenosis, which was observed on MRV examination.[13]

This study had several limitations, including the limited data on the patient's body mass index (BMI) which might be one of the factors associated with transverse sinus stenosis. In addition, there were limitations in the patient's DSA results in terms of the type of stenosis (bilateral or unilateral) as well as the percentage of stenosis present. Despite having many limitations, this study was able to fulfill the main objective of the study, to determine the prevalence of TSS and this was the first study in Indonesia. Therefore, we hoped that further research can be carried out which would make this research as a reference.

CONCLUSION

TSS was associated with the incidence of IIH. However, this finding has not yet been proven to be significant. This study also did not find a correlation between age and gender with the incidence of TSS.

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