

VARIATIONS OF THE SPINE OF SPHENOID

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Abstract : Spine of the sphenoid is related to few important structures like chorda tympani nerve and auditory tube, medially and auriculotemporal nerve laterally, each of which has an important function in the body. The present study is done, as there is scarcity of data on the length, shape and direction of spine of sphenoid and to study there variations of the spine as any variation in the spine can lead to the compression of the nerves and structures related to it. Sixty-six areas of thirty-three (33) dry skulls were studied and the length, shape, direction of the spine was noted. The length of the spine of the sphenoid varied from absence or minimally projecting spine, to a long spine.

The shape of the spine of the sphenoid varied from a pointed or rounded structure to a broad plate of bone. The spine was directed downward but the tilt was in every direction. In three specimens there was the presence of the pterygospinous plate of bone. Since the two ligaments, the anterior ligament of the malleus and the sphenomandibular ligament (both are remnants of the sheath of intermediate part of the Meckel's cartilage) are attached to the intervening spine of sphenoid, it may be conjectured that his spine also develops from the Meckel's cartilage; the pull of these two ligaments in different directions may lead to different lengths and shapes of spine, which may cause pressure on the structures related on either side of the spine.

INTRODUCTION

The base of the skull is related to number of important nerves, vessels and structures that enter the skull or exit from it. These nerves, vessels and structures are at times, related to some bony prominence or at times also groove or perforate the bone through which it travels.

One of the important bones at the base of the skull is the sphenoid bone. The pentagonal, infra-temporal surface of the greater wing of sphenoid. The spine is present lateral to the sphenopetrous fissure i.e. the sulcus from the auditory tube). Its medial side shows a faint anteroinferior groove for the chorda tympani nerve. Laterally the auriculotemporal nerve is related to it mentions that the persistence of the sheath of the intermediate part of the Meckel's cartilage, which gives rise to the anterior malleolar ligament of the malleus and the sphenomandibular ligament.

Halim¹ said that, *the anterior malleolar ligament connects the anterior process of the malleus to the spine of the sphenoid and is developmentally continued with the sphenomandibular ligament. He illustrates in his textbook of Anatomy (fig 244 on page 218 of Volume 2), all the three i.e. anterior ligament of the malleus, the spine of the sphenoid and the sphenomandibular ligament, are derivatives of 1st branchial arch (remnants of Meckel's cartilage).*

Synder and blank² mentioned the bridge of bone between the lateral surface and the base of the lateral pterygoid plate and the spine of the greater wing of sphenoid (lateral to the foramen ovale) and this place provides passage for some or most of the motor fibres of the trigeminal nerve,

The variations in the spine are expected and are not uncommon, as the size, shape, length and curvature of the spine of the sphenoid depends on the length and the pull of these two ligaments.

The present study was undertaken there is scarcity of data on the length, shape and direction of spine of sphenoid and to study there variations of the spine as any variation in the spine can lead to the compression of the nerves and structures related

to it.

MATERIALS AND METHODS.

The study was conducted on sixty-six areas comprising of thirty-three dry skulls. An important finding did not show common features of the spine of the sphenoid, thus the number of specimen were taken as one on one basis. The right and the left half of the skulls were studied, nothing the length, size, shape and direction of the spine of the sphenoid. The length of the spine was measured from the base of the spine (the base was taken as sphenotemporal suture, at the posterior most end of the infratemporal surface of the greater wing of the sphenoid) to the apex of the spine.

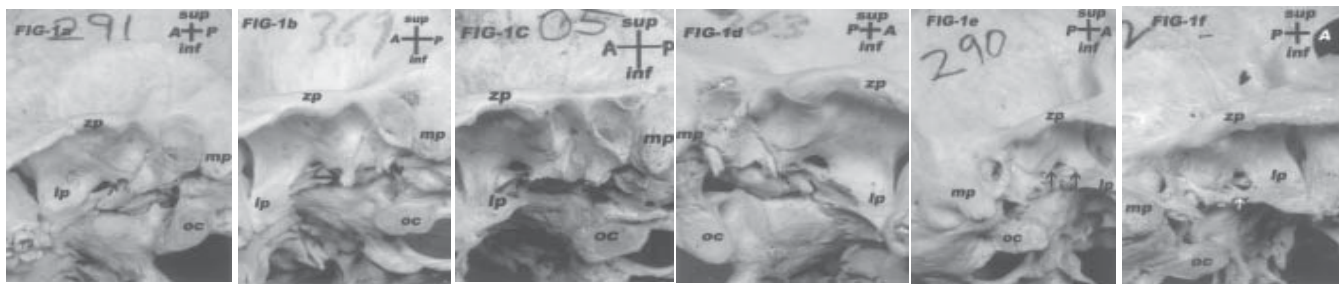
RESULTS

The length of the spine of the sphenoid varied from absence of the spine or a spicule, (Fig. 1(a)) to a long spine, (Fig.(b)). The shape of spine of the sphenoid varies from, a spine with broad base and broad rounded apex, (Fig.1 (b)) to a long and broad piece of bone, Fig.1 (c) or with a broad base with a pointed apex, (Fig 1(d)).

The spine was directed downwards but the tilt was downwards and anteriorly, fig. 1(b); downwards and extending posteriorly and fusing with tympanic plate of temporal bone (Fig. 1 (c)) downwards and posteromedially, forming the posterior and the medial wall of the foramen spinosum, Fig. 1 (d).

No half of the skull showed common features of the spine of the sphenoid, thus numbers of specimens were taken as one on one basis, (i.e. no right and the left half of the skull showed a similarity in the spine of the sphenoid).

In three specimens there was the presence of the pterygospinous plate of bone, which develops from the ossification of the pterygospinous ligament extending between spine of sphenoid and lateral pterygoid plate. Two of them were partly ossified with a large gap, Fig 1 (e), for the vessels and the nerves for the medial pterygoid muscle and in one; it was a well developed thin plate of bone with small and large foramina Fig1 (f).



The results were tabulated as below :

Spine of the sphenoid :

Absent	=	07 (10.6%)
Shape		
<i>Pointed</i>	=	28 (42.4%) Grooved anteriorly : 01 (3.5%) (Range of length 02 cm to 12 cms, mean 07 cm)
<i>Plate</i>	=	16 (24.2%) (range of length 0.2cm to 1.2cms means 0.7cm)
<i>Spicule</i>	=	12 (18.2%)
Ossified Pterygospinous ligament	=	03 (4.5%)

DISCUSSION

Our results on pterygospinous ligament in three out of 66 cases were in agreement with the study done of the spine of sphenoid by Synder and Blank² where the authors mention the ossification of the pterygospinous ligament with a forament in the ossified ligament which allows the passage of the nerves and the vessels

for the medial pterygoid muscle.

The anterior ligament of the malleus and the speno-mandibular ligament, both are remnants of the sheath of intermediate part of the Meckel's cartilage^(3,4). Since both these ligaments are attached to the intervening spine of sphenoid, it may be conjectured that this spine also develops from the Meckel's cartilage. {This fact has been shown only by Halim (illustration no. 24.4 on page 218 of his textbook of anatomy (volume 3). The pull of the two ligaments, in different directions may be responsible for varying shape of size of the spine, which in tum can cause pressure on the two nerves related on either side of the spine.

REFERENCE

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Compiled by Dr. P. Chhattree

Literature Review

Thirteen years experience of treatment of renovascular hypertension with transluminal angioplasty shows that this is a feasible treatment option.

K.A. Overhus et al, 15th Scientific Sessions, ESH, Milan, 2005.

Percutaneous transluminal renal angioplasty (PTRA) is a feasible treatment option to achieve control of renovascular hypertension, as per a study reported at the just concluded scientific session of ESH. In this follow-up study 121 patients with renal artery stenosis treated with PTRA in the period from 1991 to 2003 were selected. The methodology adopted by the study authors is described as follows: (a) screening with conventional renography with Tc- DTPA; (b) in cases with positive screening renography, the examination was repeated with/ without ACE - Inhibition; (c) plasma renin was measured before/after ACE - Inhibition; (d) If relative renal function was changed by the administration of ACEI or plasma renin increased more than 4 fold, renal angiography was performed. Based on above data the patients were further treated: (i) PTRA was performed if renal artery stenosis was found. (ii) The blood pressure and anti hypertensive medications were recorded before and after PTRA and at 1 month, 6 month, 1 year and the latest follow-up; (iii) The patients were divided into three groups: *Group 1* : normotensive without medication, *Group 2* : improved blood pressure control, *Group 3*: unchanged blood pressure. **Renal artery stenosis dilated with PTRA in 121 patients (72 men, 49 women);** stent was implanted in 71 patients. At the end of the follow-up period (*mean 41 months, 1 1/2 - 155 Months*) Patients numbers in various group : *Group i* = 13 Patients; *Group ii* = 96 Patients; *Group iii* = 12 Patients; managable complications with this treatment The authors concluded that PTRA is a feasible treatment of renovascular hypertension as 90% of the patients treated had better blood pressure control, and 11% were normotensive without medication throughout the follow-up period.

Use of Tamsulosin results in stone expulsion in almost all patients allowing complete home treatment Dellabella M, Milanese G, Muzzonigro G J Urol. 2005 Jul; 174(1):167-72

Recent studies show the interesting efficacy of different drug combinations for the spontaneous expulsion of distal ureteral stones. We performed a randomized, prospective study to assess and compare the efficacy of 3 drugs as medical expulsive therapy for distal ureteral calculi. A total of 210 symptomatic patients with distal ureteral calculi greater than 4 mm were randomly allocated to home treatment with phlorogucinol, tamsulosin or nifedipine (groups 1 to 3, respectively). Each group was given a corticosteroid drug and antibiotic prophylaxis with an injectable nonsteroidal anti-inflammatory drug was also used on demand. The primary end point was the expulsion rate and the secondary end points were expulsion time, analgesic use, need for hospitalization and endoscopic treatment as well as the number of workdays lost, quality of life and drug side effects. The expulsion rate was significantly higher in group 2 (97.1%) than in groups 1 (64.3%, P<0.0001) or 3 (77.1%, p<0.0001). Group 2 significantly achieved stone passage in a shorter time than the other 2 groups and showed a significantly decreased number of hospitalizations as well as a better decrease in endoscopic procedures performed to remove the stone. The control of renal colic pain was significantly superior in group 2 compared with the other groups, resulting in fewer workdays lost. Compared with group 1. No difference in side effects was observed among the groups. Medical expulsive therapy should be considered for distal ureterolithiasis without complications before ureteroscopy or extracorporeal lithotripsy. The use of tamsulosin in this treatment regimen produced stone expulsion in almost all cases in a short time, allowing complete home patient treatment.