

of jugular foramen were larger on the right, 12% equal and 20% smaller. None of these studies tested for any significant statistical difference. In the present study the right jugular foramen was larger in 55% of cases, while in 25% of cases it was larger on the left; this, however, was not statistically significant.

In Sturrock's investigation of 156 skulls the right foramen was larger in 68.6%, the left larger in 23.1% and equal on both sides in 8.3%. He observed complete separation on the right side in 3.2%, on the left side in 3.2% and partial separation on the right side in 1.3% and on the left side in 10.9%.

Hatiboglu and Anil[12] studied 300 Anatolian skulls from the 17th and 18th centuries and observed that in 61.6% the foramen was larger on the right side and in 26% it was larger on the left side and in the remainder of equal size. They observed complete separation on the right side in 5.6%, on the left side in 4.3% and partial separation on the right side in 2.6%, on the left side in 19.6%.

Patel and Singel[13] studied 91 Indian skulls (Saurashtra region) and observed in 60.4% cases larger right foramen, in 15.4% larger left foramen and in 24.2% equal on both sides. They observed complete separation on the right side in 23.1%, on the left side in 17.6% and partial separation on the right side in 49.5%, on the left side in 59.3%.

Conclusion

The present study observed variation in the size of jugular foramen sizes. The foramen are larger on the right than the left in Indian population.

References:

- [1] Navsa N, Kramer B A. Quantitative assessment of the jugular foramen. *Anatomischer Anzeiger*.1998; 180: 269–273.
- [2] Wysocki J, Chmielik LP, Gacek W. Variability of magnitude of the human jugular foramen in relation to condition of the venous outflow after ligation of the internal jugular vein. *Otolaryngologia* 1999; 53: 173–177.
- [3] Williams PL, Bannister LH, Berry MM, Collins P, Dyson M, Dussek JE, Ferguson MWJ. *Gray's anatomy*. 38th Ed. Edinburgh: Churchill Livingstone 1995; pp 567.
- [4] Chong VF, Fan YF. Radiology of the jugular foramen. *Clinical Radiology* 1998; 53: 405–416.
- [5] Di Chiro G, Fisher RL, Nelson KB. The jugular foramen. *J Neurosurgery* 1964; 21: 447–452.
- [6] Kanemoto Y, Ochiai C, Yoshimoto Y, Nagai M. Primarily extracranial jugular foramen neurinoma manifesting with marked hemiatrophy of the tongue: case report. *Surgical Neurology* 1998; 49: 534–537.
- [7] Tekdemir I, Tuccar E, Aslan A, et al. The jugular foramina comparative radioanatomic study. *Surgical Neurology* 1998; 50: 557–562.
- [8] Hovelacque A. *Osteologie*. Paris 1967; pp. 155–156.
- [9] Ekinci N, Unur E. Macroscopic and morphometric investigation of the jugular foramen of the human skull. *J Anatomy* 72: 525–529.
- [10] Rhoton AL Jr, Buza R. Microsurgical anatomy of the jugular foramen. *J Neurosurgery* 1975; 42: 541–550.
- [11] Sturrock R.R. Variations in the structure of the jugular foramen of the human skull. *Journal of Anatomy*. 1998;160:227-230.
- [12] Hatilboglu M.T & Anil A. Structural variations in the jugular foramen of the skulls, *Journal of Anatomy*. 1992;180:191-196.
- [13] Patel & Singel. Variations in the structure of the jugular foramen of the human skull in Saurashtra region. *J Anat Soci India*.2007;56(2):34-37.
- [14] Patridge EJ. The relations of the glossopharyngeal nerve at its exit from the cranial cavity. *J Anat*.1918;52;332-334.