

RADIOLOGICAL ANATOMY OF FORAMEN ROTUNDUM

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Introduction

Endoscopic sinus surgery has been increasingly used in the field of otorhinolaryngology due to many reasons such as better visualization, the complex anatomy of the skull base and the relations between vital vascular and nervous elements make its approach a challenge for endoscopic surgeons, consecutively, the pre-operative knowledge about the detailed anatomy of the area is crucial and the computed tomography (CT) is a useful tool for them to plan the safest route of surgery, so as to avoid dramatic complications, such as vascular or nervous injury.

- **Foramen rotundum** is the inherent bony structure in the skull base and located in the greater wing of sphenoid bone in the floor of the middle cranial fossa, the FR is located adjacent to the nasopharynx and often invaded by the nasopharyngeal cancer and other malignant brain tumor

Aim of the work

The aims of this study give the detailed description of anatomical variations of FR, as well as its relationships with surrounding vital structures, to instruct preoperative planning for endoscopic surgery.

Subjects and methods

- A descriptive approach was adopted for this study
- 200 foramens rotunda of 100 patients older than 18years old and without known skull base pathology, included in this study were demonstrated and evaluated separately using a Multislice CT technique with DICOM viewing software (Osirix or Horos).
- The following measurements were taken: Distances between right and left foramens rotunda, between foramen rotundum et midline, foramen rotundum and vidian canal, foramen rotundum and optic nerve,foramen rotundum and the anterior nasal spine, rotundum angle,foramen rotundum position, types of foramen rotundum and angle between foramen rotundum and nasal floor.
- Data were fed to the computer and analyzed using IBM SPSS software.

Results

Table (1), Comparison between Right side and Left side according to different variables in total sample

	Right side (n = 100)	Left side (n = 100)	Test of Sig.	p
FRML (cm)	1.71 ± 0.21	1.81 ± 0.22	Z=4.185*	<0.001*
HOR-FRVC (mm)	4.61 ± 1.62	4.73 ± 1.64	t=0.723	0.471
VERT-FRVC (mm)	3.99 ± 1.80	4.12 ± 1.89	Z=0.641	0.521
DD-FRVC (mm)	5.40 ± 2.25	5.71 ± 2.39	t=1.817	0.072
FR-DMT (mm)	3.15 ± 0.55	3.15 ± 0.79	Z=1.073	0.283
FR angle (degree)	47.51 ± 10.65	47.57 ± 9.51	t=0.060	0.952
ANS FR (cm)	6.22 ± 0.46	6.30 ± 0.50	t=2.001*	0.048*
NFFR angle (degree)	29.13 ± 6.56	29.37 ± 5.76	t=0.440	0.661
ONFR angle (cm)	1.74 ± 0.20	1.75 ± 0.19	t=0.437	0.663

Table (2):Comparison between Male and Female according to FR type and FR position in each side

		Sex				χ ²	MCp
		Male (n = 47)		Female (n = 53)			
		No.	%	No.	%		
FR type	Right side					2.643	0.460
	Type 1	1	2.1	3	5.7		
	Type 2A	6	12.8	6	11.3		
	Type 2B	25	53.2	21	39.6		
	Type 3	15	31.9	23	43.4		
	Left side					7.937*	0.034*
	Type 1	0	0.0	3	5.7		
	Type 2A	11	23.4	8	15.1		
	Type 2B	20	42.6	13	24.5		
	Type 3	16	34.0	29	54.7		
MH (p0)	44.0 (0.655)		41.00 (0.394)				
FR position	Right side					0.590	0.852
	Lateral position	2	4.3	1	1.9		
	Online position	10	21.3	12	22.6		
	Medial position	35	74.5	40	75.5		
	Left side					1.763	0.410
	Lateral position	2	4.3	3	5.7		
	Online position	10	21.3	17	32.1		
	Medial position	35	74.5	33	62.3		
MH (p0)	22.0 (1.000)		43.50* (0.050*)				

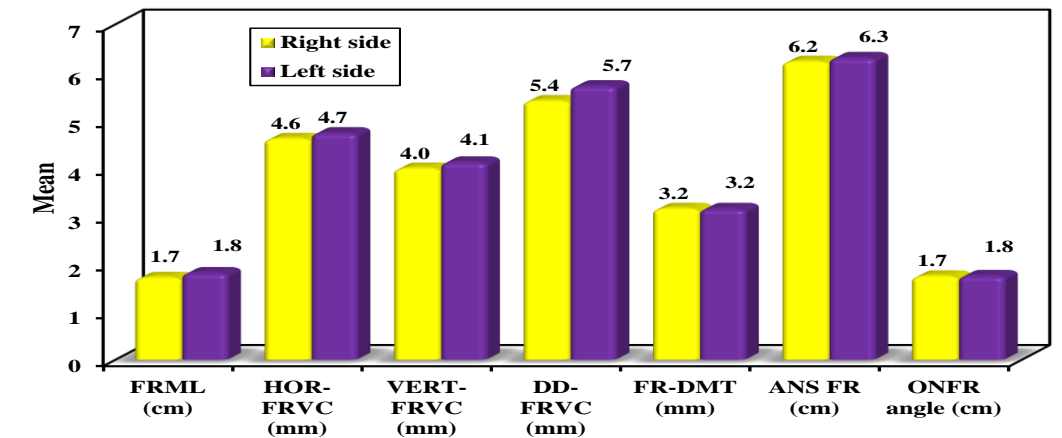


Figure (1):Comparison between Right side and Left side according to different variables in total sample

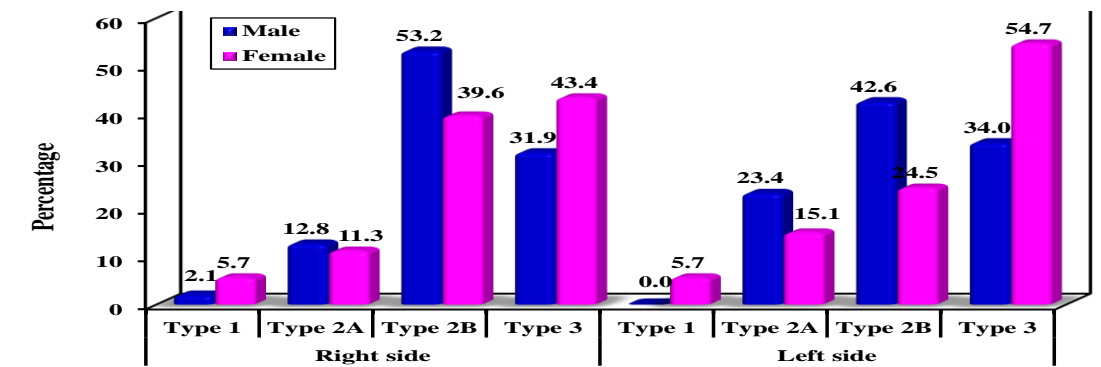


Figure (2):Comparison between Male and Female according to FR type in each side

Conclusion

This study provides more light on the anatomy of foramen rotundum with the other anatomical / surgical key structures used in endonasal surgeries such as lateral pterygoid plate and vidian canal.

The study results will be used by endoscopic skull base surgeons to get idea on the most common types of anatomical variations of the foramen rotundum which aids in better understanding of this complex area before surgery resulting in better prognosis in the Egyptian population particularly.



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