

# THE ANATOMY OF THE FOSSA OF ROSENMULLER - ITS POSSIBLE INFLUENCE ON THE DETECTION OF OCCULT NASOPHARYNGEAL CARCINOMA

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## ABSTRACT

*The Fossa of Rosenmuller (FOR) is a well established site of origin of nasopharyngeal carcinoma (NPC). Detection of early NPC requires a sound knowledge of the anatomy of the FOR. The authors study the anatomy of the FOR with the aid of CT Scan and discuss the possible influence of the anatomy of the FOR on the detection of occult NPC. This paper reveals that there are cases of postnasal space which cannot be fully inspected clinically due to the peculiar anatomy of the FOR.*

*Keywords : Fossa of Rosenmuller, occulti nasopharyngeal carcinoma, blind spot of postnasal space*

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## INTRODUCTION

Nasopharyngeal carcinoma is common in our population : 20 and 7 per 100,000 per year in males and females respectively. Worse, it not infrequently strikes patients in their prime of life.

Improvement in the survival rate requires early treatment. Early treatment requires early detection of disease.

It is well recognised that NPC commonly originates either from the junction of the superior and lateral walls or from the FOR of the nasopharynx. With the advent of fiberoptic and rigid nasopharyngoscope, virtually every corner of the nasopharynx is inspectable including the superolateral junction barring perhaps one area and that is the FOR.

The authors attempt to study the anatomy of the FOR and reveal how with the knowledge of its anatomy the detection rate of occult NPC may be improved.

## MATERIALS AND METHODS

Twenty-three patients constituting 46 Fossa of Rosenmuller with age ranging from 18 to 66 (mean age = 35) and without symptoms suggestive of NPC are selected. There are 17 males and 6 females; 22 Chinese and one Indian. The selection of patients without NPC symptoms is to ensure a normal postnasal space, for the aim of this study is to study the normal anatomy of the FOR.

CT Scanning of the FOR is carried out as follows :

### Radiology Method

Patients were examined with the Picker 1200SX CT Scanner, using 20 cm Field size, 130 kV and 110 mA.

With the patient supine, axial images parallel to the hard palate were obtained. No intravenous contrast medium was administered. Initial 3mm thick contiguous scout images of

the upper nasopharynx from the roof, caudally, were then acquired.

Selecting the image which gave the optimal view of the FOR, a local study of contiguous 1 mm or 2 mm thick image slices was obtained.

The width and depth of the FOR were subsequently measured from the optimal images.

## RESULTS

The various parameters of the FOR are tabulated in Table I. It has been discovered that the FOR is deeper than perceived and that it has a relatively narrow orifice. The FOR points laterally with its long axis making an average angle of 45 degrees with the Sagittal plane.

Table I: Parameters of the Fossa of Rosenmuller (FOR)

1	Range of Depth	1.7mm-18.8mm
2	Range of Width	1.6mm-7.4mm
3	No. of FOR >10 mm in Depth	22 (48%)
4	No. of FOR <5 mm in Width	40 (87%)
5	No. of FOR with Depth > Width	36 (78%)
6	No. of FOR with Width > Depth	10 (22%)
7	Angle between Sagittal Plane and Long Axis of FOR	45°
8	No. of FOR with depth > 10 mm and width of orifice < 5 mm	23 (50%)

There is little variation between the left and right FOR in any patient; the difference in depth varies between 2 and 3mm difference in width of orifice within 1mm.

In 22 out of 46 FOR constituting 48%, the depth is more than 10mm and with a relatively narrow orifice, 87% less than 5mm in width, it is conceivable that the floor of the FOR is beyond clinical inspection be it with a mirror or nasopharyngoscope - a blind spot of the postnasal space ?

Again in most instances (78%) the FOR has a greater depth than the width of its orifice. In only 22% does the reciprocal hold.

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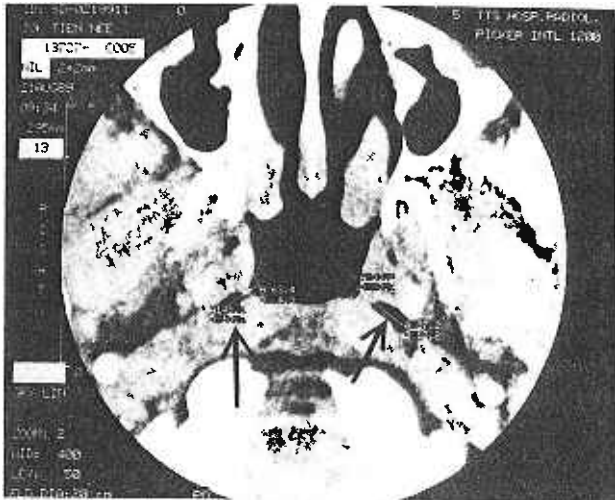
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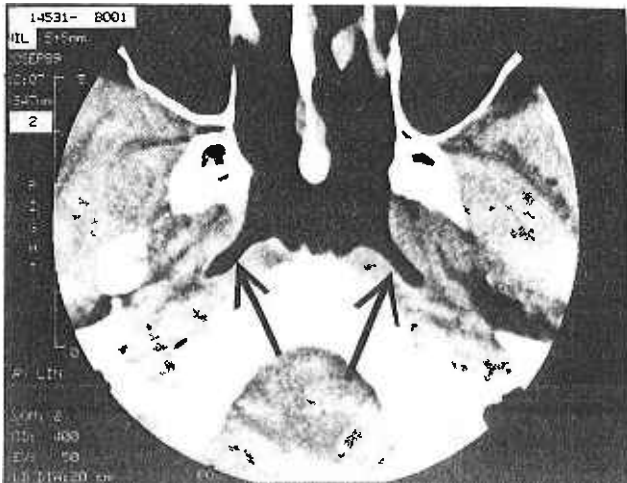
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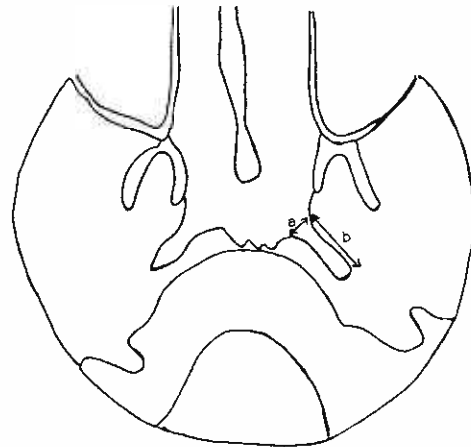
**Fig 1 - CT Scan of FOR (Arrow) with Orifice obliterated by mucosal folds**



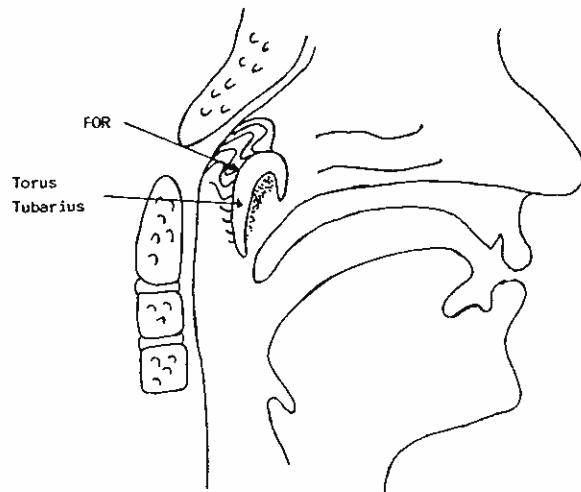
**Fig 2 - CT Scan of FOR (Arrow) with patent orifice**



**Fig 3 - Line drawing of Fig 2  
a - Width of orifice of FOR  
b - Depth of FOR**



**Fig 4 - Sagittal Section of Postnasal space**



**DISCUSSION**

The FOR (Johann Christian Rosenmüller, German anatomist, 1771-1820), variably known as pharyngeal recess, nasopharyngeal fossa and sinus of Morgagni, lies posterior to the torus tuberosus, the posterior lip of the medial end of the cartilaginous eustachian tube (Fig 4). It is a herniation of the nasopharyngeal mucosa through a deficiency between the skull base and the superior-most fibers of the superior constrictor muscle. The deficiency is bridged by the pharyngobasilar fascia.

An interesting finding in this study is that the FOR is often far too deep and narrow for clinical inspection be it with a postnasal mirror or a nasopharyngoscope. Fifty percent of the FOR in this study have a depth of more than 10 mm and orifice narrower than 5mm. In these cases, the FOR, in particular the floor of the FOR, constitutes the blind spot of the post-nasal space. Perhaps in these cases the postnasal space can never be declared normal based solely on clinical inspection.

A tumour growing in the depth of such non-inspectable FOR will not be detectable until it has reached considerable size and grown out of the FOR exhibiting itself to the ENT Surgeon. The authors believe that it is such tumour which has been labelled occult.

In view of the finding that 50% of FOR is not inspectable and that the FOR is a common site of origin of NPC, the authors feel that random biopsy of the postnasal space hoping to detect occult NPC by chance should be discouraged. The detection of occult NPC should be by biopsy with a forcep guided into the FOR under direct vision with a nasopharyngoscope. Perhaps in this manner, the early detection rate of occult NPC could be improved.

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