

## Endonasal Endoscopic Excision of Nasopharyngeal Angiofibroma (Radio Frequency Assisted)

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### Abstract

Nasopharyngeal angiofibroma is a benign disorder and it accounts for 0.5% of head & neck tumours. It's a highly vascular tumour with absence of elastic layer in its wall making it prone for unprovoked, substantial blood loss. Because of its ability to insinuate into fissures &foramina, surgical extirpation of the mass needs thorough anatomical knowledge and greater surgical skill while approaching the mass in an expanded endonasal endoscopic manner.

**Key words:**endonasal, endoscopic, angiofibroma,excision, radiofrequency cautery.

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### I. Introduction

Nasopharyngeal angiofibroma which occurs in adolescent males<sup>12</sup>, has a propensity to extend into other places from its site of origin,via fissures, foramina at the skull base. A highly vascular tumour and derives blood supply wherever it tends to grow with main feeder vessel from internal maxillary artery, sphenopalatine artery. The vascularity of the tumours can be explained by the incomplete regression of 1st branchial artery which temporarily connects internal carotid artery& the vessels from the maxillary artery. The persistence of this artery may lead to development of nasopharyngeal angiofibroma due to growth stimulation at the time of adolescence<sup>3</sup>.More specifically they are located at where sphenoid process of palatine bone meets horizontal ala of the vomer and root of pterygoid process of sphenoid bone<sup>8</sup>.

The tumour may grow laterally in to pterygopalatine, infratemporal fossa<sup>14</sup> with displacement of posterior wall of maxillary sinus anteriorly. From there further lateral extension into temporal fossa, cheek can occur where it comes in to contact with temporalis& masseter muscles. Posterior extension into vidian canal then into the foramen lacerum can take place. Further it can involve cavernous sinus,middle cranial fossa with only extra dural involvement. By invading cancellous part of sphenoid bone, it can erode the greater wing of sphenoid bone and eventually extend into middle cranial fossa<sup>1</sup>.

Radkowski staging is used to classify the mass.

Classification according to Radkowski:

Stage IA - Tumour limited to posterior nares and/or nasopharyngeal vault

Stage IB - Tumour involving posterior nares and/or nasopharyngeal vault with involvement of at least 1 paranasal sinus.

Stage IIA - Minimal lateral extension into pterygomaxillary fossa

Stage IIB - Full occupation of pterygomaxillary fossa with or without superior erosion of orbital bones

Stage IIC- Extension through the pterygomaxillary fossa into the cheek and temporal fossa

Stage IIIA - Erosion of skull base (i.e., middle cranial fossa/pterygoid base); minimal intracranial extension

Stage IIIB - Extensive intracranial extension with or without extension into cavernous sinus<sup>5</sup>.

Though many external operative procedures are there<sup>9</sup>, because of its associated morbidity & increased time required to recover postoperatively<sup>10</sup>, expanded endonasal endoscopic approaches<sup>2,6,11,15</sup> provide straight forward pathway to approach the mass and its extensions which reduces morbidity&time taken to recover. With direct vision the plane between the mass & the surrounding tissues can be ascertained well<sup>4</sup>without breaching tumour tissue. Radkowski staging was used to assess the mass in this research article. All the cases approached endoscopically without preoperative embolisation as the complications associated with the procedure are high<sup>16,17,18</sup>& no external carotid artery control, with removal made possible by radiofrequency cautery.

## II. Procedure:

This research article involves four cases aged 12-19 years with classical history of painless, profuse nasal bleed without any provocation. One was right sided & other three were left sided. All the cases belonged to Radkowski Stage IIC- mass was involving pterygopalatine fossa, infratemporal fossa, nasopharynx, nasal cavity, sphenoid sinus & cheek, with anterior bowing of posterior wall of maxillary sinus with feeder vessel from internal maxillary artery in all the cases.

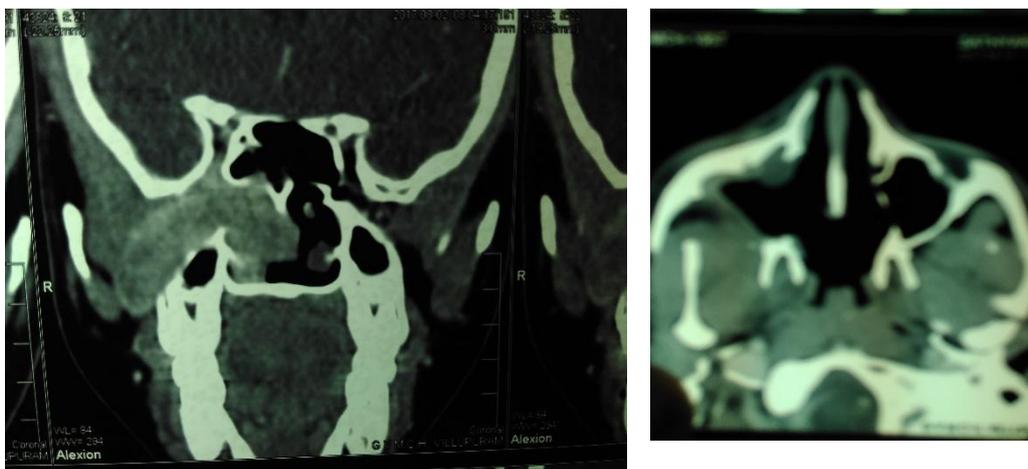
In all the cases carefully selected so as to avoid pre-operative embolisation and endonasal endoscopic approach was used & without any external carotid artery control. Using Denkers approach mass was approached with complete removal of inferior turbinate & medial wall of maxillary sinus enabling complete exposure of maxillary cavity and its posterior wall. The nasolacrimal duct was transected precisely to avoid postoperative dacryocystitis. The posterior wall of maxillary sinus was removed completely using bone punch and the mass was visualised. Care was taken not to touch the mass to avoid bleeding. The internal maxillary artery was identified and cauterised with radio frequency probe.

The mass was mobilised slowly with ball probe and suction tip and moved towards pterygopalatine fossa with control of vascularity without breaching its capsule. Bone near the pterygo palatine fossa was drilled and removed so as to completely expose the mass and to avoid leaving behind any residual tissue. The mass was mobilised completely and pushed towards nasopharynx and eventually removed in two pieces (first portion includes cheek, infratemporal fossa, pterygopalatine fossa, second portion includes sphenoid sinus, nasal cavity, nasopharynx). Care was taken to carefully remove submucosal extensions in the parapharyngeal space.

In 3 cases no blood transfusion was given with patients resuming daily chores next day onwards without any difficulty. One unit was transfused in one case. Post op CT was taken after 6 weeks showing complete removal of mass without any residue. The operating time ranged from 150 minutes - 200 minutes. Prolongation in surgical time was taken to devascularise the mass gradually (since preoperative embolisation was avoided), to reduce blood loss intraoperatively, thereby avoiding postoperative blood transfusion.

The follow-up period of cases ranged from 10 months to 24 months.

The study is to point out using radio frequency cautery, it's possible to remove the mass without much blood loss (average blood loss in the cases 75ml - 180ml).



PRE-OP CT IMAGE POST -OP CT IMAGE OF SAME PATIENT AFTER 6 MONTHS

## III. Discussion

Surgical excision of nasopharyngeal angiofibroma, a highly vascularised mass is a challenging task. With proper infrastructure and surgical team, we removed the mass with radiofrequency cautery which enables cauterization of feeder<sup>7</sup> vessels with less carbonization, no collateral damage to surrounding tissues.

With endonasal endoscopic approach, greater visualization and differentiation of the mass from surrounding tissues, enables complete removal as mentioned in numerous research papers. In this series we removed the mass completely in this manner by selectively using radiofrequency cautery.

## IV. Conclusion

With good surgical acumen and great team work, using radiofrequency cautery endoscopic removal of nasopharyngeal angiofibroma with minimal blood loss can be achieved. Complete removal is done in carefully selected cases without preoperative embolisation.

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