

# A New Hemipalatal Approach to the Nasopharyngeal Cavity

## 비인강에의 새로운 Hemipalatal Approach

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The juvenile nasopharyngeal angiofibroma is an uncommon, highly vascular, locally invasive, non-encapsulated tumor of adolescent males. In the treatment of the nasopharyngeal angiofibroma, surgery is considered to be the method of choice. However, due to its relative anatomical inaccessibility, severe extension, and difficulties in controlling the bleeding, the successful excision of the nasopharyngeal angiofibroma is difficult with high rate of recurrence. Many surgical approaches and their modifications were proposed for direct visualization of the nasopharynx and wide exposure of the operative field so as to shorten the operation time with significant reduction in blood loss. These include transpalatal nasopharyngotomy, lateral rhinotomy (Denker, 1926), sublabial transantral approach (Allen & Siegl, 1981; Anand & Conley, 1983; Sardana, 1965), medial or lateral mandibulotomy approach (Kremen, 1953), and neurosurgical craniotomy approach. Two or more approaches may be needed and complete removal in tandem depend upon the extension of the tumor.

The authors design an approach that would almost expose the whole extent of the tumor and allow complete resection of the tumor under direct vision and in this way decrease blood loss and the possibility of leaving residual tumor. With this approach, sublabial transantral exposure is possible as one stage by simple extension of the incision. Its safety was revealed by

preceding experimental study using cats. Operative procedures, advantages, and the result of this hemipalatal flap will be discussed.

### MATERIALS AND METHODS

#### 1. Experimental Study

In five cats weighing between 2.5 and 3 kilograms, anesthesia was induced with Ketamine 60mg/kg intramuscularly. The neck was hyper-extended and mouth gag was applied to depress the tongue away from the operative field. Two percent Lidocaine with 1:100,000 Epinephrine solution was infiltrated in the incision line. Mucoperiosteal incision was made in the hard and soft palates down to the hard palate bone and nasal mucosa from just distal to the incisive foramen to the midpoint between the posterior nasal spine and uvula, and the incision was extended laterally from the anterior end of the midline incision to the canine tooth and then backward running parallel to the gum margin to the maxillary tuberosity leaving 2 or 3mm wide mucous membrane on the lingual gingiva for easy closure of the flap. (Fig. 1)

The hemipalatal flap including the mucoperiosteum was raised with Joseph elevator. At the junction of the hard and soft palates, nasal mucosa was dissected backward with a curved Cottle elevator. To get further exposure of the operative field the greater palatine neurovascular bundle was severed with electrocautery (Fig. 2). Retraction suture was done in the flap and retr-

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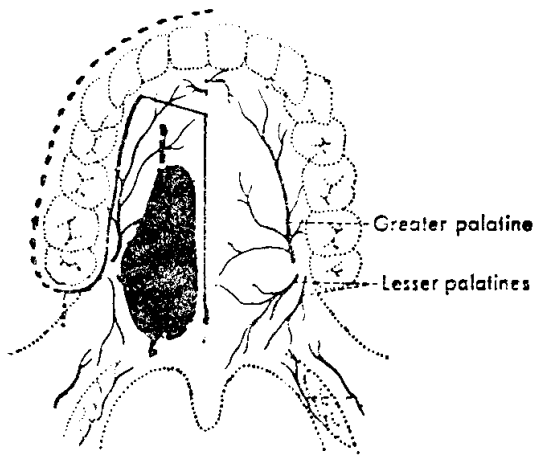


Fig. 1. A new hemipalatal incision

acted laterally. Hard palate was removed with Kerrison bone biting forceps in piecemeal and nasal mucosa was incised as depicted in figure 1. The bleeding was controlled and incision was closed in two layers. The hemipalatal flap



Fig. 2. Severing the sphenopalatine neurovascular bundle in cat

was observed 7 days after operation to evaluate its viability.

## 2. Clinical Study

Nine patients with nasopharyngeal angiofibroma diagnosed by clinical and radiological studies were managed by above-mentioned hemipalatal flap approach. Endotracheal anesthesia was induced using a noncollapsible tube with an inflatable cuff that prevents the spillage of blood into the trachea. The neck was moderately extended. Danis-Brown mouth gag was applied to stabilize the endotracheal tube and push the tongue away from the operative fields. Two percent Lidocaine with 1:100,000 Epinephrine solution was infiltrated along the incision line. Mucoperiosteal incision was made in the hard and soft palates deep to the periosteum from just distal to the incisive foramen to the soft palate depending upon the inferior extent of the tumor, and extended laterally from the anterior end of the midline incision to the canine tooth, and then extended backward running parallel to the gingival margin upto the maxillary tuberosity leaving 2 or 3mm wide mucous membrane on the lingual gingiva for easy closure of the flap. From this gingival incision, sublabial incision may extended, if needed, for the exposure to the maxillary sinus and pterygopalatine space. The hemipalatal flap including the mucoperiosteum was mobilized with Joseph elevator at the junction of the hard and soft palates, mucosa in the nasal side was dissected using a curved Cottle elevator. To facilitate further exposure of the surgical field, posteromedial wall of the greater palatine canal can be removed and the hamulus of the pterygoid bone fractured or the greater palatine neurovascular bundle severed. Stay suture was done on the distal portion of the flap and retracted laterally. Exposed hard palate was removed with Kerrison bone biting forceps in piecemeal as needed to visualize the anterior end of the tumor. The

mucosa of the nasal floor was incised as depicted in dotted line in figure 1. Exposed tumor was removed by sharp and blunt dissection. When the tumor extended to the contralateral nasopharynx, it can be exposed easily by spreading the incised soft palate. When the mass extended to the pterygomaxillary space, infratemporal fossa, and maxillary and ethmoid sinuses, sublabial transantral approach was enough to remove the mass by extending the gingival incision around the maxillary tuberosity. Postoperative bleeding was controlled with electro-cautery and nasal packing. Nasal mucosa and palatal flap were sutured in 2 or 3 layers.

## RESULTS

### 1. Experimental Study

Figure 3 shows the hemipalatal flap 7 days after operation. Five experimental flaps had no necrosis at all and were completely healed in spite of severing the greater palatine neurovascular bundle.

### 2. Clinical Study

Nine cases of nasopharyngeal angiofibroma were treated with above mentioned hemipalatal flap approach. The tumor was completely rem-



Fig. 3. Hemipalatal flap 7 days after operation in cat  
 oved under direct vision in every case. Table 1 shows the summary of 9 patients. One of the nine cases had tumor extension into the pterygopalatine space and this dumbbell shaped mass was removed by combined hemipalatal flap and sublabial transantral approach. In another one

Table 1. Case summary

Age	Sex	Chief complaint	Symptom duration	Laterality	Tumor extension	Feeding vessel	Attachment
1	M/12	Epistaxis	6Mo	Right	Nasal cavity Sphenoid sinus	Bilateral int. maxillary a.	Nasopharyngeal vault Lateral wall Nasal septum
2	M/15	Nasal obstructiion	24Mo	Left	Nasal cavity Sphenoid sinus	Ipsilateral int. maxillary a. ascending pharyngeal.	Nasopharyngeal vault Lateral wall Nasal septum
3	M/18	Epistaxis	24Mo	Right	Nasal cavity Sphenoid sinus Intracranial cavity	Bilateral int. maxillary a. Ipsilateral asc. pharyng. a.	Nasopharyngeal vault Lateral wall Nasal septum

4	M/23	Nasal obstruction	36Mo	Bilateral	Nasal cavity	Ipsilateral int. maxillary a. ascending pharyngeal a.	Nasopharyngeal vault Nasal septum
5	M/20	Nasal obstruction	12Mo	Right	Nasal cavity Pterygopalatine fossa	Ipsilateral int. maxillary a. ascending pharyngeal a.	Lateral wall Nasal septum
6	M/19	Nasal obstruction	6Mo	Right	Nasal cavity Sphenoid sinus	Bilateral int. maxillary a. Ipsilateral ascending pharyngeal a.	Nasopharyngeal vault
7	M/17	Nasal obstruction	6Mo	Right	Nasal cavity Sphenoid sinus	Ipsilateral int. maxillary a. ascending pharyngeal a.	Nasopharyngeal vault Lateral wall
8	M/18	Nasal obstruction	12Mo	Left	Nasal cavity	Ipsilateral int. maxillary a.	Nasopharyngeal vault Lateral wall
9	M/17	Epistaxis	6Mo	Left	Nasal cavity	Ipsilateral int. maxillary a. ascending pharyngeal a.	Nasopharyngeal vault Lateral wall Nasal septum

case with intracranial extension its extracranial mass was removed by hemipalatal flap approach and postoperative radiotherapy was given.

Average operation time was 1 hour and 50 minutes, and average intraoperative blood loss was 575cc (200~1500cc), and all the flaps were healed completely without any complication.

### DISCUSSION

The angiofibroma usually originates as broad based tumor from the posterolateral wall of the nasal cavity where the sphenoidal process of the palatine bone meets the horizontal alae of the vomer and the pterygoid process. It is presented as a firm, rubbery, bulging mass within the nasopharynx, and may occasionally occupy both posterior nares. A considerable number of cases have extension into the paranasal regions at the time of diagnosis. These include

the sphenoid, ethmoid and maxillary sinus, orbit, and intracranial cavity. By lateral growth via the sphenopalatine foramen, it extends into the pterygomaxillary space and further into the infratemporal fossa resulting in severe cheek swelling.

Due to frequent extension and relative anatomical inaccessibility of the nasopharynx, many surgical approaches were proposed. Of these, transpalatine approaches are used most popularly. Various palatal incisions have been used over the past years. Dibble and King (1962) proposed straight midline palate split, but it has the disadvantages of relatively poor exposure, or straight scar which contracts and shortens the soft palate postoperatively and offers poor healing following radiation or previous surgery. Henderson and Patterson (1969) proposed the Z-palatal incision. Wilson (1957) advocates the 'U' shaped palatal flap, and Wilson et al (1972) modified it by

setting the palate back as in the palatal "push back" procedure. But considering the general unilaterality of the tumor, there is no need of bilateral exposure of hard and soft palate, and this U-shaped approach has still some limitation of exposure, and causes flap necrosis when damaging the greater palatine neurovascular bundle during operation.

We solved this problem using hemipalatal flap approach. In cases of the contralateral extension of the nasopharyngeal tumor, the nasal septum was displaced contralaterally without any problems, and the tumor was removed under direct vision. From our experimental study using cats, in which the unilateral greater neurovascular bundle was severed after raising the hemipalatal flap, we can expose the surgical field more widely and safely. One of our 9 cases had a tumor extension into the maxillary sinus, which was removed by hemipalatal flap and extension of this flap incision into the sublabial sulcus.

Average operation time was 1 hour and 50 minutes, and average blood loss during the procedure was 575cc (200~1500cc), which was markedly reduced in comparison with previously reported blood loss of 1800cc (Cho, 1973). This reduction in blood loss may be partly due to preoperative embolization of the feeding vessels (Persky et al, 1984) and partly due to shortened operation time by new surgical exposure of the nasopharynx. No noticeable complication was experienced.

## CONCLUSIONS

A new surgical approach to the nasopharynx via hemitranspalatal flap has been described. Its major advantages are excellent exposure of the surgical field with more safety, avoidance of unnecessary mutilation of the hard palate with postoperative disturbance of nasal

physiology, reduction in intraoperative blood loss by shortening the operation time, and further exposure of operative field by simple sublabial extension of hemipalatal flap incision. There were no noticeable postoperative complications and morbidity.

—국문초록—

## 비인강에서의 새로운 Hemipalatal Approach

민양기 · 김재희

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비인강혈관섬유종은 수술적제거에 의하여 치료가 가능하다 비인강의 해부학적인 불규칙성과 수술시의 심한 출혈 및 주위조직으로의 다양한 침습등으로 인하여 종양의 완전 제거가 힘들다.

저자들은 비인강에서의 새로운 hemipalatal approach를 고안하였다. 이 방법에 의하여 보다 넓은 수술 시야를 안전하게 확보할 수 있었고 불필요한 경구개의 절단을 피할 수 있었으며, 수술 시간을 단축시키고 수술시의 출혈을 감소시킬 수 있었다. 또한 절개 부위를 구순아래로 확장함으로써 수술부위를 확장시킬 수 있는 장점이 있었다.

9례의 비인강혈관섬유종 환자에서 저자들의 수술 방법에 의하여 두개 외측에 있는 종양의 완전 제거가 가능하였고 수술시간은 평균 1시간 50분, 수술시 출혈량은 평균 575cc이었다. 수술후 특기할 만한 합병증은 관찰되지 않았다.

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