

## Two cases of nasopharyngeal branchial cyst

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### Abstract

Two cases of nasopharyngeal cyst, in a two-year-old girl and a six-year-old boy, are described. The cysts were located in the right lateral wall of the nasopharynx in both cases. Histopathological examinations revealed that the cyst walls were lined with columnar epithelium. The positions of the cysts and pathological features indicated that they were of branchial origin, and they were assumed to originate in the second branchial pouch because of their anatomic location. They differed from previously reported cases in that they extended nearly to the base of the skull, occupying the parapharyngeal space. It was considered that they might have originated from the dorsal part of the second branchial pouch or the layer of endodermal cells cut off from the lower part of the eustachian tube.

**Key words:** Nasopharynx; Branchioma.

### Introduction

Cystic lesions in the nasopharynx are relatively rare. They are divided into several groups according to location or developmental mechanism. Several reports on cysts originating from the lateral part of the nasopharynx suggest a branchial origin. In development of the human embryo, five branchial arches appear and this mesodermal tissue is separated on the ectodermal side by grooves and on the endodermal side by pouches. Among theories offered to explain the etiology of branchial cysts, the branchial apparatus theory suggests that internal cysts may be derived from remnants of these pharyngeal pouches.

Two cases of nasopharyngeal cyst are described. The cysts were both located in the right lateral wall of the nasopharynx and extended close to the base of the skull through the parapharyngeal space. This paper will focus on the etiology of this congenital anomaly.

### Case reports

#### Case 1

In October 1990 a female patient, two years old, with nasal

obstruction and a mass lesion in the nasopharynx was referred to our clinic. Examination by fiberoptic nasopharyngoscopy revealed a cystic mass situated in the right half of the nasopharynx covered with normal mucosa. The right tympanic membrane and eustachian tube orifice were of normal appearance. No information was available on her hearing acuity. CT scan and MRI (Fig. 1) demonstrated that the cystic mass lesion occupied the right half of the nasopharynx and extended inward and upward to the base of the skull passing through the parapharyngeal space. Surgery was performed under general anaesthesia via a per-oral approach. On inspection, the cyst had a smooth submucosal swelling between the fossa of Rosenmuller and the upper pole of the right tonsil. Total excision of the cyst using a trans-oral approach was considered, but the very thin cyst wall was ruptured during the dissection, so marsupialization was carried out. Histopathological examination of the cyst wall showed a single-layer of columnar respiratory epithelium. No lymphoid tissue was present in the cyst wall (Fig. 2).

#### Case 2

In January 1991 a male patient, six years old, came to our

TABLE I  
 SUMMARY OF KNOWN CASES OF BRANCHIAL CYSTS OF THE NASOPHARYNX

Authors	Age	Sex	Site	Epithelium	Treatment	Origin
Magnotti (1927)	8	F	Not stated	Strat. cil. col.	Simple excision	Second arch
Guissani (1928)	25	M	Left	Simple strat. col.	Simple excision	First pouch
Hoogland (1951)	69	M	Right	Not stated	Aspiration	First pouch
Taylor and Burwell (1954)	1 53	M	Bilateral	Pseudo-strat. cil. col.	Aspiration and sclerosant injection	Second pouch
	2 49	M	Bilateral	Strat. squamous	Aspiration	Second pouch
	3 54	M	Right	Pseudo-strat. cil. col.	Aspiration and sclerosant injection	Second pouch
Mills (1959)	52	F	Right	Strat. cil.	Simple excision	Second pouch
Shaheen (1961)	1 18	M	Bilateral	Strat. squamous	Aspiration	
	2 59	M	Bilateral	Pseudo-strat. cil. col.	Simple excision	
Boysen <i>et al.</i> (1979)	45	F	Right	Strat. squamous	Simple excision	Second pouch
Yoshimura	1 48	F	Right	Cil. col.	Simple excision	Second pouch
<i>et al.</i> (1986)	2 58	M	Right	Strat. cil. col.	Simple excision	Second pouch
Takimoto <i>et al.</i> (1989)	12	M	Right	Cil. col.	Simple excision	Second pouch
Dilkes <i>et al.</i> (1990)	42	M	Right	Not stated	Simple excision	Second pouch

Presented in part to the Annual Meeting of the Practica Otologica (Kyoto), Sapporo, July 1991.  
 Accepted for publication: 31 December 1992.



FIG. 1

MRI showing high intensity mass in the nasopharynx extending to the base of the skull (*Case 1*).

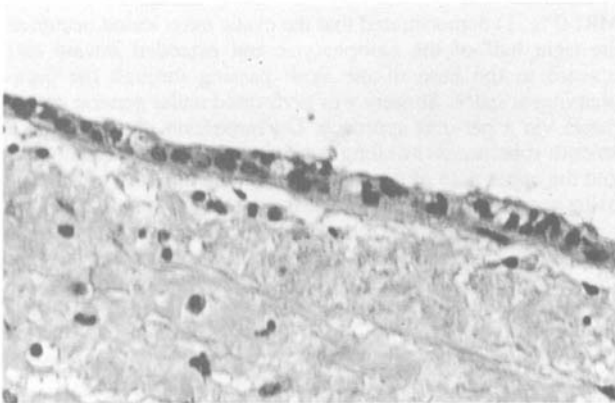


FIG. 2

Cyst wall showing single layer of columnar epithelium. Subepithelial lymphocyte was not found (*Case 1*).

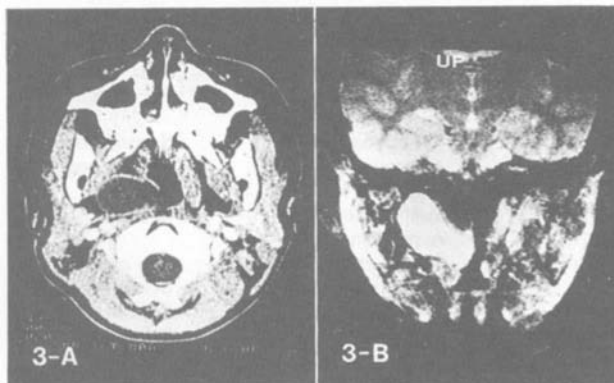


FIG. 3

3-A: Axial CT scan with contrast showing homogenous low density mass in the right nasopharynx and parapharyngeal space. 3-B: MRI, coronal view, showing high intensity mass in the same position as that of *Case 1* (*Case 2*).



FIG. 4

Photograph showing nasopharyngeal cyst. Soft palate is elevated (*Case 2*).

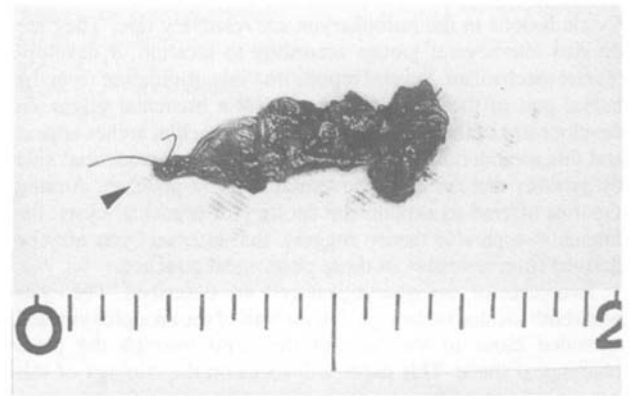


FIG. 5

Excised cyst. Arrow indicates the pharyngeal side.

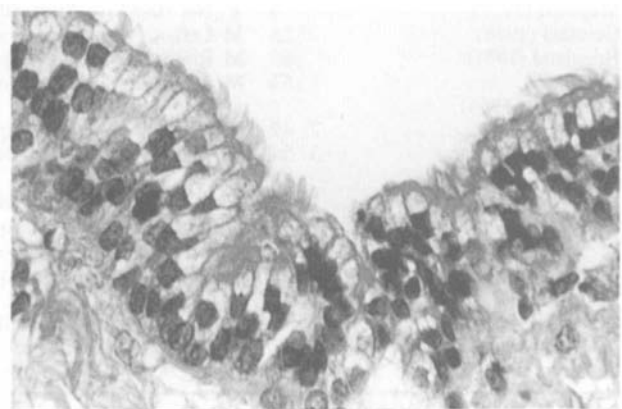


FIG. 6

Cyst wall showing stratified layer of ciliated columnar epithelium. Subepithelial lymphocyte was not found.

clinic presenting a mass lesion in the nasopharynx. He had no loss of hearing, nasal obstruction or sneezing. On inspection from the mouth, the cystic mass was found to be hanging down to the oropharynx on the right side. Otolaryngoscopic examination, audiometry and tympanometry were all normal. CT scan (Fig. 3a) and MRI (Fig. 3b) revealed a cystic mass located in a similar position to that of *Case 1*. Under general anaesthesia, complete resection was performed using the operating microscope. The swelling arose from the lateral wall between the fossa of Rosenmuller and the upper pole of the right tonsil (Fig. 4). It occupied the parapharyngeal space pushing the levator and tensor veli palatini muscle anteriorly and extended to the base of the skull. The cyst wall was very thin and contained a yellow serous fluid (Fig. 5). Histopathological findings showed a stratified layer of ciliated columnar epithelium and no lymphoid tissues (Fig. 6).

Neither of the two cases have had recurrence up to date.

## Discussion

Nasopharyngeal branchial cysts are rare disorders. Most branchial cysts are of second branchial cleft origin deep in the sternocleidomastoid muscle or along its anterior border. Bailey (1933) classified branchial cysts into four different types according to their relationships to surrounding structures. His Type IV cyst is located in the side of the pharynx and the cyst wall is derived from endoderm. The lateral nasopharyngeal congenital cyst is included in this type of anomaly.

Table I summarizes the findings of previous case reports of the nasopharyngeal branchial cysts, including a patient population of ten males and four females, with ages ranging from 8 to 69 years. Only one patient was under 10 years of age. A nasopharyngeal branchial cyst may exist without symptoms, especially if it is of small size, which would help explain the higher number of older patients. In our cases, *Case 1* had a complaint of nasal obstruction, but *Case 2* presented no symptoms and the cyst was accidentally detected during a regular check-up at school. These anomalies probably occur more often than is presumed. In this respect, CT scan and MRI greatly aided early detection and permitted differentiation from other solitary masses or malignant disorders. Total excision is the treatment of choice in such cases, and the intra-oral (Takimoto *et al.*, 1989; Dilkes *et al.*, 1990) or transpalatal approaches are the preferred methods. In our *Case 2*, an intra-oral approach using microscopy enabled the dissection of the intact thin cyst wall from surrounding tissues and complete resection.

In a review of previous pathological examinations, 11 cases (including ours) revealed a single or stratified columnar epithelium with or without cilia; squamous epithelium was found in four cases; and subepithelial lymphocytes infiltration was found in nine cases (three of these with squamous epithelium).

Theories regarding the etiology of internal branchial cysts are divided into two groups. The first suggests that they are derived from the branchial apparatus. The type IV cyst probably originated from remnants of the pharyngeal pouch. The second group of theories considers the presence of subepithelial lymphocytes, suggesting that the cysts are derived from ectopic epithelial cells in the regional lymph nodes (Wild *et al.*, 1987). In our cases, the cystic wall was lined with columnar epithelium without lymphocyte infiltration and the early age of presentation indicates that the cysts may be from the branchial apparatus. These cysts usually lie between the upper pole of the tonsil and a point just below or behind the eustachian tube orifice. The second pouch fistula is open at the same site, suggesting that they originated from the second pharyngeal pouch. In contrast, Guisani (1928) and Hoogland (1951) stated that the cysts were of first pouch origin. In our cases, the site of pharyngeal attachment and the lack of deformity of derivatives of the first branchial apparatus support the view that these cysts originated in the second pharyngeal pouch. However, their extension differs from previously described cases. Simpson (1969) showed a drawing of a complete second branchial fistula with the lesion passing

between the internal and external carotid arteries, over the IXth and VIIIth cranial nerves, to enter the pharynx at the tonsillar fossa. He postulated that a cyst might lie anywhere along this tract. Gill's case (1950) also corresponds to this tract, but the extension seen in our cases contradicts his hypothesis. Frazer (1923) described a double layer of endodermal cells cut off from the lower aspects of the eustachian tube found in the third month embryo. If a cyst originating from such a vestige were present, it would lie below the tube, behind the tensor palatini and in front of the carotid and stylopharyngeus. These findings correspond to our cases, leading us to conclude that the cysts in our cases might have originated from Frazer's X part or the dorsal part of the second branchial pouch.

## Acknowledgements

The authors would like to thank Cameron A. Gillespie, M.D., Yokoska Naval Hospital, for reviewing our manuscript.

## References

- Bailey, H. (1933) The clinical aspects of branchial cysts. *British Journal of Surgery* **10**: 173–182.
- Boyzen, M. E., de Besche, A., Djupesland, G., Thorud, E. (1979) Internal cysts and fistulae of branchial origin. *Journal of Laryngology and Otology* **93**: 533–539.
- Dilkes, M. G., Chapman, J., Stafford, D. (1990) Per-oral excision of a branchial cyst. *Journal of Laryngology and Otology* **104**: 143–144.
- Frazer, J. E. (1923) The nomenclature of diseased states caused by certain vestigial structures in the neck. *British Journal of Surgery* **11**: 131–136.
- Gill, N. W. (1950) A branchial fistula terminating in a tubulodermoid cyst lying posterior to the tonsil. *Journal of Laryngology and Otology* **64**: 62–69.
- Guisani, M. (1928) Cisti rinofaringea di origine branchiale. *Annali di Laringologia, Otologia, Rinologia, Faringologia* **29**: 213.
- Hoogland, G. A. (1951) Nasopharyngeal cyst of branchiogenic origin. *Journal of Laryngology and Otology* **65**: 515–517.
- Magnotti, T. (1927) Cisti mucosa multiloculare della naso-faringea: nota clinicohistologica. *Archivio Italiano di Otologia, Rinologia e Laryngologia* **38**: 639.
- Mills, C. P. (1959) A branchiogenic cyst of the nasopharynx. *Journal of Laryngology and Otology* **73**: 191–192.
- Shaheen, O. H. (1961) Two cases of bilateral branchiogenic cysts of the nasopharynx. *Journal of Laryngology and Otology* **75**: 182–186.
- Simpson, R. A. (1969) Lateral cervical cysts and fistulas. *Laryngoscope* **79**: 30–59.
- Takimoto, T., Akemoto, Y., Umeda, R. (1989) Pharyngeal cyst arising from second branchial cleft. *Journal of Laryngology and Otology* **103**: 964–965.
- Taylor, J. N. S., Burwell, R. G. (1954) Branchiogenic nasopharyngeal cysts. *Journal of Laryngology and Otology* **68**: 667–679.
- Wild, G., Mischke, D., Lobeck, H., Kastenbauer, E. (1987) The lateral cyst of the neck—congenital or acquired? *Acta Otolaryngologica (Stoch)* **103**: 546–550.
- Yoshimura, H., Fujiyoshi, T., Kurono, Y., Kawauchi, H., Mogi, G. (1986) Two cases of nasopharyngeal cyst. *Practica Otologica (Kyoto)* **79**: 1815–1821.

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