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Choanal atresia

by

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Congenital abnormalities of the nose and nasopharynx are not uncommon but there are few recorded series in the literature of atresia and stenosis of the posterior nares.

Pastore and Williams (1939) from the Mayo Clinic recorded a total of twelve cases, four of which were bilateral.

In 1931 Stewart found only six cases in the records of the Edinburgh Royal Infirmary between 1907–1926.

Choanal atresia may be unilateral or bilateral, and the occlusion may be complete or incomplete; the obstructive tissue varies from a thin diaphragm of soft tissue to a thick wall composed of bone covered by mucous membrane, at the posterior end of the nasal airway (Fig. 1). Other associated congenital defects may be present (Flake and Ferguson, 1964), and a familial tendency has been reported by McGovern (1950), but this was not present in our series.

When the condition is bilateral and the occlusion is complete, there is usually marked chest retraction with mouth breathing, and cyanosis during feeding is a common feature in infants. Inability to pass a naso-gastric tube confirms the diagnosis but a few cases of bilateral atresia may remain unrecognized at birth (Durward, Lord and Polson, 1943).

Unilateral atresia of the posterior nares is often missed in the neonatal period. Later, such cases present with unilateral, often profuse, nasal discharge and obstruction.

The diagnosis of atresia or stenosis of the posterior nares may be confirmed by the instillation of a small quantity of radio-opaque contrast such as Ultrafluid Lipiodol or Neo-Hydriol into the nasal cavity, with the patient in the supine position. A lateral radiographic projection of the upper respiratory air passages will demonstrate a lack of flow of the contrast medicine from the nasal cavity into the nasopharynx (Figs. 2A and B, 3A, 4A).

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Material

During the last six years, eight cases of choanal atresia have been discovered at the Ahmadi Hospital, Kuwait, three of which were diagnosed in the neonatal period (Table I). One boy aged three years presented with complete bilateral nasal obstruction. There were six cases of bilateral atresia and only two were unilateral.

Management

In neonates, once the diagnosis of choanal atresia is confirmed, the patient is prepared for surgery. An oral airway is established and maintained, whilst the passage of an oro-gastric tube facilitates feeding. A suitable quantity of blood is cross-matched prior to surgery, as even a small amount of blood loss may be critical in the immediate post-natal period.

Further examination is facilitated by general anaethesia, when the nature of the obstruction may be established by inserting a metal cannula through the nose, and at the same time all the mucus in the nasal cavity is sucked out.

Our method is to perforate any bony septum that may be present with an antral

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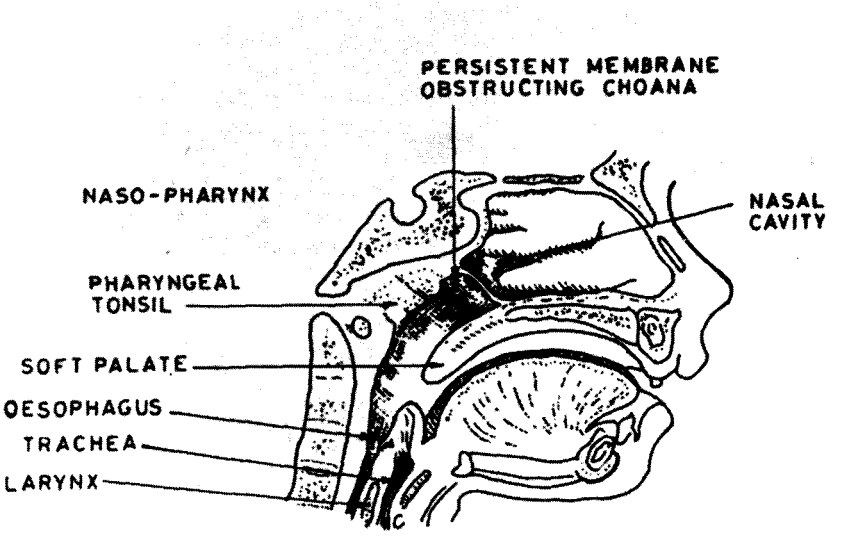


FIG. 1

Semi-schematic drawing of the morbid anatomy of congenital atresia of the posterior nares.

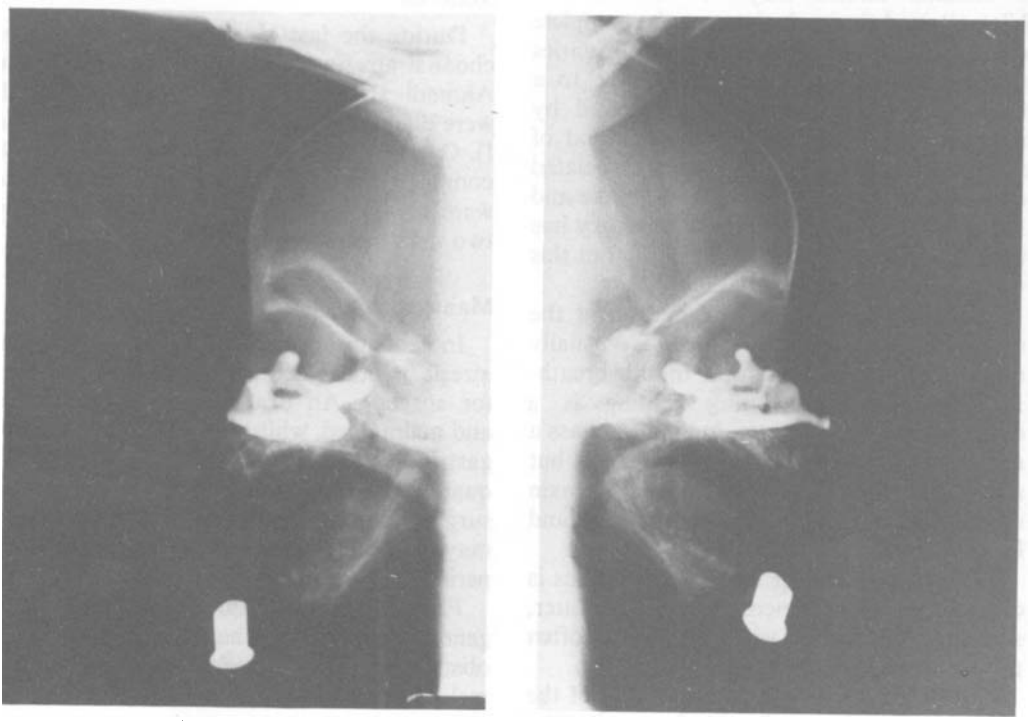


FIG. 2A & B

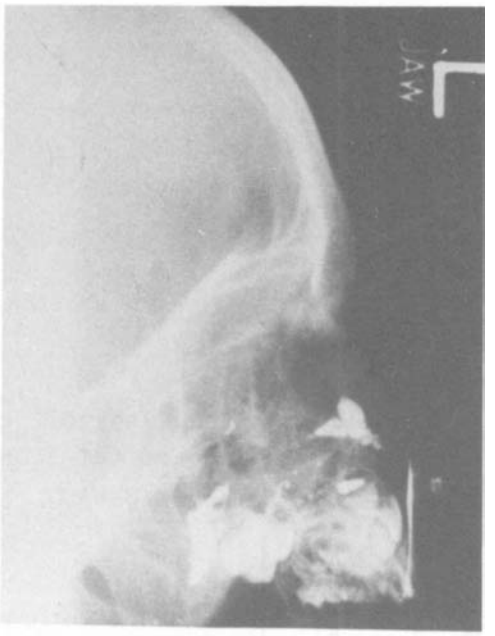
Lateral radiographs of the nasal cavity after instillation of Ultra-fluid Lipiodol into the right (A) and left (B) nostrils. Complete choanal atresia has prevented the flow of contrast medium from the nasal cavity into the nasopharynx.

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TABLE I

	Age	No. of Patients	Sex	Presenting symptoms	Nature of obstruction	Diagnosis	Surgical treatment
(i)	Neonatal period	Three	Two male One female	Severe respiratory difficulty. Cyanosis during feeding. Marked intercostal retraction.	Complete bilateral obstruction	Inability to pass naso-gastric tube. Radiography after instillation of contrast medium.	Transnasal approach.
(ii)	2–6 years	Four	Two male Two female	Unilateral: Unilateral nasal obstruction and discharge. Bilateral: Mouth breathing. Bilateral nasal obstruction with nasal discharge. Sense of suffocation, particularly during feeding and at night.	Unilateral—two cases. Incomplete bilateral—one. Complete bilateral—one.	Radiography	Transpalatine approach.
(iii)	14 years	One	Female	Mouth breathing since babyhood. Bilateral nasal obstruction and discharge.	Incomplete bilateral	Radiography	Transpalatine approach.





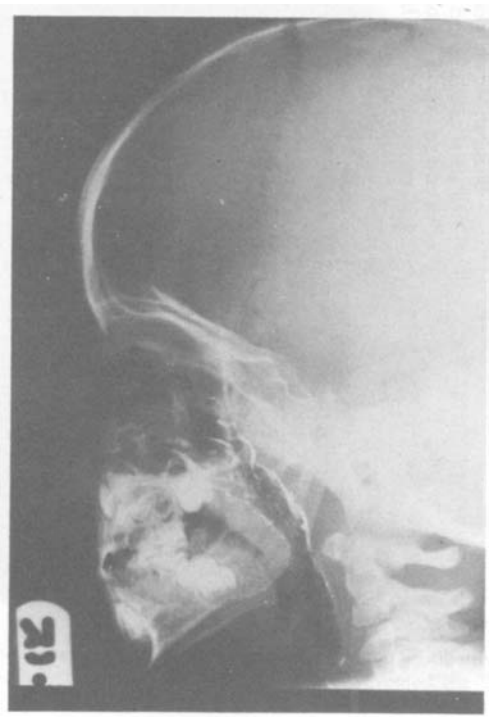


FIG. 3

A. Bilateral choanal atresia in a boy aged three years, a bony septum preventing the flow of contrast into the nasopharynx.

B. A contrast filled rubber tube is shown *in situ*, maintaining patency in the post-operative period.

C. One month later, patency is proven by the free flow of contrast medium into the nasopharynx.

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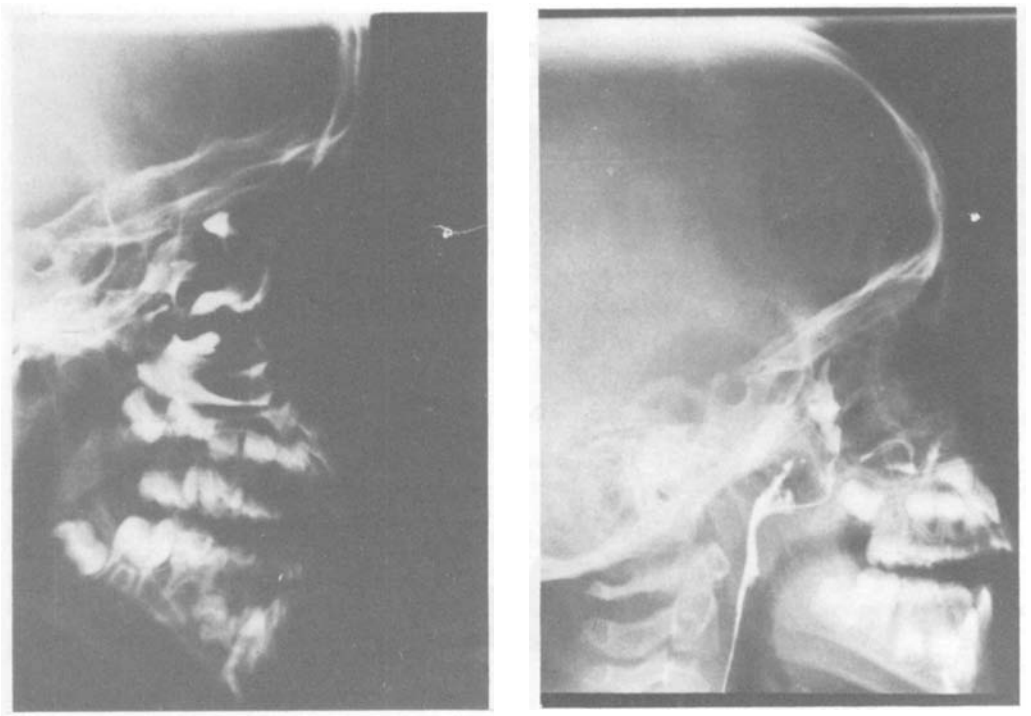


FIG. 4

A. Unilateral atresia in a child aged six years complaining of breathing difficulty and nasal discharge.

B. Patency has been established following surgery.

trocar and cannula or with a Tilley's harpoon-trocar, close to the floor of the nasal cavity. This is preferred to the use of an electric drill (Evans, 1978). The opening is then enlarged with a Lister's urethral sound, starting from size 2/5 and then gradually increasing to size 8/11. A plastic tube of suitable diameter is then inserted through the nasal cavity into the nasopharynx and kept *in situ* by means of a silk suture through the columella. Post-operatively the child is nursed in an incubator, with a humidity of 50 per cent. After three weeks the patient is re-examined under general anaesthesia and, if patency is satisfactory, the plastic tube is removed. The opening in the posterior nares is dilated again with a Lister's urethral sound. Using a Hajek's punch forcep the opening is then further enlarged, by excising the bony septum around the aperture. Any blood loss occurring at this stage is replaced by transfusion. The dilatation is repeated at increasing intervals until a satisfactory nasal airway is established and healing is complete.

Occasionally, however, and particularly if the partition is composed of thick bone, it may be necessary for the tube to be retained in position for a longer period, even up to three months.

In older children and in adults, the unilateral type and on occasions even bilateral choanal atresia may be encountered, the diagnosis having been missed in the post-natal period and in early childhood. Four such cases are included in our series.

In such instances, surgical management differs from that in the new born. A trans-palatine approach to the posterior nasal cavity is made by an incision from one alveolus to the other, anterior to the tensor

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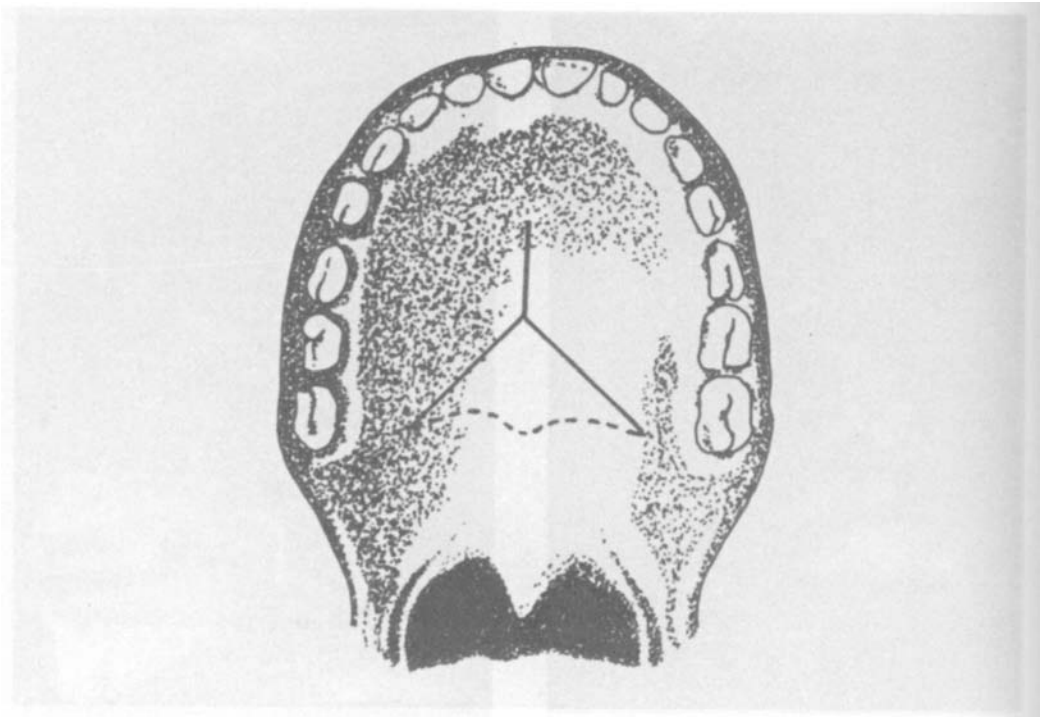


FIG. 5
Palate with the lines of incisions.

tympani muscle and medial to the palatine foramina, to avoid the greater palatine artery (Keogh, 1965; Ranger, 1969). The muco-periosteal flap is elevated from the hard palate as far as its posterior border. The operative procedure then differs according to whether the condition is unilateral or bilateral.

When unilateral, the post-nasal space is opened only on the affected side and a midline incision is made anteriorly, extending from the original incision as indicated in Fig. 5. Triangular flaps are raised on each side and kept apart by stay sutures. The hard palate on the atretic side is removed with a drill. The patent side is not interfered with, thus avoiding fibrosis around the normal aperture. After 'nibbling' away the bony partition, the muco-periosteum is elevated from the posterior end of the nasal septum and the exposed bone removed by drilling only. It is extremely important that the whole of the bony partition is 'smoothed' out of the medial pterygoid plate and roof of the nasopharynx, again with an electric drill. Sometimes it is difficult to preserve the mucosa over the bony palate, particularly in children, but this does not seem to affect the long-term surgical outcome. To maintain patency, a Jacques plastic catheter is introduced *via* the nostril into the nasopharynx (Fig. 3B). If this proves difficult to pass, manipulation is facilitated by the use of a metal introducer. The catheter is removed after three weeks, and patency is maintained by regular periodic passage of a Lister's urethral sound. Employing this technique, we have not encountered re-stenosis in our series.

When choanal atresia is bilateral, the same surgical approach is made, but some of the hard palate is excised on both sides. Post-operative management is as already described.

Should the partition be composed of membrane only, such tissues must be excised

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right up to the bony margin using punch forceps of suitable size.

Four weeks after surgery, contrast medium (e.g. Ultra-fluid Lipiodol) is introduced into each nostril separately by means of a dropper. With the child remaining in the supine position, two lateral radiographs of the nasopharynx are taken, one following the introduction of contrast medium into one nostril, and a second after instillation into the other side. Patency of the posterior nares is proven by the demonstration of contrast in the naso-pharynx (Figs. 3C, 4B).

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