COANAL ATRESIA

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DEFINITION

Posterior Choanae are the posterior nasal aperturrres which allows passage of air through during breathing. Congenital atresia can occur either unilaterally or bilaterally. U/L obs not diag early. B/L obs. is emergency as kids are obligate nasal breathers till 6 weeks(and so start crying)

TYPES OF CHOANAL ATRESIA

1. Bony - 90%
2. Membranous - 10%

THEORIES FOR THE DEVELOPMENT OF CHOANAL ATRESIA:

1. Persistence of a **Buccopharyngeal membrane** from the foregut.
2. Persistence of the **naso buccal membrane of Hochstetter** – most commonly accepted theory.
3. The abnormal persistence or location of **mesodermal adhesions** in the choanal region.
4. A misdirection of mesodermal flow secondary to local genetic factors better explains the popular theory of persistent naso buccal membrane
5. Medial outgrowth of palatine processes
6. Prenatal use of antithyroid medication (carbimazole)

PATHOLOGY

Unilateral : bilateral = 3 : 2

Pure bony (30%); bony + membranous (60%); membranous (10%)

**CHARGE** association - (C- coloboma; H- congenital heart disease; A- atresia choanae; R- retarded growth and development; G- genital anomalies in males; E-ear anomalies and deafness)

BOUNDARIES OF THE ATRETIC PLATE

1. Superior – Under surface of the body of sphenoid
2. Lateral – Medial pterygoid lamina
3. Medial – Vomer
4. Inferior – Horizontal plate of palatine bone
**SIGNS & SYMPTOMS**

- Nasal Obs = U/L
- Thick tenacious secretions which cannot be cleared fully
- Foul breath (Halitosis)
- Rhinolalia Clausa
- Cyclic nasal obs.. child sleeps with mouth closed ➔ progressive obs with stridor ➔
- There is also associated loss of sensation of smell. Patient's with unilateral atresia has c/o unilateral nasal block associated with thick tenacious secretions which cannot be cleared fully. These patients commonly have foul smelling breath either due to mouth breathing and its attendant drying effects, or due to the inability to clear the nasal cavity of its secretions. These patients also have associated change in voice due to loss of normal nasal intonation i.e. Rhinolalia clausa. The respiratory obstruction is cyclic - as the child falls asleep the mouth closes and a progressive obstruction starting with stridor followed by increased respiratory effort and cyanosis. Either the observer opens the child's mouth or the child cries and the obstruction is cleared. Child with bilateral atresia has difficulty in sucking milk

**CLINICAL EXAMINATION:**

1. **Failure to pass a # 6 to 8 French plastic catheter** through the nares into the pharynx. (a typical solid feeling will be encountered at the level of the posterior choana approx. 3-3.5 cm from the alar rim). If obstruction is encountered within 1 - 2 cms from the nasal rim it is probably due to traumatic deflection of nasal septum during delivery. **If obstruction is due to mucosal oedema it can be shrinked using nasal decongestants like oxymetazoline / xylometazoline.**
2. **Wisps of cotton** may be placed in front of the nasal cavity and the movement of air flow can be ascertained.
3. **Placing methylene blue in the nares** and not visualizing it within the pharynx.

**INVESTIGATIONS**

The current investigation of choice is **CT and gives information whether the obstruction is membranous or bony** and the actual structures involved and its thickness. It demonstrates thickening of the vomer, bowing of lateral wall of the nasal cavity and fusion of bony elements in choanal region. **Congenital unilateral atresia is always associated with deviation of nasal septum and thickening of the vomer bone**

**MANAGEMENT**

- **In bilateral atresia** securing the airway takes the first place. An oral airway may be introduced to tide over the immediate crisis.
- Intraoral nipple – a large nipple can be modified by having its end cut off and then ties are attached to the nipple and placed around the occiput. This type of airway is called a McGovern nipple and provides an airway through which the baby can breathe. A very small feeding tube can then be passed either through another hole in the nipple or alongside the nipple for gavage feeding. This is the preferred method of establishing an oral airway.

**ROLE OF TRACHEOSTOMY**

- Controversial. Only if Patient is unable to maintain the oral airway
SURGICAL MANAGEMENT:

- Earlier methods
- Transnasal puncture using Lemperts curette or Urethral sound (blind procedure and requires revisions)
- Transseptal technique by creating a window in septum anterior to atretic plate.

TRANSNASAL APPROACH: (using endoscopes)

- A diamond burr on an angled hand piece is used to drill the atretic bony plate. It is perforated at the junction of the hard palate and the vomer
- To improve visualisation the inferior turbinate can be out fractured or even be trimmed. After drilling care is taken to preserve the mucosal flaps
- Sialistic stent placed for 6 weeks to prevent restenosis
- While performing this procedure caution must be taken not to injure the sphenopalatine vessels behind the middle turbinate
- KTP laser and mitomicin can be used

Advantages of this procedure:

1. This process is faster and easier
2. Blood loss is minimal
3. Can be performed in children of all ages who do not have associated external nasal deformities
4. Child can be immediately breast fed
5. Child can be discharged on the 3rd day itself

Disadvantages:

1. Vision is highly limited especially in the new born
2. Inability to adequately remove enough of the posterior vomerine septal bone and prevent restenosis
3. Longer stenting time
4. Endoscopes do not offer binocular vision
5. Cannot be done safely and with good results on patients with multiple nasal and nasopharyngeal anomalies.

TRANSPALATAL APPROACH

- Modified trendlenberg position. The palate is injected with 0.5% lidocaine with 1:200,000 epinephrine in the area of the mucosal incision. a Owens type (U-shaped) mucosal incision is made beginning just behind the maxillary tuberosity on one side and then continued medial to the alveolar ridge up to the canine region and then angled back to the Nasopalatine foramen. A likewise incision is made on the opposite side and the mucosal flap is elevated taking care not to damage the greater palatine arteries. Mucosa of the nose and nasopharynx is elevated and preserved. Then the palatine bones posterior to the greater palatine foramina, the atresia plates and the posterior vomer are carefully drilled away using a diamond burr. Two 14 or 16 French catheters are passed simultaneously into each nostril to check the patency of the newly created choanae

Advantages:

1. Better visualization and exposure
2. Both hands are free  
3. Less stenting period (a Portex endotracheal tube can be cut and used as a stent)  
4. Less failure rate  

Disadvantages:  

1. The incisions, which are identical to those for a cleft palate repair, may have a banding effect on maxillary growth due to scar formation. (Therefore, most surgeons prefer to wait to use this approach until some teeth are in occlusion - at approx. 12-18 months).  
2. Palatal growth can be stunted in 50% of individuals  
3. Increased blood loss  
4. Increased risk of development of palatal fistulas post operatively  

CARE OF THE POST OP PATIENT:  

1. Patients with GERD require prolonged stenting and dilatations for chances of restenosis.  
2. Stenting usually done using Foley's catheter as it is well tolerated, easy to introduce and remove, minimizes septal trauma, inflatable so adjusts pressure on coanal walls, easy to fix in case of unilateral coanal atresia.  
3. The parents must be taught to maintain the stents with frequent suction and a saline-moistened pipe cleaner or cotton applicator 3 to 6 times per day.  
4. Antibiotics and decongestants are prescribed if there is evidence of rhinitis  
5. Patients must be followed up regularly till the stents are removed.