

The use of nasal trumpet as a non-invasive treatment method in congenital nasal stenosis

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Received: 26th September 2016, Revised 6th October 2016, Accepted: 6th January 2017

SUMMARY: Kemal Ö, Atmaca S, Bel-Çeçen A, Düzgün B, Aygün HC. The use of nasal trumpet as a non-invasive treatment method in congenital nasal stenosis. Turk J Pediatr 2017; 59: 210-213.

Newborns and infants are dependent on nasal respiration and therefore, nasal obstructions may lead to life-threatening outcomes in this age group. Although the most common cause of nasal obstruction in newborns are choanal atresia, soft tissue edema, congenital nasal bone anomalies such as narrowness of the apertura piriformis and midnasal stenosis should be kept in mind.

A 5-day-old infant was referred to our clinic with the complaints of respiratory problems. Physical examination revealed nasal bone hypoplasia and saddle nose deformity. In the endoscopic examination, the septum was seen to be deviated in an 'S' shape and the nasal passages were almost completely closed. The paranasal CT examination reported significant narrowing of the airway in the central part of the nasal cavity. After application of nasal trumpet to both nasal passages, clinical recovery was determined in the patient and no pathology was determined during the follow-up period.

Key words: nasal stenosis, nasal trumpet, newborn.

As newborns are dependent on nasal respiration, any pathology preventing the normal airflow must be diagnosed quickly and the necessary precautions should be taken.

Although structural nasal anomalies as less common, choanal atresia and pyriform aperture stenosis are seen relatively more frequently, more uncommon anomalies such as midnasal stenosis must not be ignored. Before surgical treatment for midnasal stenosis, there are conservative treatments such as nasal drops and McGovern pacifier in addition to the treatment option of nasal airway which is non-invasive, low-cost, and can be applied easily and quickly¹.

There have been extremely few cases of midnasal stenosis and treatment reported in literature. Raghavan et al², reported treatment of dilatation and nasal stent application under general anesthesia in a 6-week old female Asian infant with bilateral midnasal stenosis. In the current case of a patient with midnasal stenosis, nasal trumpet application was considered to be an alternative treatment option that was non-invasive, low-cost and could be applied

easily. The aim of this paper was to share this experience. Family compliance can be considered to be extremely good because of the ease of application of nasal trumpet use.

Case Report

A 5-day old male infant, born at 37 weeks, was referred to our clinic with complaints of respiratory problems which had been ongoing since birth and became more evident during feeding. In the antenatal ultrasonographic examination applied in the 5th month of pregnancy, a nasal anomaly had been determined. Oxygen support by a hood was provided during the examination of the infant which revealed hypoplasia in the nasal bones and the collapse of the nasal root (Fig. 1).

Intercostal and suprasternal contractions were observed. The finest feeding tube was able to pass into both nasal passages. On paranasal tomography images, evident narrowing was observed in the airway at the level of the inferior turbinate in the central section of the nasal cavity (Fig. 2).

As bruising and carbon dioxide retention developed in the patient during follow-up, surgery was planned. Endoscopic examination was done under general anesthesia. The septum was seen to be deviated to the right and there was narrowness in the central section of both nasal passages. Passages were seemed to be almost completely closed. A no. 3 intubation tube was placed in both nasal passages and the anterior edges were fixed to the septum with 4.0 prolene sutures. During follow-up, after the first month, the patient tore the septum



Fig. 1. The examination of the infant which revealed hypoplasia in the nasal bones and that the nasal root had collapsed.

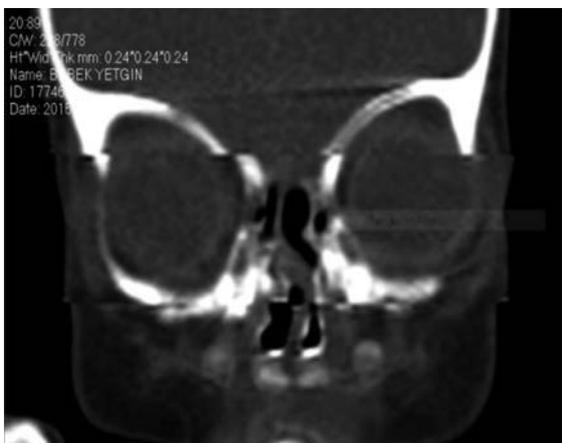


Fig. 2. CT-scan of midnasal stenosis.

by pulling on the tubes, respiratory problems developed rapidly and so the intubated patient was again referred to our clinic. Bedside application of a no. 12 nasal airway (nasal trumpet) (Fig. 3) to both nasal passages was made and after a short period the patient was extubated. Nasal trumpet can be placed in the nose which can easily done by the parents and this is the advantage of the device. Although the risk of nasal trumpet removal by the infant exists, parents can insert them readily. The possibility of bilateral removal of the trumpets by the infant stipulates close parent or caregiver supervision. It is not fixed by a suture or something similar. When the patient was seen to have recovered well, he was discharged. Airways were used continuously for 1.5 months. At the follow-up examination 1.5 months later, the patient was seen to have no further need for the nasal trumpet.

We informed the patient about the publication and written informed consent was obtained

Discussion

The epiglottis in newborns extends as far as the soft palate, separating the digestive and respiratory tracts and thus feeding and respiratory functions can occur at the same time. Approximately 90% of newborns cannot achieve successful oral/nasal respiration coordination. This explains the dependence of the newborn on nasal respiration for the first 2 months of life³. As newborns and infants are dependent on nasal respiration, findings of a nasal obstruction in this age group in



Fig. 3. Nasal airway (nasal trumpet).

particular can be life-threatening and require emergency intervention. Nasal obstruction in newborns is identified by apnea seizures during feeding, chronic unilateral or bilateral rhinorrhea and findings of severe respiratory distress despite a normal tracheobronchial tree⁴. In addition, respiratory problems caused by a nasal obstruction in newborns show a tendency to be relieved by crying⁵. A case of rhinitis observed in this age group, non-specific nasal mucosa is the most frequently seen cause of nasal obstruction⁶. This condition generally responds to treatment with nasal saline drops administered in saline and will improve over time⁶.

The most serious results of nasal obstruction emerge associated with bone and fibrous tissue anomalies in the nasal cavity⁶. These are generally choanal atresia, piriform aperture stenosis and nasal cavity stenosis⁶. Tumoral formations such as glioma, encephalocele, teratoma and dermoid can be included in the less common reasons. Tomography is useful in the determination of the location and degree of nasal obstruction.

In the exclusion of choanal atresia and piriform aperture stenosis, care must be taken that midnasal stenosis is not overlooked in patients with nasal obstruction. Midnasal stenosis is narrowness of the fibrous or bone tissue in the nasal cavity between the piriform aperture and the choana⁷. This narrowness, which is generally unilateral, originates from disproportionate development of the lateral wall of the nasal cavity or advanced septum deviation⁷. In patients with nasal obstruction-related respiratory distress, the McGovern pacifier and oral airway can be used as conservative treatment¹. Indications for surgical treatment in cases of nasal obstruction are nasal airway obstruction leading to sleep apnea, a history of repeated intubation or intolerance of intubation, feeding difficulties with concomitant cyanosis or the failure of the conservative treatments applied⁸. If a 5Fr catheter cannot be passed down the nasal passage, this is also an indication for surgical treatment⁹. In cases that do not respond to conservative treatment in a period of 10-15 days, surgery is recommended⁹.

Raghavan et al.² reported the case of a 6-week old Asian female infant with bilateral nasal

stenosis. In this case, bone narrowness of 3 cm in length started from 0.5 cm posterior to the piriform aperture. After dilatation, stent placement was attempted. After 8 weeks the stent was removed and no recurrence of the complaints was observed during a 6-month follow-up period². Özdemir et al.¹⁰ used balloon dilatation for a newborn with nasal stenosis and they offered their method as an alternative of surgery. They remarked that nasal balloon dilatation is an easy, non-invasive and repeatable way for nasal stenosis. In the current case, the application of nasal trumpet for midnasal stenosis was considered an extremely suitable treatment option as it does not require general anesthesia, can be applied easily at the bedside and has high family compliance.

In conclusion, in patients with findings of nasal obstruction who do not respond to medical treatment and for whom piriform aperture stenosis and choanal atresia have been excluded, midnasal stenosis should be kept in mind. The application of nasal trumpet to patients with midnasal stenosis can be accepted as a non-invasive, low-cost treatment method, which can be applied quickly and easily.

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