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Late presenting nasal deformities after nasal continuous positive airway pressure injury: 33-year experience



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KEYWORDS

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Summary Purpose: This study was designed to characterize the resultant nasal deformities seen in adolescent and adult patients who sustained nasal continuous positive airway pressure (nCPAP) injuries during their NICU admission.

Patients and methods: Data from patients who sustained nCPAP injury in the NICU and seen for plastic surgery evaluation at one institution over the past 33 years was collected. Exclusion criteria were patients with additional nasal trauma after nCPAP injury. A retrospective review was performed, including demographics, time of initial injury, surgical timing, associated medical history, nasal function and photographs. Deformities were characterized according to aesthetic nasal subunit location and secondary nasal deformities. Outcome measures included the need and type of surgical correction, presence of airway obstruction, and surgical complications.

Results: 11 patients were included; the average age was 13.9 ± 4.6 years. The average gestational age was 26.5 ± 1.6 weeks. All of the nasal deformities included the inferior third of nose. The nasal soft triangle and columella were the most common subunits affected. Three patients had combined deformities with involvement of at least two nasal subunits. All injuries resulted in secondary nasal deformities, including nostril asymmetry, columellar asymmetry, nasal tip deviation, lack of projection and nasal airway obstruction. All patients required at least two operative interventions for treatment. Mean age of initial reconstruction was 7.2 years. Despite surgical intervention, secondary deformities and nasal airway obstruction was still present.

Conclusion: Late presenting nCPAP injury deformities most commonly affect the lower third of the nose and can result in a myriad of secondary nasal deformities. The nasal soft triangle and columella were the most commonly involved subunits. Secondary deformities involved the

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nasal aesthetic subunits adjacent to the primarily affected areas, resulting in asymmetry as well as nasal airway obstruction. Most patients required staged open nasal reconstruction with composite grafts.

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Introduction

To provide respiratory support to very low birth weight (VLBW) (<1500 g) neonates, nasal continuous positive airway pressure (nCPAP) is commonly used as a non-invasive alternative to endotracheal intubation and tracheostomy.

Nasal injury is a common phenomenon secondary to nCPAP, with the incidence ranging from 13.2% to 50%.^{1–5} Its severity and risk factors has been well documented.^{4–7} Late presenting cosmetic and functional sequelae has not been reported. This retrospective study was designed to identify and characterize the resultant nasal deformities seen in adolescent and adult patients who sustained nCPAP injuries during their neonatal hospital admission.

Patients and methods

A retrospective review was performed at one institution over a 33 year period for patients who sustained nCPAP injury in the NICU and subsequently evaluated during their adult or adolescent years by a plastic surgeon for nasal issues. Patients who experienced additional nasal trauma after nCPAP injury were excluded. Associated data collected included patient demographics, time of initial injury, surgical timing, associated medical history, nasal function, and photographs.

Nasal deformities were evaluated and characterized by reviewing photographs taken both pre- and postoperatively from nasal reconstruction. Nasal deformities were characterized according to location of the involved nasal aesthetic subunit and associated secondary deformities. Primary deformities were characterized as those caused by the initial nCPAP injury. Secondary deformities were defined as those as a result of adjacent tissue scarring, unbalanced nasal growth, or scar contracture. Photographs were evaluated by two plastic surgeons independently and reassessed two months later. Outcome measures included the need and type of surgical correction, airway obstruction, and surgical complications.

Results

A total of eleven patients were identified, with the average age being 13.9 ± 4.6 years (7–19 years). The average age of preoperative evaluation was 6.9 ± 4.8 years (1–17 years). The average age of postoperative evaluation was 12.5 ± 4.5 years (7–18 years). All patients were white except for one African American. Two were twin brothers, the rest were female. The average gestational age was of 26.5 ± 1.6 weeks (24–28 weeks). The average birth weight was

788.8 ± 185.5 g (538.6 g–1162.3 g). All patients required nCPAP therapy at birth. The average duration of nCPAP therapy was 1 week (maximum 2 months). Patients stayed in NICU on average of 2 months (maximum 5 months).

All nasal deformities included the inferior third of nose (Figures 1–4). The nasal soft triangle and columella were the most commonly affected subunits (Table 1). Three patients had combined deformities involving two or more nasal subunits. Primary deformities included nasal subunit scarring and tissue deficiency. Secondary deformities



Figure 1 Nasal deformity involving different nasal subunits, including bilateral soft triangle, columella and lower nasal tip.



Figure 2 Nasal deformity involving bilateral soft triangle.

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