Columellar reconstruction with chondrocutaneous graft after injury caused by CPAP

Reconstrução de columela com enxerto condrocutâneo após lesão causada por CPAP

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ABSTRACT

Introduction: Continuous positive pressure in the nasal airways (CPAP) is a non-invasive form of ventilation used in premature newborns in intensive care units. However, it can affect the nose of these patients, even evolving with ischemia and columellar necrosis. Several techniques are described to reconstruct the columella, such as skin grafts, composite grafts, local flaps, and free flaps, but the atrial chondrocutaneous graft has stood out. This study aims to describe a case of columella necrosis using CPAP with reconstruction using posterior atrial chondrocutaneous grafting.

Case Report: A brown, female patient, with a history of prematurity and prolonged use of CPAP when she was born due to hyaline membrane syndrome, developed columella necrosis. The patient underwent posterior auricular chondrocutaneous grafting to reconstruct the columella. She presented a satisfactory surgical result, evolving with 100% graft vitality.

Discussion: Columellar necrosis associated with the use of CPAP can be aesthetically and functionally debilitating, and represents a reconstructive challenge. The options for obtaining acceptable results are limited. However, the use of ear grafts is technically straightforward, uses structurally similar donor tissues, does not cause additional scarring on the nose, is performed in a surgical period, and generally has an excellent result. Posterior auricular composite grafting for columellar reconstruction proved safe, with satisfactory aesthetic and functional results and minimal morbidity in the donor area.

Keywords: Acquired nasal deformities; Necrosis; Continuous positive airway pressure; Reconstructive surgical procedures; Autografts
INTRODUCTION

Continuous positive airway pressure (CPAP) is a non-invasive form of ventilation used as a method of respiratory support in premature newborns in intensive care units as an alternative to endotracheal intubation and tracheostomy. However, due to immaturity, the nose of these patients can be easily affected. Nasal injury is a relatively common consequence secondary to CPAP with an incidence of around 13.2% to 50%, and can vary from edema and erythema to columellar laceration and necrosis. Less than 1% of these patients develop irreversible ischemia and necrosis, resulting in a spectrum of nasal disfigurement.

Patients with functional and/or aesthetic impairment of columella after using CPAP may need intervention. For columellar reconstruction, size, symmetry, color matching, skin texture, condition of the surrounding tissue, and donor area must be considered. Several techniques have been described, and they include skin grafts, composite grafts, local flaps, and free flaps. Among these various procedures, the auricular chondrocutaneous graft is one of the most advantageous methods, as it allows the reconstruction of the structural cartilage together with the skin, in a single surgical time, in addition to the ear being considerably similar in shape, curve, color and texture to the columella.

The objective of this study is to report a case of an atrial chondrocutaneous graft for columellar reconstruction after necrosis using CPAP.

CASE REPORT

Female patient, 4 years old, brown, with a history of prematurity (gestational age 31 weeks and 4 days) and fetal distress due to placental abruption, developed hyaline membrane syndrome, requiring mechanical ventilation for 16 days and continuous positive pressure in the nasal airways for another 8 days. As a result of using CPAP, he presented a columella lesion with local necrosis. On physical examination, a patient with no columella, with a consequent drop in the tip of the...
nose (Figure 1). For reconstruction, the posterior atrial chondrocutaneous graft was chosen.

Patient in the supine position under general anesthesia. Surgical demarcation\(^1\) (Figure 2) was performed on the columellar defect, with transversal lines at the upper and lower edges, joined by a median vertical line, and the donor area in the posterior region of the left ear with an ellipse (Figure 3). Incision over the ear tag, followed by removal of a composite graft containing skin, subcutaneous tissue, and cartilage. An incision was made over the nasal marking, making two lateral flaps. Graft positioning, with cartilage fitting at the base of the columella, followed by suturing it to the flaps (Figures 4 and 5). Compressive dressing made with gauze.

The patient did not have any complications and was discharged from the hospital on the 1st postoperative day. The surgical wound showed no signs of complication, with a good appearance. The patient returned for outpatient follow-up and the graft was 100% vital (Figure 6). She will remain in follow-up until adolescence, to assess the need for re-approach for aesthetic refinement.
Columella reconstruction with chondrocutaneous graft

DISCUSSION

Although nursing initiatives have sought to reduce the incidence, nasal injury remains a common problem in preterm newborns who receive non-invasive respiratory support, especially in preterm infants born less than 30 weeks of gestation\textsuperscript{2,5,6}. Columellar necrosis associated with CPAP use can be aesthetically and functionally debilitating and represents a reconstructive challenge\textsuperscript{2}. The options for obtaining acceptable functional and cosmetic results are limited in the reconstruction of this delicate subunit, but the use of composite grafts is consistent with many fundamentals of plastic surgery\textsuperscript{8}.

Nasal reconstruction requires the management of several layers simultaneously in a three-dimensional shape\textsuperscript{7,8}. The practice has shown advances since in 1985\textsuperscript{9}, surgeons Burget and Menick, proposed the principle of subunits of the nose\textsuperscript{10}. Nasal columella has traditionally been a subunit that is difficult to repair due to its unique contours, limited availability of adjacent skin, and tenuous vascularization\textsuperscript{10}. The simplicity and elegance of using compound ear grafts to repair such defects were already recognized in 1896\textsuperscript{8}. The procedure is technically straightforward, uses structurally similar donor tissues, does not cause additional scarring on the nose, performs in a surgical procedure, and usually has a very satisfactory result\textsuperscript{8}.

Posterior auricular composite grafting for columella reconstruction proved safe and had little technical difficulty in repairing the described lesion. The aesthetic and functional result was satisfactory, with minimal morbidity in the donor area.

COLLABORATIONS

GCVFS Conception and design study, Writing - Original Draft Preparation, Writing - Review & Editing
CMM Conception and design study, Writing - Original Draft Preparation, Writing - Review & Editing
MATAF Conception and design study, Writing - Review & Editing
SFF Conception and design study, Writing - Review & Editing
DCL Methodology, Supervision
RPP Final manuscript approval, Supervision

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