

Nasolacrimal Duct Mucocele

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Abstract

Nasolacrimal duct mucocele (NLDM) is a rare, mostly unilateral nasolacrimal duct obstruction in newborns. It is identifiable on prenatal imaging. Patients may present with eyelid swelling and tearing. It is typically diagnosed through imaging that shows lacrimal sac enlargement and a nasal mass. Initial treatment is conservative, with surgery reserved as a secondary option for resistant cases. More recently, dacryocystoscopy has improved the precision and outcomes for those with NLDM.

Keywords: Neonatal, Head and Neck, Face, Congenital

Case Summary

A term neonate was referred for MRI at 6 days of life. At birth, the neonate had Appearance, Pulse, Grimace, Activity, and Respiration (APGAR) scores of 1, 1, 6, and 7 at 1, 5, 10, and 15 minutes of life, respectively. Based on the low APGAR scores and severe respiratory distress, resuscitation was initiated.

Imaging Findings

MRI (Figure 1) showed a normal brain. There was an incidental note of an enlarged left nasolacrimal sac and duct, with a small intranasal cyst. CT (Figure 2) at 4 months of age showed similar findings with an enlarged left lacrimal sac at the eye's medial canthus, a widened bony nasolacrimal canal, and a small nasal cavity mass.

Diagnosis

Nasolacrimal duct mucocele (NLDM).

The differential diagnosis includes benign conditions such as epidermoid cysts, hemangiomas, nasal gliomas, hemangioma, cephalocele, and dermoid cysts.

Discussion

NLDM, also called congenital dacryocystocele, dacryocele, amniotocele, or congenital mucocele, is a rare type of nasolacrimal duct obstruction (NLDO).^{1,2} It accounts for 0.1-1.3% of congenital NLDO.¹ NLDMs affect roughly 1 in 3884 newborns in the United States. They are typically unilateral (82.5%) and more commonly affect the right side (54.8%).¹

An NLDM can obstruct the nasolacrimal system at either the distal Hasner valve or proximal Rosenmuller valve.³ Obstruction at the Hasner valve is anatomical, while at the Rosenmuller valve, it is functional. Both lead to fluid buildup in the lacrimal sac, causing distension, cystic swelling at the medial canthus, and epiphora. If untreated, this can increase the risk of

secondary infection, such as dacryocystitis.^{2,3}

The lacrimal system develops between the 16th and 25th week of gestation, making prenatal detection of NLDO possible.¹ In 35-73% of full-term fetuses, an imperforate nasolacrimal duct can be found, which is categorized as NLDO.³ NLDM has been detected as early as 23 weeks of gestation, with an average detection time of about 31.3 weeks, ranging from 23 to 40 weeks.

NLDO is often asymptomatic but can be identified prenatally using ultrasonography and MRI.^{1,2} Approximately half of the prenatal NLDO cases cause symptoms after birth, with 96% resolving spontaneously by the first year.^{2,4,5} Because most congenital NLDOs resolve spontaneously, newborns are observed. If symptoms persist and NLDM is diagnosed, conservative treatment with daily massage, warm compresses, and topical antibiotics is initiated, resolving symptoms in about 76% of cases.² If these measures are unsuccessful, nasolacrimal duct probing is considered, typically after 12 months, or earlier for significant dacryocystitis or unresolved obstruction by the first birthday.⁵

Clinical signs of NLDM typically appear between 4 days to 10 weeks after birth, with symptoms most commonly presenting around 7 days of life.^{1,4} The primary

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Figure 1. (A) Sagittal T2-weighted MRI showing a hyperintense mass (arrow) at the medial aspect of the left eye with extension inferiorly through the nasolacrimal duct. (B) Coronal T2-weighted MRI highlighting the oval-shaped mass (arrow) at the medial canthus of the left eye.

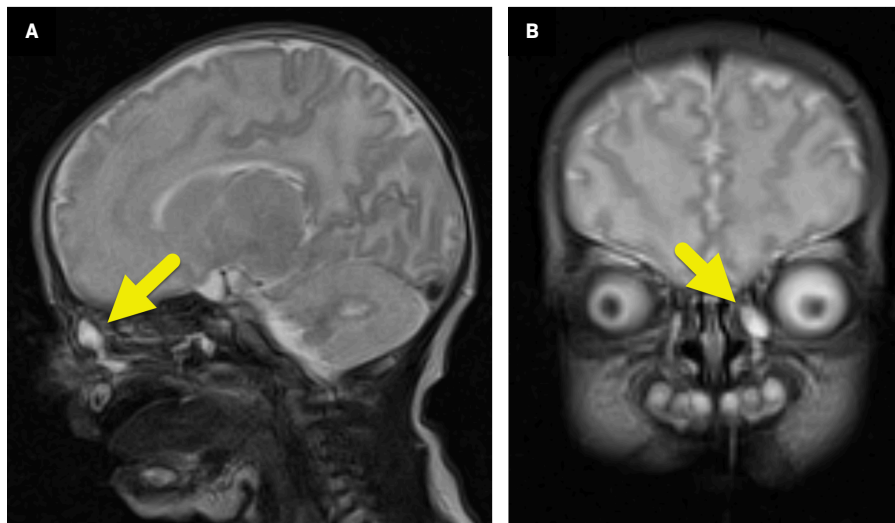
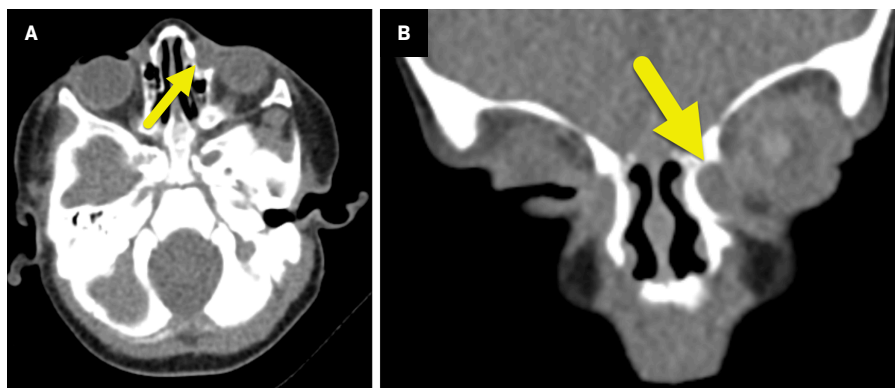


Figure 2. (A) Axial CT showing a soft-tissue mass (arrow) at the medial aspect of the left eye with widening of the nasolacrimal canal. (B) Coronal CT showing the mass (arrow) with widening of the nasolacrimal canal.



symptoms are epiphora and a proximal cyst near the medial canthal area, often visible as a bluish or reddish swelling. Additionally, mucopurulent discharge and intermittent eyelid crusting are common. In severe cases, particularly when the cyst is bilateral, significant respiratory distress may occur due to the obstruction of the nasal passages. Since neonates are obligate nasal breathers, any blockage can interfere with their ability to breathe comfortably, especially during feeding and sleeping.¹

The diagnosis of a nasolacrimal duct mass typically relies on identifying a triad of imaging findings: an enlarged

lacrimal sac at the eye's medial canthus, a widened bony nasolacrimal canal, and a nasal cavity mass indicative of the mucocele's inferior extension.⁶ These findings help distinguish NLDM from similar conditions, such as choanal atresia, hemangioma, glioma, encephalocele, and dermoid cysts.⁶ Choanal atresia and NLDM both present with nasal obstruction; however, choanal atresia involves a blockage of the choana (90% bony, 10% membranous), whereas NLDM is a soft-tissue mass in the nasal cavity or lacrimal apparatus. CT scans, preferred for detailed bone imaging, help visualize

the bony structures of the nasolacrimal canal and differentiate osseous conditions like choanal atresia from NLDM, which involves soft tissue masses.^{1,6}

Initial treatment often involves non-invasive methods such as daily lacrimal sac massage, which helps promote drainage. Antibiotics may be added if an infection occurs to reduce inflammation and prevent the spread of infection/inflammation to adjacent tissue.^{2,4,6} If infection occurs or airway obstruction persists, more intensive treatments may be necessary. About 10% of patients unresponsive to conservative measures may need procedures like probing with irrigation or silastic stent insertion to treat blockages.^{3,4}

In patients with persistent or recurrent dacryocystitis, surgical intervention may be required.^{7,8} Dacryocystorhinostomy creates a new drainage route into the nasal cavity, and an endoscopic approach is favored for this procedure as it is less invasive than the external lateral nasal surgical approach.² The integration of dacroendoscopy (DE) has significantly improved the management of NLDO by allowing for direct visualization and precise identification of obstructions within the lacrimal system, facilitating targeted and minimally invasive treatments in children. This approach has been associated with improved patient satisfaction due to faster recovery times, a better cosmetic result, fewer postoperative complications, and reduced reliance on subsequent interventions, thereby enhancing overall treatment efficacy.⁸

DE is effective for managing NLDO and NLDM in children and neonates. DE-guided procedures show high success rates, even in young infants, improving outcomes for technically difficult cases. Early DE-guided probing achieved a 97.1% success rate after 1 year. Traditional probing had variable success rates: 25-61% for repeat probing, 33-89% for late probing, and 33-52% for complex cases. DE-assisted nasal endoscopic marsupialization has also been effective for NLDM in

neonates as young as 43 days, underscoring its value in young patients and complex cases.⁸

Conclusion

NLDM is a rare, mostly unilateral NLDO in newborns. It is identifiable on prenatal imaging. Patients may present with eyelid swelling and tearing. It is typically diagnosed through imaging that shows lacrimal sac enlargement and a nasal mass. Initial treatment is conservative, with surgery reserved as a secondary option for resistant cases. More

recently dacryoendoscopy has improved the precision and outcomes for those with NLDM.

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