

Original Article

Endoscopic intranasal findings in unilateral primary acquired nasolacrimal duct obstruction



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Abstract

Purpose: To evaluate intranasal endoscopic findings in patients with unilateral primary acquired nasolacrimal duct obstruction and compare them with the normal cohort.

Methods: A prospective case-control study with 50 unilateral primary acquired nasolacrimal duct obstruction (PANDO) and 50 healthy controls. All patients were evaluated by endoscopic nasal examination for the presence of deviated nasal septum (DNS), type of deviation (bony or cartilaginous), side of deviation, septal spurs, caudal dislocation, any turbinate hypertrophy and endoscopic features suggestive of sinusitis.

Results: A significant increase in the incidence of nasal septal deviation was found in PANDO cases (60%, 30/50) compared to controls (36%; 18/50; $P = 0.03$). The laterality of septal deviation corresponded to the side of NLD obstruction in 90% (27/30) cases. Higher location of DNS (73% vs 22%; $P = 0.0009$) and bony deviation (77% vs 44%; $P = 0.02$) were observed among study group as compared to controls. The odds of having NLD obstruction are 2.7 times more among individuals having septal deviation versus no deviation (95% CI, 1.19–5.99).

Conclusion: Unilateral PANDO has a higher incidence of ipsilaterally deviated nasal septum. This association is significant. Routine nasal endoscopic examination should be performed in cases undergoing dacryocystorhinostomy to better plan a concomitant septoplasty if needed.

Keywords: Deviated nasal septum, DNS, Primary acquired nasolacrimal duct obstruction, PANDO, Nasal endoscopy, Sino-nasal anomalies

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Introduction

Pathogenesis of primary acquired nasolacrimal duct obstruction (PANDO) is still unclear despite extensive existing knowledge on its management.^{1,2} Assessing intranasal anatomy has a relevance in management of PANDO and could provide insights into the associated pathologies. Facial asymmetry and nasal septal deviation have been postulated to be the cause of unilateral NLD obstruction.^{3–5} In a retrospective study by Taban et al.,³ NLD obstructions corresponding to the side of deviated nasal septum (DNS)

were reported in 71% of cases ($P < 0.03$). Lee et al.⁴ published similar evidence in east Asians, where positive linear correlation was found between the side of DNS and NLD obstructions, when the degree of facial asymmetry was considered ($P = 0.043$). Apart from nasal septum, no other intranasal features were documented in these studies. Computed tomography based data exists on associated sino-nasal anomalies in PANDO.^{6–12} Similar significant endoscopic intranasal anomalies and pathologies have been described to be associated with congenital nasolacrimal duct obstruction.¹³ However, no cause-effect relationship could be

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ascertained from the published data. We aimed to assess the associated intranasal features in patients with unilateral PANDO.

Methods

A prospective case-control study was conducted for consecutive patients diagnosed with PANDO in the Dacryology services of a tertiary care eye center from April 2016 to September 2016. Institutional review board and ethics committee approval were obtained. All patients were assessed and operated by a single surgeon (MJA). All patients provided an informed written consent before the surgical procedure.

Relevant histories, including presenting symptoms, duration of PANDO, and details of any previous nasal surgery were recorded. Lacrimal probing and irrigation were performed for both the eyes to confirm unilateral NLD obstruction. Healthy volunteers who had no history of epiphora constituted the control group. Subjects with maxillofacial trauma, past history of nasal surgeries or any other known lacrimal duct disease were excluded. Nasal endoscopic evaluation was performed using a 4 mm; zero degree telescope (Karl Storz, Tuttlingen, Germany) was performed in all patients. Data collected include demographics, details of PANDO, type of septal deviation (bony or cartilaginous; high or low), side of deviation, the presence of septal spurs, caudal dislocation, any turbinate hypertrophy and endoscopic features suggestive of sinusitis. Septoplasty was performed as per surgeon's discretion wherever access to the intended site of surgery was hindered by the deviated septum. Data analysis was carried out using SPSS version 21 (SPSS Inc, Chicago). Descriptive statistics were performed using Microsoft Excel. Chi-square test was used to calculate association between each of endoscopic findings and the side of NLD obstruction. Fisher exact test was used to compare study and control group. A P value <0.05 was considered to be significant.

Results

The study group and the normal cohort, each had fifty patients. The demographics were comparable in both the groups (Table 1; $P = 0.09$ for age, $P = 0.11$ for sex). PANDO was found to be more frequent among women (60%; 30/50). Left sided dominance of PANDO was observed in 66% (33/50) cases. Thirty patients (60%) had deviated nasal septum in PANDO group versus 18 (36%) in control group ($p = 0.03$). The odds of having NLD obstruction are 2.7 times more among individuals having septal deviation versus no deviation (95% CI, 1.19–5.99). Of the 30 patients with DNS in the study group, the laterality of septal deviation

corresponded to the side of NLD obstruction in 90% (27/30) cases, which was quite significant. There was a higher incidence of bony DNS in study group compared to the control group. This higher incidence can be correlated with high location of DNS in study group compared to controls. Turbinate hypertrophy, the presence of septal spur or endoscopic evidence of sinusitis had no significant association with NLD obstruction when compared with the controls. Laterality of NLD obstruction had no significant correlation with any other intranasal endoscopic findings (Table 1).

Discussion

The current study found that unilateral PANDO was observed to be associated with ipsilateral deviated nasal septum. However, other endoscopic parameters were not significantly different among study and control groups.

Association of PANDO with ipsilateral nasal septum deviation was in agreement with the findings described earlier by Taban et al. and Lee et al.^{3,4} However, both these studies were retrospective in nature and lacked a control group. Lee et al. assessed facial asymmetry using photographic documentation in PANDO that revealed deviation of nasal septum toward smaller side of the face, hypothesizing the causative role of bony abnormality in PANDO. Maximal development of human face and nasal septum takes place in first decade of life. But the mean age observed for PANDO is in fourth to fifth decade, which reiterates the role of other factors in etiopathogenesis of PANDO. However, this association is not conclusive of the role of nasal septum in etiopathogenesis of PANDO and reflects a possible influence of embryologic developmental factors in PANDO.

Co-occurrence of endoscopic sino-nasal anomalies and NLD obstruction has been demonstrated on computed tomography of paranasal sinuses (CT-PNS).⁸ Kallman et al.⁶ reported sino-nasal anomalies (osteomeatal complex disease, ethmoidal opacification, agger nasi cell opacification, concha bullosa, and nasal septal deviation) in 87% of patients with NLD obstruction versus 63% of the control group ($p < 0.05$) on coronal CT-PNS. Habesgolu et al.⁹ reported significantly higher numbers of concha bullosa, inferior turbinate hypertrophy and osteomeatal disease on the side of NLD obstruction versus contralateral side ($p < 0.05$) on CT-PNS. However, in their study, nasal septal deviation, ethmoidal sinusitis and irregularity of middle turbinate were no different on either sides. Cervelli et al.⁸ studied lacrimal outflow on pre and post-operative CT dacryocystography, among DNS cases undergoing septorhinoplasty. Reduced lacrimal flow was found in 45.8% ($n = 24$) cases which resolved after surgical correction of nasal septum. Radiological anatomy of nose and NLD assessment by Yazici et al.¹¹ showed increased

Table 1. Demographic and endoscopic findings of study and normal population.

Parameter	Study group {n = 50}	Normal {n = 50}	P value
Mean age (range)	40 (11–68)	37 (10–60)	0.09, Mann-Whitney test
Male:female	20:30	29:21	0.11, Fisher-Exact test
Deviated nasal septum, n (%)	30 (60)	18 (36)	0.03, Fisher-Exact test
High:low	22:8	4:14	0.0009, Fisher-Exact test
Bony:cartilaginous	23:7	8:10	0.02, Fisher-Exact test
Septal spur, n (%)	5 (10)	2 (4)	0.44, Fisher-Exact test
Caudal dislocation, n (%)	2 (4)	2 (4)	1.00, Fisher-Exact test
Turbinate hypertrophy, n (%)	9 (18)	3 (6)	0.12, Fisher-Exact test

incidence of deviated nasal septum toward the side of PANDO ($P = 0.008$). However, no differences were noted for other paranasal abnormalities between PANDO and the control groups. In a Japanese population based radiology study, no significant bony NLD canal narrowing was observed with or without primary acquired nasolacrimal duct obstruction.⁷ However, the radiology based studies did not correlate their findings with endoscopic assessments.

Women had a higher incidence of PANDO compared to men in our study which is also supported by existing literature. Longer length of NLD canal was detected on multi-detector CT among men when compared to women but no significant difference in NLD diameter was found. Exact reason for female preponderance in epidemiology of PANDO is unknown.

Associated sino-nasal anomalies are known to influence the surgical outcomes of endoscopic dacryocystorhinostomy (En-DCR).^{14–16} Associated sino-nasal anomalies on CT studies were reported in 26/37 patients undergoing En-DCR with reduced success rates (82.8%) as compared to cases who had no sino-nasal anomaly (92.3%).¹⁴ Ali et al.¹⁵ reported performing septoplasty in 47% of their 262 patients of endoscopic DCR. Figuiera et al.¹⁶ reported lesser number of septoplasty (11.9%, $n = 576$), although septoplasty was the most common concomitant intranasal procedures performed during En-DCR.

Strengths of our study are its prospective nature along with a control arm, inclusion of only unilateral PANDO patients and performance of a detailed endoscopic evaluation. The limitation is the small sample size which precludes further meaningful subgroup analysis.

To conclude, typical patterns of association between septal deviation and NLD obstruction exist, but cause-effect relationship is not yet ascertained. Endoscopic evaluation should be performed for every patient undergoing dacryocystorhinostomy so as to better plan the concomitant septoplasty when required for a deviated septum.

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Conflict of interest

The authors declared that there is no conflict of interest.

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