**Proboscis Lateralis**

Proboscis lateralis describes a rudimentary nasal structure or appendage that is located off-center from the vertical midline of the face. Proboscis lateralis is a rare craniofacial malformation frequently associated with abnormalities of the eyes and/or ocular adnexa. We report a case with ipsilateral colobomatous microphthalmia and choanal atresia.

**Report of a Case.** A 3.5-kg black male infant was born at 40 weeks' gestation by uncomplicated spontaneous vaginal delivery with Apgar scores of 8 and 9 at 1 and 5 minutes. At birth, the patient was noted to have a 2.5 x 1.1-cm trunk-like appendage (Figure 1) arising from his left medial canthus with a clear mucoid discharge draining from an orifice at its distal end. Also noted were left microphthalmos, left choanal atresia, and a mildly hypoplastic left nasal ala. Prenatal history was negative for consanguinity, exposure to alcohol, ionizing radiation, prescription medications, or recreational drugs. The patient’s mother denied any family history of blindness, craniofacial abnormalities, mental retardation, or other congenital defects. Chromosomal analysis was reported as 46,XY. Findings from examination of the left eye were remarkable for microphthalmia with a horizontal corneal diameter of 5.0 mm. The anterior chamber was well formed and the lens was clear. Funduscopic examination results were remarkable for a posterior chorioretinal coloboma with a partial retinal detachment. Findings from examination of the right eye were normal.

Computed tomographic images (Figure 2 and Figure 3) demonstrated normal cerebral parenchyma, ventricular architecture, and mid-line anatomy. Hypoplasia of the left nasal passage with left-sided choanal atresia was present. A defect in the medial wall of the left orbit was noted, and a tubular soft tissue structure extended from the medial aspect of the preseptal soft tissue and appeared continuous with the nasal cavity and ethmoid sinus. The left globe was small and dysplastic with a colobomatous cyst posteriorly.

Surgical excision of the proboscis was performed at age 4 months. Since the nasal alae were relatively well developed, reconstruction was unnecessary, and the soft tissue appendage was simply amputated from its origin at the superior aspect of the left medial canthus. The fistulous tract to the ethmoid sinus was excised, and the choanal atresia was then repaired.

Pathologic findings revealed an oblong, skin-covered, tubular mass

![Figure 1. Proboscis with metal skin hook inserted into the distal orifice. Note the slightly hypoplastic left nasal ala and obvious microcornea of the small left eye.](image1)

![Figure 2. Axial 1.5-mm contrast-enhanced computed tomographic scan, bone windows. A. Left-sided choanal atresia (arrow). B. Portion of the proboscis on the left (open arrow) with a pneumatized central canal. The soft tissue extends through a defect (arrow) in the medial wall of the left orbit, continuous with the ethmoid sinus.](image2)
(Figure 4) measuring 2.5 cm in length × 1.1 cm in greatest diameter. At the distal end of the appendage was a 3-mm orifice that was patent to probing. Microscopic examination of sections from the mass (Figure 5 and Figure 6) revealed a hamartomatous malformation covered by hair-bearing skin. The stromal soft tissues were noted to be composed of fibroadipose tissue with abundant bundles of skeletal muscle. A central canal was lined by squamous mucosa distally, changing to respiratory-type mucosa more proximally. Small plates of hyaline cartilage as well as several normal-appearing peripheral nerves were noted in the soft tissues adjacent to the central canal.

Comment. Proboscis lateralis is a rare congenital anomaly in which a tubular, nose-like structure is seen to arise from the medial canthus. It was first mentioned in 1861 by Forster in his monograph Congenital Malformations of the Human Body in which he described an 8-month-old girl with a proboscis emanating from her left frontal area, heminasal aplasia, and a depression between her 2 normal eyes that was surrounded by eye-lids complete with both eyelashes and a conjunctival lining. Selenskoff, however, is often credited with first describing proboscis lateralis in an 1884 autopsy.

Although it was initially reported that no sex predilection existed, Boo-Chai noted a 2:1 male-female preponderance. Review of 9 cases subsequent to Boo-Chai’s report supports the notion of a male preponderance with a 3:1 male-female ratio. There does not seem to be any racial predilection in proboscis lateralis.

The embryologic defect that results in proboscis lateralis appears to involve the nasal placode, which is a primary organizer of the nasal area of the midface. Duplication of the nasal placode, which is very rare, may generate a lateral proboscis in the absence of any other facial anomalies. Usually, however, the nasal placode develops abnormally, which may result in legion midfacial anomalies, but continues to act on mesenchymal tissue, allowing it to fuse into the tubular lateral proboscis.

Although the proboscis generally arises from the area of the medial canthus, exceptionally rare cases have been described in which the anomalous structure arises from the lateral canthus, nasal root, or chin, or is present bilaterally. This trunk-like appendage is generally 2 to 3 cm in length and 1 cm in diameter and has a central tract lined with respiratory epithelium. The tract drains at a dimpled opening at the distal end of the proboscis and may be continuous with the paranasal sinuses proximally. Generally, there is heminasal hypoplasia or aplasia on the side of the proboscis although, in rare cases, the nose is normal. Anomalies often affect the nasal cavity as well as the nares, and complete closure of the nasal cavity at the piriform aperture may be seen in cases in which heminasal aplasia is present. Cleft lip and/or palate may also be present. To the best of our knowledge, this is the first reported case of proboscis lateralis associated with choanal atresia.

Of interest to the ophthalmologist is the frequent association of abnormalities of the eye and ocular adnexa with proboscis lateralis. Although Wang et al reported that...
ocular defects are rare in patients with proboscis lateralis, a subsequent review of the literature by Boo-Chai\(^2\) noted that 24 of 34 patients with proboscis lateralis had associated anomalies of the ipsilateral eye and/or ocular adnexa. These abnormalities included anophthalmia, microphthalmia, microcornea, lenticular opacities, cyclopean eye, and colobomas of the choroid, retina, iris, and eyelids. The presence or absence of ocular abnormalities was used by Boo-Chai\(^2\) to help categorize patients with proboscis lateralis into 4 groups: group I has a lateral proboscis with a normal nose (but may have ocular findings); group II, lateral proboscis with an ipsilateral deformity of the nose; group III, ipsilateral deformity of the nose and the eye and/or ocular adnexa; and group IV, cleft lip and/or palate in addition to the nasal and ocular abnormalities.

It is noteworthy that most patients with proboscis lateralis do not have serious central nervous system abnormalities, in stark contrast to a mid-line proboscis, which is often indicative of holoprosencephaly. Nonetheless, proboscis lateralis may coexist with central nervous system anomalies,\(^4,12\) and early neuroimaging is indicated to rule out intracranial abnormalities.

Because there is some variability in facial anomalies and the degree of nasal hypoplasia seen with proboscis lateralis, management must be individualized. When marked hypoplasia or aplasia of the nasal ala is present, reconstruction is indicated. The structure and texture of the proboscis make it an ideal substrate for nasal reconstruction, and for this reason, the proboscis should not be excised if future nasal reconstruction is anticipated. Depending on the size and location of the proboscis and the degree of nasal hypoplasia, a variety of techniques may be used to reconstruct an aesthetically acceptable nose, including use of the proboscis as a pedicle flap.\(^2,5,7,13,14\)

In our patient, ipsilateral nasal hypoplasia was minimal, and simple amputation of the proboscis and excision of the fistula connecting it to the ethmoid sinus was appropriate. However, endoscopic repair of the choanal atresia was complicated by the narrow nasal opening and required conversion to a transpalatal approach. At one time, it was suggested that the affected eye be enucleated to prevent formation of a fistula to the meninges and subsequent meningitis. There is no evidence, however, that such communication occurs, and enucleation is not recommended unless tumor is suspected.

Because of the variety of maxillofacial and ocular disease seen with proboscis lateralis, optimal care of the patient warrants a multidisciplinary approach that may involve an otolaryngologist or oromaxillofacial surgeon, plastic surgeon, and ophthalmologist.

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**Figure 5.** Transverse cross section of the proboscis at its base revealing a mucosa-lined central canal with clusters of submucosal glands and plates of hyaline cartilage (hematoxylin-eosin, original magnification ×65).

**Figure 6.** The mucosal surface varied from cuboidal/low columnar at the base (A) to hyperplastic variably ciliated pseudostratified columnar epithelium more distally (B) and to stratified nonkeratinizing squamous mucosa near the skin surface (hematoxylin-eosin, original magnification ×160).
Late Occurrence of Diffuse Lamellar Keratitis After Laser In Situ Keratomileusis

Diffuse lamellar keratitis (DLK) is a noninfectious inflammatory complication associated with laser in situ keratomileusis (LASIK). Post-LASIK sterile interface keratitis has also been described as “sands of the Sahara syndrome” and “central focal interface opacity after LASIK.” The corneal infiltrates may be focal or multifocal but remain confined to the lamellar interface without extension, anterior chamber reaction, or associated epithelial defect. Common to all previously reported cases is an onset within 1 month after LASIK treatment, enhancement, or flap manipulation. We report 2 cases of DLK appearing after the immediate postoperative period (2-7 months after LASIK), 1 of which had bilateral involvement.

Report of Cases. Case 1. A 48-year-old woman with euthyroidism and a treatment history of hypothyroidism underwent bilateral sequential LASIK using a 180-µm Hansatome microkeratome (Bausch and Lomb, Rochester, NY) and a Summit Apex Plus excimer laser (Summit Technology, Waltham, Mass). Preoperative refraction of −4.75 +1.50 × 0.92 OD and −4.50 +1.75 × 0.85 OS yielded a best-corrected visual acuity of 20/20 OU. Fifty percent epithelial flap defects in both eyes and mild DLK in the left eye were present on postoperative day 1. The defects healed with bandage soft contact lens wear and the DLK resolved after 1 week of intensive florometholone treatment. One month postoperatively, uncorrected visual acuity was 20/40 OD and 20/30 OS. Refraction of +0.25 +1.50 × 102 OD and −0.75 +0.75 × 102 OS yielded a best-corrected visual acuity of 20/25 OU. The flaps were well healed with the exception of mild interpalpebral punctate epithelial staining in both eyes. She was offered bilateral lower punctal plugs, which she declined.

Two months postoperatively she complained of a sudden onset of redness and a foreign body sensation in her left eye. Examination was remarkable for an uncorrected visual acuity of 20/40 OS. Slitlamp biomicroscopy showed minimal diffuse conjunctival hyperemia and a focal 2 × 2-mm nonsuppurative infiltrate in the lamellar interface inferocentral to the pupil. Mild edema of the flap without epithelial defect was noted. The anterior chamber was quiet. A regimen of hourly topical ofloxacin was started. Examination 24 hours later revealed a visual acuity of counting fingers. Slitlamp biomicroscopy showed severe diffuse conjunctival hyperemia, diffuse stromal edema with a large central epithelial defect, and a diffuse lamellar infiltrate without anterior or posterior extension (Figure 1). The lamellar flap was lifted and debrided of soft infiltrate. Scrapings were sent for aerobic, anaerobic, atypical mycobacterial, and fungus staining and culturing. The interface was irrigated with fortified vancomycin and tobramycin eye drops, the flap was repositioned, and the bandage soft contact lens was applied. Fortified vancomycin and tobramycin eye drops were administered hourly. One day later, discrete granular infiltrates reappeared in the interface. Stains and cultures revealed no organisms. Topical prednisolone acetate was given every 2 hours to treat DLK and then hourly when cul-
tures remained without growth after 48 hours. On complete re-epithelialization, the bandage soft contact lens was removed and the dose of fortified antibiotics was decreased to 4 times per day. Prednisolone was taken hourly. On day 21, uncorrected visual acuity was 20/60 OS. Refraction of plano +1.00 × 180 yielded a best-corrected visual acuity of 20/30 OS. Slitlamp biomicroscopy showed mild interface scarring centrally, 2+ granular infiltrates, and 1+ stromal flap edema (Figure 2).

The left eye remained stable during the prednisolone dose taper. However, 3 months postoperatively, her right eye showed a small epithelial erosion without keratitis. On follow-up day 3, slitlamp biomicroscopy of the right eye revealed a healing erosion with few focal interface opacities and mild diffuse granular infiltrates (Figure 3). The keratitis resolved after a 5-day regimen of prednisolone acetate taken hourly and ofloxacin taken 4 times per day.

Case 2. A 51-year-old woman with myopic amblyopia currently taking thyroxine for hypothyroidism underwent bilateral LASIK for treatment of high myopia. She came for a second opinion regarding management of superior limbal keratoconjunctivitis in the right eye 7 months postoperatively. Refraction of −1.75 yielded a visual acuity of 20/40 OD. Slitlamp biomicroscopy was remarkable for mild superior conjunctival hyperemia, redundancy, and rose Bengal staining. She underwent superior conjunctival resection and was given tobramycin/dexamethasone ointment to apply 4 times per day. Three days after resection, she complained of worsening pain and decreased vision. On examination, her best-corrected visual acuity was 20/80 OD. The superior conjunctival defect was healing well without suppuration. Diffuse granular infiltrates were visible in the flap interface without epithelial defects or anterior chamber reaction. Her regimen was switched to ofloxacin taken 4 times per day and prednisolone acetate taken hourly. Follow-up examination 48 hours later showed best-corrected visual acuity to be 20/40 OD with completely resolved interface keratitis.

Comment. The causes of DLK are not clearly defined. A rare postoperative complication of LASIK, with an estimated incidence of 3 in 400,2 DLK is thought to be a secondary inflammatory response to a variety of potential agents within the space of the flap interface. Four clinical stages have been described, ranging from non–visually significant focal infiltrates to diffuse infiltrates with stromal necrosis.5 Known to occur within a week after either primary LASIK or enhancement procedures, DLK has also been reported after epithelial flap debridement to reduce visually significant basement membrane irregularities 1 month after LASIK enhancement.6

Unusual in our cases is the late onset of DLK. In the most severe case, the lack of initial epithelial defect, confinement of infiltrate to the interface, rapid progression despite hourly ofloxacin treatment, rapid improvement with intensive topical steroids, and negative microbiology culture results strongly support a diagnosis of DLK rather than
infectious keratitis. One case series review of infectious ulcerative keratitis following LASIK reported that all cases had epithelial defects and none had infiltrate confined only to the interface.6 Our case 1 had documented recurrent epithelial erosions and typical DLK in the acute postoperative period. Case 2 had probable microdisruption of the superior corneal epithelium after manipulation of the superior conjunctiva. We propose a mechanism whereby an inflammatory reaction to corneal surface disruption occurs in the potential space of the flap interface resulting in a clinical picture of lamellar keratitis.

We report these 2 cases to bring attention to the possibility of DLK occurring beyond the immediate postoperative period, especially when the potential for corneal surface disruption exists. As more patients undergo LASIK, more cases of late-onset DLK will be seen. Care must be taken to exclude infectious keratitis. However, the prognosis for recovery is good following intensive topical steroid treatment.

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Retinal Degeneration Associated With Congenital Transcobalamin II Deficiency

Transcobalamin II (TCII) is a cobalamin (Cbl)-binding plasma protein that promotes the cellular uptake of Cbl (vitamin B12) by many tissues. Transcobalamin II deficiency is a rare autosomal recessive disorder.1

Report of a Case. A girl, born to healthy nonconsanguineous parents, was seen at age 3 months with pallor, lethargy, failure to thrive, and hypotonia. At age 7 months, she was seen by a physician because of pallor, purpura, hypotonia, myoclonia, epileptiform episodes of blinking, and chronic upper respiratory infections. Her blood cell count revealed severe pancytopenia. Serum Cbl levels were in the low to normal range. Methylmalonyl aciduria and homocystinuria were detected. The total unsaturated Cbl binding capacity of serum, measured as previously described,2 was 48 pmol/L (reference range, 440-880 pmol/L), without binding of [57Co]Cbl to TCII. Immunoreactive TCII serum levels were 95 pmol/L (reference, >370 pmol/L). Culture findings from the patient’s fibroblasts incubated with [35S]-methionine expressed immunoreactive radio-labeled TCII with the same molecular weight as native TCII, but no Cbl-binding TCII was secreted into the culture medium. The patient was treated with intramuscular hydroxocobalamin, 1000 µg every 10 days for 1 year, and subsequently with oral hydroxocobalamin (1000 µg per day) and oral folic acid until age 16 years.

At age 13 years, she was seen for headaches, lipothyria, epileptiform myoclonic episodes, cerebellar dys-
supplementation, no progression of retinal degeneration was observed.

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Interferon-Associated Retinopathy and Cystoid Macular Edema

Many cases of interferon-associated retinopathy have been reported since the first case in 1990.1 This disease, characterized by retinal hemorrhage and cotton-wool spots, has a good prognosis.2,3 We describe the first patient with interferon-associated retinopathy with decreased vision due to bilateral cystoid macular edema (CME).

Report of a Case. On February 4, 1999, a 24-year-old man with chronic, active hepatitis C began treatment...
with interferon beta at a daily dose of $4 \times 10^6$ U for 9 weeks. His corrected visual acuity was 20/20 OU and no abnormal fundus findings were noted in either eye before treatment. About 1 month later, the platelet count decreased from $350 \times 10^9$/L to $160 \times 10^9$/L and the triglyceride level increased markedly from 1.26 to 4.73 mmol/L (112-419 mg/dL). The patient also developed proteinuria and hypoalbuminemia (serum albumin level decreased from 0.039 to 0.023 g/L). Three days before the end of treatment, many cotton-wool spots and retinal hemorrhages were found in both fundi. Although the corrected visual acuity remained at 20/20 OU, the interferon therapy was terminated. However, the bilateral retinopathy worsened 11 days after the termination of interferon treatment (Figure 1). The visual acuity decreased to 20/40 OU because of CME.

Fluorescein angiography (Figure 2) showed capillary nonperfusion at the site of cotton-wool spots, capillary microaneurysms, and diffuse capillary dilatation. In the late phase, diffuse leakage from the dilated capillaries resulted in the pooling of fluorescein, with a petaloid appearance in the center of the macula. Marked diffuse leakage of fluorescein and pooling of fluorescein in the cystoid spaces were observed in the left eye (angiogram not shown) as noted in the right eye.

Comment. Interferon-associated retinopathy is typically characterized by retinal hemorrhages and cotton-wool spots. However, various atypical interferon-associated ocular complications have been reported, including oculomotor nerve paralysis; optic disc edema; subconjunctival, preretinal, and vitreous hemorrhage; and retinal vein occlusion. Although severe visual losses due to atypical ocular complications have been reported, there have been no cases reported of visual decrease due to CME secondary to interferon-associated retinopathy.

Although the pathogenesis of interferon-associated retinopathy is not known, the deposition of immune complexes in vessels, immunological dysfunction, and increased adhesion of activated leukocytes to vascular walls have been suggested. Diabetes mellitus and...
hypertension, decreased platelet counts, and increased triglyceride levels during interferon treatment are risk factors of interferon-associated retinopathy. Our patient did not have any underlying systemic disease that might involve a risk of interferon-associated retinopathy. However, the platelet count decreased and triglyceride level increased after interferon therapy, resulting in a blood condition that might have caused a susceptibility to retinopathy. Our patient had hypoalbuminemia, which might have been responsible for the CME. Hypoalbuminemia decreases plasma oncotic pressure, and therefore decreases the oncotic pressure difference between the plasma and interstitial fluid. As a result, the influx of water from the interstitial space to the capillary may decrease, as explained by the Starling law. This decreased water reabsorption may have led to the marked cystoid macular edema in this situation, where interferon has already damaged retinal vessels and consequently increased vascular permeability.

Our findings suggest that interferon-associated retinopathy progresses and the visual acuity decreases even after the termination of interferon therapy. They also suggest that hypoalbuminemia due to proteinuria is a risk factor of CME. However, interferon-associated retinopathy has a good visual prognosis without any treatment even when accompanied by CME.

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**Prophylaxis of Vasovagal Reaction With Atrohist Plus**

Vasovagal reactions (VVRs) can present a treatment dilemma for medical professionals, and fear of causing such reactions can prevent ophthalmologists from performing necessary examinations. Atenolol, midodrine hydrochloride, paroxetine, fludrocortisone acetate, as well as salt and fluid intake have demonstrated efficacy in treating the disorder. Other vasoconstrictors and selective serotonin reuptake inhibitors are being studied, but to our knowledge, there are no medications to prevent isolated incidents of VVR with known triggers. We describe 2 patients who experienced VVRs on application tonometry or instillation of dilating drops. Subsequent reactions were prevented with oral Atrohist Plus (a combination of phenylephrine hydrochloride, phenylpropanolamine hydrochloride, chlorpheniramine maleate, and hydrobromide; Vintage Pharmaceuticals Inc, Charlotte, NC) administered 1 hour prior to examination.

**Report of Cases.** Case 1. A 41-year-old healthy man with an ocular history of myopia and a family history of glaucoma was seen for complaints of decreased visual acuity for several months. After instillation of a fluorescein sodium–benoxinate hydrochloride solution, the application tonometry demonstrated the intraocular pressure (IOP) of 21 mm Hg OU, and immediately after tonometry, the patient fainted. Owing to lightheadedness, he refused additional drops for dilation. The undilated fundus examination revealed a cup-disc ratio of 0.50 U. The patient was followed as a glaucoma suspect, and after each IOP measurement, he felt faint, sweaty, or lightheaded. On one occasion, he experienced a severe VVR, became lightheaded, tremulous, diaphoretic, and fainted. Blood pressure and pulse were measured immediately following this presumed VVR and were found to be normal, 134/84 mm Hg and 74 bpm, respectively. No formal testing for VVR was performed.

Repeated IOP examinations were indicated, but additional tonometry measurements incurred a high risk of another syncopal episode. Since there are no oral medications identified in the literature to prevent isolated incidents of VVR, intravenous atropine was suggested by a cardiologist. As an alternative to the intravenous medication, Atrohist Plus was selected, and 1 tablet was administered to the patient 1 hour prior to tonometry measurement. Application tonometry was performed, and the patient did not experience any symptoms of VVR. One tablet of oral Atrohist Plus was administered 1 hour prior to his next 3 office visits, and no symptoms of VVR were reported.

Case 2. A 21-year-old healthy man with no medical problems was known to experience a VVR and faint after the instillation of dilating drops. The patient had an ocular history of myopia and contact lens wear and was seen for a comprehensive examination and laser in situ keratomileusis consultation. One tablet of Atrohist Plus was administered approximately 1 hour prior to the eye examination. A complete eye examination was performed, including application tonometry followed by instillation of dilating drops (1% tropicamide and 2.5% phenylephrine). No symptoms of VVR were reported.

**Comment.** Predictable VVRs and fainting during tonometry or instillation of eye medications are uncommon occurrences but may force the ophthalmologist to choose between a comprehensive eye examination and an adverse event. The use of the oral medication, Atrohist Plus, can be a useful tool in the prevention of VVR when the ophthalmologist is aware of the precipitating factor. The primary indication for use is for relief from irritation of sinus, nasal, and upper respiratory tissues.
owing to its vasoconstrictive properties and subsequent drying of the mucosa. The drug is contraindicated in patients receiving monoamine oxidase inhibitors, patients with asthma, patients younger than 12 years, women who may be pregnant, or patients with known hypersensitivity to antihistamines or sympathomimetics. In addition, acute angle-closure glaucoma may be precipitated by the dilating effects of this oral medication; therefore, narrow angles should be ruled out before its administration.3

Atrohist Plus presumably prevents VVRs through the anticholinergic effects of atropine, hyoscyamine, and scopolamine and the adrenergic effects of phenylephrine and phenylpropanolamine. The anticholinergics act by blocking acetylcholine at the muscarinic receptors in smooth muscle, cardiac muscle, and sinoatrial and atrioventricular nodes as well as in exocrine glands, resulting in increased heart rate and blood pressure and decreased heart block. Phenylephrine acts primarily on \( \alpha \)-1 adrenergic receptors in arterial smooth muscle to cause vasoconstriction, while phenylpropanolamine acts on both \( \alpha \)-1 and \( \beta \)-1 receptors to cause vasoconstriction as well as increased heart rate, contractility, and cardiac output. The combination of medications most likely acts by preventing the bradycardia and hypotension associated with VVR.4

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Spelling Error. In the Photo Essay titled “Iris Creep Producing Corectopia in Response to Molteno Implants,” published in the February issue of the ARCHIVES (2001; 119:304), “corectopia” should have been written with only 1 “r.” Additionally, in that same article, “ectropium uvae” should have been written, “ectropion uveae.”