PROGRESSIVE HEMIFACIAL ATROPHY
A NATURAL HISTORY STUDY *

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Purpose: To describe two very different natural history courses in 2 patients with hemifacial atrophy. Progressive hemifacial atrophy (Parry-Romberg syndrome, Romberg syndrome, PHA) is characterized by slowly progressive atrophy, frequently involving only one side of the face, primarily affecting the subcutaneous tissue and fat. The onset usually occurs during the first 2 decades of life. The cause and pathophysiology are unknown. Ophthalmic involvement is common, with progressive enophthalmos a frequent finding. Pupillary disturbances, heterochromia, uveitis, pigmentary disturbances of the ocular fundus, and restrictive strabismus have also been reported. Neurologic findings may be present, but the natural history and progression of ocular findings are often not described in the literature.

Methods: We studied the records and present findings of 2 patients with progressive hemifacial atrophy who were observed in our institution over a 10-year period.

Results: Both patients showed progression of ophthalmic findings, primarily on the affected side. One patient has had chronic uveitis with secondary cataract and glaucoma, in addition to retinal pigmentary changes. She also had a third-nerve paresis of the contralateral eye and mild seizure activity. The other patient had mild uveitis, some progression of unilateral retinal pigmentary changes, and a significant increase in hyperopia in the affected eye, in addition to hypotony at age 19 without a clear cause, but with secondary retinal and refractive changes.

Conclusion: Ocular manifestations of progressive hemifacial atrophy are varied, but can progress from mild visual impairment to blindness.

INTRODUCTION

Progressive hemifacial atrophy, also known as Parry-Romberg syndrome or Romberg syndrome, was first described by Parry[1] in 1825 and well defined by Romberg[2] in 1846. It is a craniofacial disorder with onset in the first or second decade of life in individuals who are morphologically normal at birth.

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Romberg[2] suggested a "trophoneurosis," that is, a dysfunction of trophic fibers of peripheral nerves leading to the facial atrophy. Wartenberg[3] proposed that progressive hemifacial atrophy is a heredodegenerative disease, but its cause still remains unestablished.[3,4]

Progressive hemifacial atrophy usually has an insidious onset, but its unrelenting progressive course over many years often results in severe functional, aesthetic, and psychological complications. In most, but not all, cases the abnormality is anatomically limited to one side of the face and cranium. A vertical demarcation line in the skin may give rise to the coup de sabre description often noted in these patients.[1] This is reminiscent of Melville's description of Captain Ahab in *Moby Dick*: "a slender rod-like mark, lividly whitish. It resembled a perpendicular seam...." [5] The involved side demonstrates slow involution and atrophy affecting many tissues, with loss of subcutaneous fat and dermal atrophy, and resultant tissue contraction. If onset is in the first 2 decades, secondary bony changes may occur. These findings are in stark contrast to the contralateral normal side.

Ophthalmic complaints are common and were reported in 16% of cases in one series, although this may be a low estimate. [6,7] A wide array of diverse ophthalmic findings have been noted, [6-26] but only enophthalmos secondary to fat atrophy could be called characteristic of the syndrome.

We report a 10-year follow-up of 2 patients with progressive hemifacial atrophy whom we originally described in 1987.

CASE REPORTS

CASE 1

A 21-year-old woman was examined in February 1985 because of redness, tearing, and foreign-body sensation of recent onset in the right eye. Symptoms began at age 9 years, with loss of hair. The patient had lived in Mexico all her life until 1985, although she visited a relative in Chicago every few years. A diagnosis of scleroderma had been given in Mexico, although a dermatologist in Chicago believed it was a case of progressive hemifacial atrophy. Additionally, she had seizures involving her left arm at 9 to 10 years of age and had taken phenobarbital for a few years. She had discontinued the medication and had had no recurrence of seizures. She complained of occasional diplopia, and a progressive right head turn was noted in photographs from her teen years. She had had a period of ammenorhea at age 15 years, but an extensive workup revealed no abnormalities.

At examination a midline scalp indentation with focal alopecia was present in the paramedian area. A mild enophthalmos of the right eye was noted, as was slight left ptosis (Fig 1). Uncorrected visual acuity was 20/30 OD and 20/20 OS. Motility examination indicated straight eyes in the primary position, with a slight right head turn. There were full ductions in the right eye, but the left eye showed decreased adduction and elevation in test positions

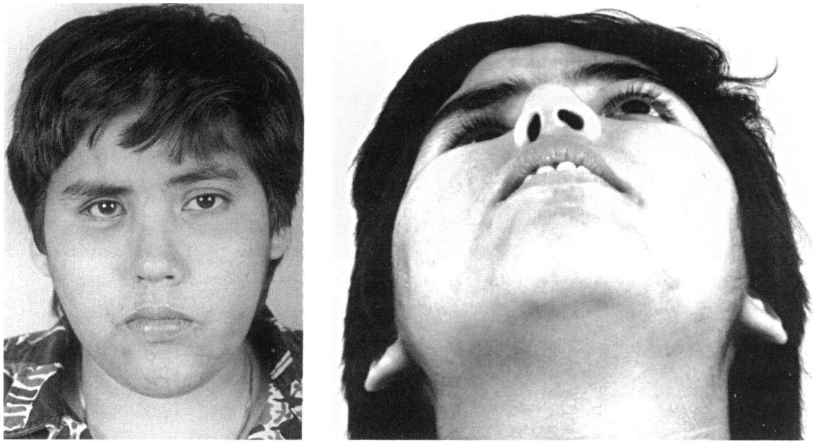

FIGURE 1

Case 1. A, Twenty-one-year-old patient with mild enophthalmos and slight ptosis OS due to partial third-nerve palsy. B, View looking up, demonstrating flattened right side of face.

for superior rectus and inferior oblique muscles. There was also a slight decreased depression in the field of the left inferior rectus.

In the right eye, slit-lamp examination showed a broad band of peripheral anterior synechia extending for 5 clock hours inferiorly (Fig 2). There were multiple large keratic precipitates and +2 flare and cell in the anterior chamber. The pupil was oval and minimally reactive. The lens had a +1 postsubcapsular cataract. Ophthalmoscopy with the pupils dilated showed patchy, irregular sections of retinal hypopigmentation and hyperpigmentation and areas of chorioretinal atrophy that measured one-fourth to one-half disc diameter (Fig 3). The macula and retinal vessels appeared normal. Ocular tensions were 26 mm Hg OD and 18 mm Hg OS. Gonioscopy demonstrated complete closure of the inferior angle for 6 clock hours. Cycloplegic refraction was +1.75 +0.50 x 90.

Examination of the left eye indicated a partial third-nerve palsy and mild ptosis.[1] The cycloplegic refraction was +1.25 +0.25 x 90. The remaining results of examination of the anterior and posterior segment were within normal limits. The pupil was 5 mm, and it constricted to 3 mm with light stimulation.

The patient was treated with 0.5% Timoptic, atropine, and local steroids to the right eye, resulting in improved ocular tension, but in a few weeks the visual acuity decreased to 20/100 because of papillitis of the right optic nerve. Vision improved with systemic steroid therapy, but ocular tension became elevated, and steroids were discontinued. Some improvement occurred

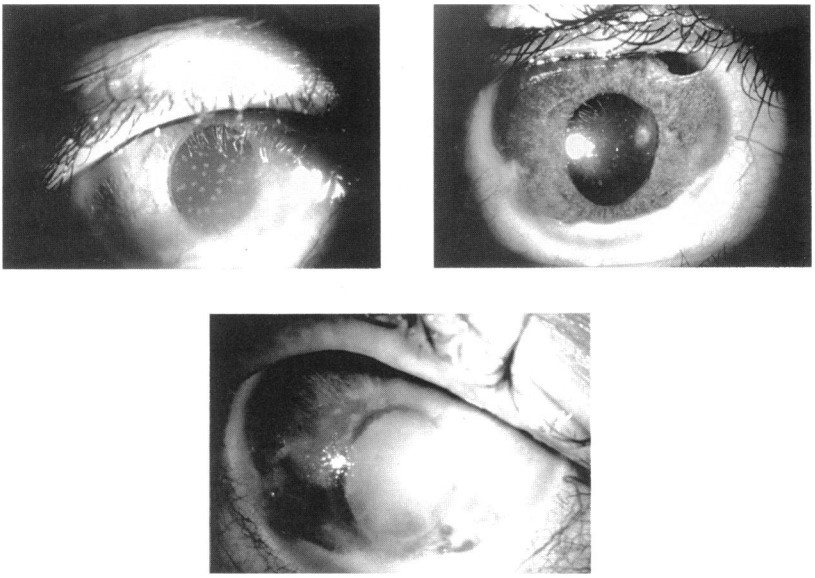

FIGURE 2

Case 1. Anterior segment OD at different stages of disease. A, At age 21, showing anterior synechia and oval pupil. Visual acuity 20/40. B, at age 24, after long-standing uveitis, glaucoma requiring filtering procedure, and cataract formation. Note iris atrophy and progressive anterior synechia. Visual acuity counting fingers. C, at age 32, corneal ulcer, corneal epithelium now very abnormal. Band keratopathy is also present. Visual acuity light perception.

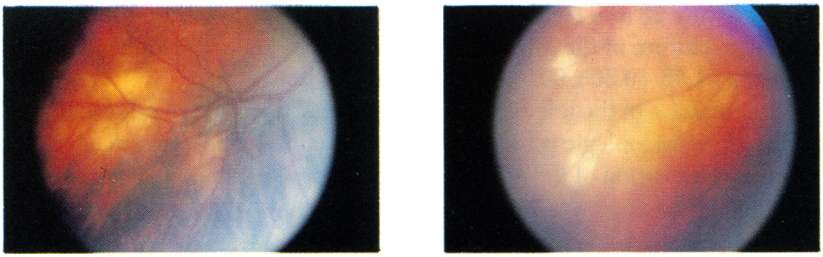

FIGURE 3A FIGURE 3B

Case 1, age 21. Fundus views on: affected right side showing areas of hyper and hypopigmentation and atrophy..

during the next few months, with visual acuity increasing to 20/40 OD.

Initial laboratory test results were normal for VDRL, rheumatoid factor, and complement levels. Later, results of angiotensin-converting enzyme, lysozyme, and fluorescent treponemal antibody absorption tests were found to be normal. Computed tomography showed enophthalmos of the right globe, replacement of fatty reticulum, and slight asymmetry of the bony orbits, but no evidence of central nervous system disease. A magnetic resonance image also indicated the expected fat changes and a foreshortened optic nerve, but no abnormalities of the brain.

During 1985 the patient showed fluctuations in ocular tension. She developed shortness of breath, and Timoptic was discontinued. Propine was added at one time, but was discontinued because of local injection. Visual fields indicated a superior paracentral scotoma and superior Bjerrum scotoma in the right eye. Hertel was 7 in the right eye and 15 in the left. Neptazane was added after systemic steroids were discontinued.

In 1986 the patient began to experience episodes of paresthesias involving the fingers of her left hand through her left elbow. These were believed by neurologists to represent focal seizures. Further neurologic evaluations disclosed negative Babinski responses, but deep tendon reflexes were hypoactive bilaterally. She began treatment with phenobarbital, which she discontinued herself later.

Enophthalmos became more pronounced on the right. The patient showed progression of the left third-nerve palsy, with intermittent diplopia (Fig 4). The left pupil was less reactive. Corneal reflexes were intact, with equal sensitivity. Findings in the right eye were significant for band keratopathy with chronic granulomatous uveitis and ocular hypertension. Treatment was started with antiglaucoma therapy and FML for uveitis. The visual acuity decreased to 20/50+2.

In 1987 a motility examination showed more right hypertropia. There was escalating uveitis that did not respond well to therapy, and secondary glaucoma developed. On July 10 the patient was admitted on an emergency basis because of acute angle-closure glaucoma in the right eye; ocular tension was 45 mm Hg OD and 12 mm Hg OS, and the patient was receiving maximum medical therapy. Gonioscopy disclosed only 3 clock hours of bare trabecular meshwork. Visual fields showed increased density of a nasal scotoma in the right eye. She underwent a right trabeculectomy on July 22. Between 1987 and 1990 she showed fluctuation in ocular tension and uveitis in the right eye, and her visual acuity dropped to the 20/100 to 20/200 level.

In 1990 the patient suffered a central retinal vein occlusion in her right eye, with loss of vision to counting fingers. Her uveitis remained unresponsive to medication, as did the secondary glaucoma. The right hypertropia now measured 50 prism diopters. In May 1990 a Molteno valve was implanted, and a recession of the right superior rectus muscle was performed. Forced ductions tested at the time of surgery showed restriction to depres-

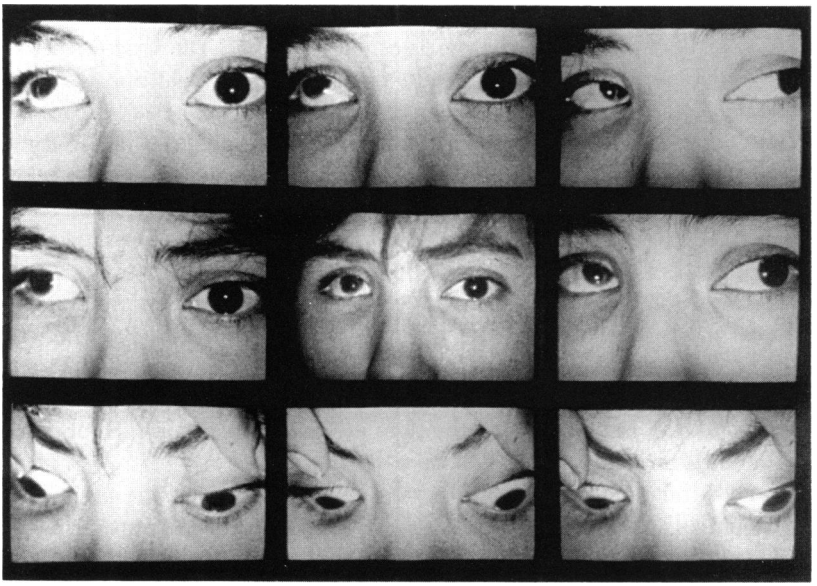

FIGURE 4
Case 1, age 23. Partial third-nerve palsy OS with most limitation in the test field of the left medial rectus and left inferior oblique muscles; mild ptosis is present.

sion in the right eye. Retinal examination demonstrated nonprogressed geographic areas of chorioretinal atrophy. After surgery the patient had a temporary choroidal detachment caused by hypotony.

In November 1990, on routine examination, a 1 to 2+ flare was noted in the left eye, with 1+ cells. Visual acuity was 20/20 in this eye. The patient was given local steroids, and the uveitis cleared. In 1992 she experienced a vague history of possible amaurosis fugax in both eyes. She was hospitalized, but results of neurologic and cardiac evaluations were unremarkable. Ocular examination at the time showed a visual acuity of hand movements OD, with mature cataract, and no view of the fundus. The left eye showed a more complete third-nerve palsy, with significant ptosis. The enophthalmos, coup de sabre lesion, and right facial atrophy had continued to become more marked.

By June 1994 progressive facial atrophy and alopecia were so severe that the patient desired reconstructive surgery, and in 1995 she had a midline scalp splitting procedure with implantation of dermal expanders as part of a two-stage scalp advancement procedure for treatment of alopecia with tissue augmentation for facial atrophy. In March 1995, 1 week before the planned second stage of scalp and facial reconstruction, she was examined

because of right ocular pain. A corneal ulcer and an associated small hypopyon were found. The keratitis eventually responded to topical antibiotics and bandage contact lens treatment, and in March 1995 the patient underwent scalp and facial reconstruction.

At her most recent examination, the patient had an improved facial appearance, with residual asymmetry and enophthalmos of the right side of the face. Visual acuity in the right eye remained light perception. Biomicroscopy of the right eye disclosed band keratopathy inferiorly, a shallow chamber, almost 360° of peripheral anterior synechiae, a healed corneal scar centrally, a mature cataract, and peripheral iridectomy at the 1 o'clock position. There was a filtering bleb superonasally. The posterior pole could not be visualized because of the cataract. Ocular tensions were 22 mm Hg OD and 18 mm Hg OS. Corrected visual acuity in the left eye remained 20/20 (with + 0.25 +0.75 x 70).

Motility examination at this time showed a right hypertropia of 40° and a small exotropia. Forced duction testing was positive in the right eye, showing restriction in downgaze. The left eye was normal, except for a few old keratic precipitates. The left pupil is now 6 mm and nonreactive to light. There was almost complete involvement of ocular muscles innervated by the third nerve in the left eye.

The patient is being fitted for a scleral shell prosthesis in the right eye.

CASE 2

An 11-year-old boy was examined at the Craniofacial Center in 1987 because of progressive left hemifacial atrophy diagnosed at 5 years of age (Fig 5). The recorded ocular findings were enophthalmos of the left eye, with a mild persistent conjunctival hyperemia nasally. Uncorrected visual acuity was 20/20 OD and 20/25 OS. Cycloplegic refraction showed plans +0.25 x 90 OD and +2.75 +0.5 x 90 OS. Results of motility examination were normal, with straight eyes in the primary position, no significant phoria, and normal rotations. The pupils were equal and normally reactive. Biomicroscopy indicated a +1 conjunctival hyperemia nasally with one or two old central keratic precipitates in the left eye, but no anterior chamber reaction was apparent. On funduscopic examination, a large area of peripapillary depigmentation was seen in the left eye, with a normal-appearing retina in the right eye. Intraocular pressures were normal.

Examination in 1989 was notable for the development of anisocoria, with the right pupil measuring 4 mm and the left, 8 mm. There was light-near dissociation but no afferent defect. The previously noted findings of enophthalmos and evidence of minimal old iridocyclitis and peripapillary fundus changes in the left eye remained essentially unchanged (Fig 6). The external examination was remarkable for apparent progression of the left facial atrophy.

FIGURE 5
Case 2. Note progression of facial atrophy on left side of the face. A, Age 5 years. B, Age 10. C, Age 17. D, age 19 following craniofacial surgery; showing less severe asymmetry.

In 1992 an orbital computed tomographic scan showed a shortened left optic nerve with enophthalmos. External examination showed progressive left hemifacial atrophy (Fig 5). Ocular examination at this time disclosed some decrease in visual acuity in the left eye. Uncorrected visual acuity was 20/20 OD and 20/100 OS. Cycloplegic refraction was plano in the right eye and +4.5 sphere in the left eye, which improved the visual acuity to 20/50.

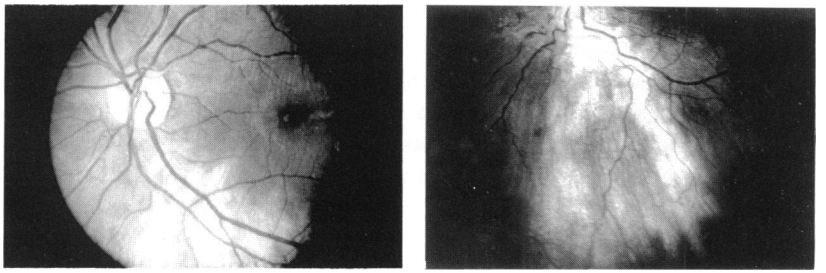

FIGURE 6

Case 2. A, Age 13. Fundus of affected left side, showing areas of hypopigmentation along vessels inferiorly. B, Age 19 years. Left fundus showing more pigmentary changes in retinal pigment epithelium and folds in retina, possibly secondary to hypotony.

Biomicroscopic examination of the left eye indicated a few old keratic precipitates on the central cornea and trace nasal conjunctival injection. The results of funduscopic examination remained abnormal, as previously described, with pigmentary changes in the left eye.

Between 1992 and 1994, the patient underwent several craniofacial procedures (genioplasty, rhinoplasty, craniotomy with split cranial bone grafting to the left orbit and forehead, and augmentation of the left malar region) (Fig 5). He was subsequently examined ophthalmologically on November 12, 1994, and again in January 1995, at which time the following findings were noted.

There was a residual left facial atrophy, with 4 mm of enophthalmos on the left, and madarosis of the left lower eyelid. Anisocoria was still present, with the right pupil measuring 4 mm and the left pupil, 6 mm. There was better near reaction in the left eye than the reaction to direct light response. Visual acuity was 20/30-2 OD and 20/800 OS. Cycloplegic refraction was -0.25 +1.00 x 10 in the right eye and +4.25 +1.50 x 55 in the left eye, improving vision to 20/25 OD and 20/80 OS. The results of motility examination were normal, with orthophoria and full rotations. There was still a trace conjunctival injection on the left, with +1 dilated conjunctival vessels, but now the cornea showed early band keratopathy with three ghost keratic precipitates and trace cell and flare in the anterior chamber. There was questionable atrophy of the left iris stroma, without heterochromia. Applanation tonometry showed hypotony in the left eye, with intraocular pressure of 10 mm Hg OD and 4 mm Hg OS. Examination of the fundus with the pupils dilated showed normal results in the right eye, but the left eye showed rare vitreous cells and elevation of the retina in the peripapillary, papillomacular bundle area, with vessel tortuosity emanating from the disc. Retinal striae

were noted in the macular area, with retinal folds extending from disc to macula (Fig 6). These findings were felt to be due to hypotony. Several chorioretinal scars were seen in the nasal periphery, with atrophic areas of the retinal pigment epithelium in the temporal retina. A fluorescein angiogram showed no evidence of vascular leak or cystoid macular edema. A-scan ultrasonography indicated an axial length of 23.6 mm OD and 20.2 mm OS.

DISCUSSION

Our two patients with Parry-Romberg syndrome showed different degrees of severity, a wide spectrum of pathologic changes, and progression of ocular complaints during a course of years. The first case demonstrated greater severity and variety of ocular complications. Additionally, there were unusual associated neurologic findings of a progressive third-nerve palsy on the side contralateral to the other ocular problems. There also appeared to be focal seizures of the left side, but radiologic evaluation failed to show any central nervous system lesions. The patient experienced unremitting uveitis culminating in secondary glaucoma, papillitis, and cataract. The disorder was active in her case for more than 20 years, contrary to the usual notion that the syndrome runs its course within about 10 years.

In the second case the disease took a much more insidious course, but it did appear to be stabilizing about 13 years after diagnosis. The progressive hyperopia in the affected eye in this patient has been reported previously and, in fact, is suggested as a possible initial sign of progressive facial hemiatrophy.

The retinal findings in these two patients, though uncommon, are not unique.[8,13] In case 2 some changes were attributed to hypotony, with a vitreous abnormality producing contraction of the internal limiting membrane. The pupillomotor findings in this case were consistent with a tonic pupil.

The incidence of hemifacial atrophy is unknown, although 772 cases were reported by Rodgers in 1964.[27] It is an unusual disease that affects more women than men.[4] Almost all cases are sporadic, but a few affected families have been noted.[4,28]

No single cause of progressive hemifacial atrophy has been demonstrated, but many theories have been promoted.[1,3,14,20,28-31] Some investigators hypothesize that in some cases it may represent a heredodegenerative disease from a gene of low penetrance.[14,28] Others believe it is related to systemic collagen vascular disorders, especially linear scleroderma.[28] Other suggested causes include traumatic, infectious, inflammatory, or trophic mechanisms, with predilection for the sympathetic system. Moss and Crickelair[32] performed unilateral cervical sympathectomies on 14 rats and were able to demonstrate varying degrees of unilateral facial atrophy in all animals. However, no changes were noted in the cornea, teeth, muscle dermis glands, or con-

nective tissue. Hickman and Shields[33] presented a well-studied case in which histologic evidence of perivascular infiltrate and collagen proliferation suggested a possible autoimmune nature of this illness. Another possibility is that pathologic changes are caused by an unusual "slow" virus. Nelhause[34] reported a case of a 4-year-old child with progressive hemifacial atrophy in whom results of a brain biopsy suggested viral encephalitis. A popular hypothesis is the vasomotor trophoneuritis theory, involving the sympathetic nervous system. In keeping with other chronic progressive neurologic disorders, many patients have symptoms suggestive of other central nervous system involvement.[30,35,36]

The disease may affect any or all of the superficial facial tissues, skin, subcutaneous fatty tissue, underlying musculature, cartilage, and bone. It is usually limited to one half of the face. Involvement of the cervical neck and torso is rare but possible. One of the primary characteristics is the coup de sabre deformity of the forehead, so called because the atrophic scar resembles a scar that could have been inflicted by a sword or saber. The skin overlying the affected area may be firmly adhered to muscle or bone and may be creased at the affected site. Muscle function is usually not affected.

In addition to cutaneous atrophy, numerous ocular and neurologic complications have been reported. Ophthalmologic complications include keratitis, uveitis, cataracts, ipsilateral enophthalmos, optic neuritis and atrophy, pupil anomalies ranging from tonic to Horner pupil, heterochromia iridis, and retinal pigmentary changes. Reported less frequently are progressive refractive changes, contralateral ocular muscle[7] involvement, glaucoma, hypotony, retinal vasculitis, and scleral melting.[7,8,11,17,22,26] Neurologic abnormalities reported include focal seizures, trigeminal neuralgia, paresthesia, contralateral Jacksonian seizures, contralateral hemianopia, ipsilateral migraine headaches, ipsilateral cerebral calcification, facial palsy, and dysesthesia.[4,23,35,36] Imaging studies may fail to reveal any abnormalities, but there are reported cases with central nervous system changes.[8,30,36]

The pathologic changes are slowly progressive and usually reach a maximum in 2 to 10 years. In some patients the disease is self-limited; in others, however, prolonged atrophy and degeneration may occur, and eventually the affected half of the face has a skeletal-like appearance.

Some similar findings may be seen in hemifacial microsomia (first and second branchial arch syndrome) and its variants, such as Goldenhar syndrome, but these are congenital and essentially nonprogressive conditions. Posttraumatic atrophy and partial lipodystrophy (Barraquer-Simon disease) are included in the differential diagnosis, but facial atrophy and partial lipodystrophy are usually bilateral and involve primarily adipose tissue.

Surgical reconstruction of the skeletal and facial deformities primarily involves augmentation of the affected areas.[37,38] Secondary procedures on uninvolved areas and scalp, such as the use of silicone implants and dermal expanders, may be used to enhance the cosmetic result. Repairs undertaken

while the disease is still active succumb to the same forces or factors responsible for the initial atrophy.

Ocular problems of strabismus, secondary glaucoma, uveitis, keratitis, and strabismus are managed in the traditional fashion[7] with careful monitoring and surveillance. However, as our cases demonstrate, the manifestations and natural course vary widely.

REFERENCES

1. Parry CH. Cited by Wartenberg R: *Collection From Unpublished Medical Writings of the Late Calet Hillier*. London, Underwood, 1825, p 478.
2. Romberg HM. Cited by Wartenberg R: *Trophoneurosen Kliniske Ergenbrisse*. Berlin, Forster, 1846, pp 75-81.
3. Wartenberg R: Progressive facial hemiatrophy. *Arch Neurol Psychiatry* 1945; 54:75-96.
4. Gorlin RJ, Cohen MM, Levin LS: *Syndromes of the Head and Neck*. Oxford University Press, 1990, pp 819-822.
5. Melville H: *Moby Dick*. New York, A & C Boni, 1926.
6. Lindemann HO: Interessante befunde bei hemiatrophia facialis progressiva. *Albrecht von Graefes Arch Klin Ophthalmol* 1940; 142:409-427.
7. Muchnick RS, Aston SJ, Rees TD: Ocular manifestations and treatment of hemifacial atrophy. *Am J Ophthalmol* 1979; 88:889-897.
8. Miller MT: Progressive hemifacial atrophy (Parry Romberg disease). *J Pediatr Ophthalmol Strabismus* 1987; 24:27-35.
9. Sugar HS, Banks TL: Fuchs' keratochromic cyclitis, associated with facial hemiatrophy (scleroderma, or coup de sabre). *Am J Ophthalmol* 1964; 57:627-632.
10. Garcher C, Humbert P, Bron A, et al: Neuropathie optique et syndrome de Parry-Romberg. *J Fr Ophthalmol* 1990; 13:557-561.
11. Hoang-Xuan T, Foster S, Jakobiec FA, et al: Romberg's progressive hemifacial atrophy: An association with scleral melting. *Cornea* 1991; 10:361-366.
12. Perkins ES: Heterochromic uveitis. *Trans Ophthalmol Soc U K* 1961; 81:53-66.
13. Moura RA: Progressive facial hemiatrophy. *Am J Ophthalmol* 1963; 55:635-639.
14. Franceschetti A, Koenig H: L'importance du facteur hegeredodegeneratif dans l'hemiatrophie faciale progressive (Romberg): etude des complications oculaires dans ce syndrome. *J Genet Hum* 1952; 1:27-64.
15. Franceschetti A, Maeder G: Hemiatrophie faciale avec alopecie (syndrome de Romberg): associee a une cyclite heterochromique (syndrome de Fuch). *J Genet Hum* 1958; 7:116-120.
16. Auvinet C, Glacet-Bernard A, Coscas G. et al: Hemiatrophie faciale progressive de Parry-Romberg et sclerodermie localisee. *J Fr Ophthalmol* 1989; 3:169-173.
17. Johnson RV, Kennedy WR: Progressive facial hemiatrophy (Parry-Romberg syndrome): Contralateral extraocular muscle impairment. *Am J Ophthalmol* 1969; 67:561-564.
18. Aracena T, Roca FP, Barragan M: Progressive hemifacial atrophy (Parry-Romberg syndrome): Report of two cases. *Am J Ophthalmol* 1979; 11:953-958.
19. Grayson M, Pieroni D: Progressive facial hemiatrophy with bullous and band-shaped keratopathy. *Am J Ophthalmol* 1969; 67:561-564.
20. Segal P, Jablonska S, Mrzyglod S: Ocular changes in linear scleroderma. *Am J Ophthalmol* 1961; 51:807-813.
21. Walsh FB, Hoyt WF: *Clinical Neuro-ophthalmoloqy*. Baltimore, Williams & Wilkins, 1969, vol 1, pp 970-974.
22. Karney H, Baum JL: Refractive change as initial sign of progressive facial hemiatrophy. *Am J Ophthalmol* 1975; 79:878-879.
23. Archambault LD, Froom NK: Progressive facial hemiatrophy: Report of three cases. *Arch Neurol Psychiatry* 1932; 27:529-584.
24. Calmettes L, Amalrid P. Bessou P: L'hemiatrophie faciale (maladie de Romberg) eses manifestations oculaires. *Riv Oto-Neurol Oftalmol* 1959; 31:215.
25. Collier M: Hemiatrophic faciale progressive avec megalocornea, micropapille et dystrophie

naugeuse centrale du la cornea. *Acta Ophthalmol* 1971; 49:946-954.
26. Ong KB, Billson FA, Pathirana DJ, et al: A case of progressive hemifacial atrophy with uveitis and retinal vasculitis. *Aust N Z J Ophthalmol* 1991; 19:295-298.
27. Rodgers BO: Rare craniofacial deformities. *J Reconstr Plast Surg* 1964; 5:1213-1305.
28. Lewkonia RM, Lowry RB: Progressive hemifacial atrophies (Parry-Romberg syndrome): Report with review of genetics and nosology. *Am J Med Genet* 1983; 14:385-390.
29. Tuffanelli DL, Marmelzat WL, Dorsey CS: Linear scleroderma with hemiatrophy: Report of three cases associated with collagen vascular disease. *Dermatologica* 1966; 132:51-58.
30. Terstegge K, Kunath B, Felber S, et al: MR of brain involvement in progressive facial hemiatrophy (Romberg disease): Reconsideration of a syndrome. *AJNR* 1994; 15:145-150.
31. Abele DC, Bedinsfield RB, Chandler JW, et al: Progressive facial hemiatrophy (Parry-Romberg syndrome) and borreliosis. *J Am Acad Dermatol* 1988; 19:820-825.
32. Moss ML, Crickelair GF: Progressive facial hemiatrophy following cervical sympathectomy in the rat. *Arch Oral Biol* 1959; 1:254-258.
33. Hickman J. Shields W: Progressive hemifacial atrophy. *Arch Intern Med* 1964; 113:716-720.
34. Nelhause G: Acquired unilateral vitiligo and poliosis of the head and subacute encephalitis with partial recovery. *Neurology* 1970; 20:965-974.
35. Wolf SM, Verity MA: Neurologic complications of progressive facial hemiatrophy. *J Neurol Neurosurg Psychiatry* 1974; 37:997-1004.
36. Lederman RJ: Progressive facial and cerebral hemiatrophy. *Clev Clin Found* 1984; 51:545-548.
37. Rees TD: Facial atrophy. *Clin Blast Surg* 1976; 3:637.
38. Inigo F, Rojo P, Ysunza A: Aesthetic treatment of Romberg's disease: Experience with 35 cases. *B J Plast Surg* 1993; 46:194-200.

DISCUSSION

DR. JOSEPH FLANAGAN. I would like to congratulate Drs. Miller and Spencer on this excellent and informative paper. The early presenting signs of hemifacial atrophy may be quite subtle and this was demonstrated by Dr. Knox's clinical slide. Over the past several years I have had the opportunity to examine 6 patients with progressive hemifacial atrophy. The first 5 cases were referred in for strictly cosmetic considerations. There were very subtle findings such as enophthalmos and mild asymmetry of the forehead area and cheeks. These cases were treated conservatively, without surgery, because of the excellent ocular function, normal visual acuity and motility. Last week I had the opportunity to evaluate a 26-year-old female who was referred for cosmetic consideration of significant enophthalmos of the right eye. She gave a history similar to that noted in the paper, of being struck in the right eye with a football approximately 10 years prior to the date of examination. We were considering the possibility of an orbital fracture on the right side, with secondary enophthalmos. In addition to 7 mm of enophthalmos, she had a mild ptosis, corneal changes, cataract, glaucoma and also evidence of a granulomatous uveitis. A CT scan was performed, which showed an infiltrating process in the posterior aspect of the orbit and enlargement of all of the extraocular muscles. This was initially interpreted by the radiologist as a possible metastatic breast carcinoma. A mammogram performed on the following day was negative. Approximately 2 days after her initial examination, the patient awoke at 2 a.m. in the morning and noted

complete numbness of the opposite left side of her body. She was extremely anxious and was referred to a neurologist for neurologic evaluation, who verified the hypesthesia on the left side of the body. An MRI scan with enhancement was ordered and it showed a lesion in the thalmus, possible suggestive of an infarct; however, a metastatic lesion could not be ruled out in this area. This is an interesting case, beginning in the third decade of life, initially with subtle changes, a history of trauma and then progression to develop virtually all of the findings discussed by Drs. Miller and Spencer this morning.

When I evaluated the original CT scan for this patient, I considered the possibility of a sclerosing, inflammatory pseudotumor, which might have occurred at sometime during the course of progression; however, without evidence of inflammation, pain, or other findings.

I would like to ask Dr. Miller if in her case there was ever any evidence of an inflammatory process occurring in the orbit at anytime over the course of this disorder.

DR. JULES BAUM. In your second patient, you noted hyperopia. In a case history we published about 20 years ago, we had one patient who before any other ocular or nonocular were noted, demonstrated arrested myopia on the affected side. In the first decade, both eyes initially were around -1 and, on the non-affected side went from a -1 to -4 over a period of about 10 years. On the affected side it progressed from -1 to a +2.25. I guess we should now all look out for unilateral arrested in my opinion. That may be an indiction that the syndrome may be in the offing.

DR. MARILYN MILLER. Thank you for the discussion. I think what has been brought up is the problems of early diagnosis, the unusual course and the unpredictability which exists in all these cases.

In answer to Dr. Knox's question, there was not a fourth nerve palsy on the other side. I knew you were interested in this and I had the patient come in last week and looked closely. There could be partial paresis but certainly not a complete paralysis.

Also, I had a nice discussion with Dr. Knox recently and this 1992 MRI had been previously read as normal (slide). But I retrieved it and took it to the radiologist and said "would you look at this again?" And he said "there is a bright spot, near the superior colliculus on the left that on '92 MRI that had not been present on one done in '87." I would have read this as normal, but now in that location, it may be abnormal. Unfortunately, the lesion is not on the correct side to explain the left third nerve.

Dr. Flanagan, you raised the questions of the problem of early diagnosis in some patients. There is a confusion of this entity and congenital hemifacial atrophies. One must make the distinction as the natural history is different.

The focal seizures are often on the other side and in this patient both

times she had them on the left side, tingling in the arm primarily, which I believe is common.

And, Dr. Baum, I am very much aware of the hyperopia issue. In fact, in the first paper I wrote, the affected side on all 6 patients were always more hyperopic than the unaffected side. Most were not dramatic, except in this patient who showed the greatest amount of hyperopia, +2.50, but which has progressed to almost 6 diopeters of hyperopia on the affected side.

Thank you.