FACIAL PONTINE DIPLEGIA (TRAUMATIC)

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Bilateral paralysis of the facial nerve may, like the unilateral, be of the central or peripheral type. The central paralysis signifies a cortical, subcortical or nuclear lesion; a peripheral paralysis indicates a lesion of the nerve trunk along its course, *i.e.*, after it leaves the nucleus. In central facial paralysis of one or both sides, the upper portion is more or less spared, while in peripheral paralysis all the branches are involved, the paralysis being total. Contrary to the unilateral total facial paralysis, generally known as Bell's palsy, the bilateral type is an exceedingly rare occurrence. It may be in-born, or form a part of the clinical picture of polyneuritis, syphilis or tumor of the brain, of a basilar meningitis, and finally of head injuries.

As the facial nerve pursues a complicated course through the pons, Fallopiian canal and the face, after emerging from the stylo-mastoid foramen, it is obvious that a bilateral lesion of any of the foregoing regions may result in a double total paralysis of this nerve in facial diplegia. Thus, injuries to both sides of the face, after application of forceps, for instance,¹ lesions of the Fallopiian canal, of the pons (tumors, hemorrhages or other vascular disorders) may result in a facial diplegia. Of the foregoing causes, the traumatic are the most uncommon, *the rarest*. Even the *war* literature, according to Marchand,² so far has not furnished many cases. Of these he reports one. To this may be added the cases of Romberg,³ Hubbell,⁴ Edgeworth,¹ Oppenheim and Halletz,⁵ and Ransohoff⁶ who

¹ Edgeworth, E. F., Case of bilateral facial paralysis due to injury by forceps at birth, Brit. M. J., 1894, p. 11 (January 6).

² Marchand, Progrès Méd., XX, 120, 1918.

³ Romberg, M. H., Lehrbuch der Nervenkrankheiten des Menschen, 1857, pp. 764 und 773, Berlin.

⁴ Hubbell, Case of both facial and both abducens paralysis following injury, Buffalo Med. and Surg. Journal, 29, 94, 1889.

⁵ Oppenheim, R., and Halletz, G. L., La Diplégie faciale traumatique, Paris Médical, VII, 136, 1917, August 11.

⁶ Ransohoff, J., Traumatic facial diplegia, Annals of Surgery, 70: 150, 1919.

also briefly refers to a case of E. Sachs, and one to be recorded by ourselves.

History of Case.—A colored soldier, 24 years old, on June 9, 1919, had his head injured between two railroad cars. He was un-

FIG. 1. Facial diplegia with paralysis of the left abducens. The patient tried to look to the left: the right eye is turned inwards, the left—immobile. The left side of face appears more paralyzed.

conscious for three weeks. Two and one half months after the accident, August 23, 1919, he entered the Cook County Hospital's neurologic service.

Examination.—Excellent physical and mental condition; no Rom-

berg, no abnormalities in gait, in the muscular, bony or genito-urinary systems. He did not complain of headache, dizziness or gastro-intestinal disturbances, in fact the subjective examination was negative, except the extreme dryness of the tongue and inability to pronounce labials (b, p, m). The face was expressionless, mimical movements like laughing, smiling, etc., were impossible; both naso-labial folds were obliterated, the corners of the mouth and the lower lip were hanging down, especially the left; he could not wrinkle forehead, pucker his lips, close his eyes, show the teeth. In drinking or smoking he had to roll up and support the lower lip. The tongue was very dry, slightly corrugated, but could be protruded and moved in every direction. The uvula, soft palate, showed no abnormalities; the right eye could move in every direction, while the left showed a marked paralysis of the external movements (Fig. 1), but in-, up- and downward movements were normal. There was no nystagmus even upon extensive movements of the eyes.

The taste for sour, sweet and salt was lost, mostly over the anterior two thirds of tongue, while bitter was absent all over the tongue. The sensibility of the face, tongue, like that over the rest of the body, was normal. The tendon, skin and mucous reflexes, except the conjunctival and corneal, were normal.

The electrical examination (the galvanic current only was available) showed a complete reaction of degeneration of both facial nerves and of the muscles supplied by them.

The Roentgen examination (Dr. Blaine) revealed "a shadow indicating a fracture extending into the middle fossa of the skull close to the base and involving the right parieto-temporal region."

Ear Examination, performed September 22, 1919, in the ear service of Cook County Hospital: "Granulations present on the roof of the canal of the left auditory meatus about mid-way, probably resulting from a fracture. There is no drum perforation. In the right ear an exostosis dividing the canal in two parts."

Nystagmus Test.—Rotation to the right produced no nystagmus, to the left a nystagmus to the right that lasted six seconds (normally about 25 seconds). No past-pointing either stationary or after rotation to the left; but after rotation to the right there was a momentary past-pointing to the right (two inches), with both hands. Hearing fairly good."

Conclusions.—"Vestibular apparatus badly damaged; the lesion is probably central and not due to fracture through the labyrinth."

Two more examinations of the vestibular apparatus were made (October 9 and 13) for the express purpose of determining a pos-

sible pons lesion by alternate irrigations of the vertical and horizontal canals, as advocated by Lewis Fischer.⁷

October 9, 1919: Douching of the right ear (cold water) gave no nystagmus, no past-pointing, no vertigo from either vertical or horizontal canals; douching of the left ear elicited no response from the vertical canals, while the horizontal canals gave a slow nystagmus to the left of 15 seconds duration, and past-pointing to the left, two inches.

October 13, 1919: Stimulation of the vertical canals by rotation gives normal, but much shortened reactions. Stimulation of the horizontal canals by rotation to the right gives nystagmus to the left, lasting about three seconds, and a momentary past-pointing to the right; rotation to the left gives a nystagmus to the right lasting about six seconds, and produces a past-pointing with the left, but not with the right hand. Hearing normal on the left ear, somewhat diminished on the right; bone conduction normal on the left, prolonged on the right. Conclusions: "the lesion of the vestibular apparatus is not due to a labyrinth destruction, is not peripheral" (Boot).

The serologic, urinary, ophthalmoscopic findings were all negative. Blood pressure 112 and 68; pulse 76; resp. 18.

Course.—The right facial nerve, especially the lower branch, showed marked and progressive improvement, but the left facial and left abducens remained stationary at the time of the last examination (October 13, 1919).

SUMMARY AND DISCUSSION

The outlined findings can be summed up as (1) a bilateral degenerative facial paralysis of peripheral type, (2) a paralysis of the left abducens, (3) involvement of chorda tympani, (4) slightly impaired hearing on the right and (5) lesion of a central portion of the vestibular apparatus. The chorda tympani involvement speaks for a lesion of both facial nerves in their Fallopian course, that is in the petrosal portion of the temporal bone. Such a localization would be very plausible and could well be explained by the fracture of the skull. But a bilateral fracture of the pyramid bones is usually fatal (Marchand), and could not very well explain the involvement of the left sixth nerve. A hemorrhage in the Fallopian canals or any other traumatism to the auditory canal could account for the slight auditory and pronounced chorda tympani disorders, but then we must admit of a separate lesion for the sixth nerve paralysis. In

⁷ Jones, I. H., and Fischer, Lewis, *Equilibrium and Vertigo*, 1918, J. B. Lippincott Co., Philadelphia and London.

other words, in this case we must look for several or multiple lesions, which are the rule in severe concussions of the brain (Jacob⁸). One of these lesions, probably the principal one, is evidently in the pons,

FIG. 2. Diagram of the pons and medulla oblongata. VI, VI, nuclei of the sixth nerves looped by the trunks of the seventh nerves; XII, the nucleus of the twelfth nerve. (From Obersteiner.)

its tegmental portion, which contains the sixth nuclei which are looped by the seventh nerves in their course to the periphery (Fig. 2). Assuming such a course, it would be easy to give an anatomical

⁸ Jacob, A., Experimentelle Untersuchungen über die traumatischen Schädigungen des Zentralnervensystems (mit besonderer Berücksichtigung der Commotio cerebri und Commotionsneurose), Nissl-Alzheimer's Arbeiten, V, 182, 1912.

explanation for the combined seventh and sixth nerve involvement, as well as for that of the adjacent structures (the longitudinal bundle, acustico-pontine fibers, contralateral seventh nerve) and of the vestibular test findings. Any other focus, a hemorrhage, for instance, on the base of the brain, around the sixth nerves, would give a crossed hemiplegia which in our patient was absent. Hubbell's case, which is almost a copy of ours, was also interpreted—among others by Putnam—as a pontine lesion.

In the absence of a post-mortem it is, of course, impossible to be absolutely definite as to the nature (hemorrhage, laceration of brain tissue) or the exact seat of the lesion, but the anatomical considerations, the vestibular test findings decidedly speak for the facial diplegia in this case being of a pontine origin.

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