ACUTE OTITIS MEDIA WITH PARALYSIS OF THE SIXTH NERVE (GRADENIGO SYMPTOM-COMPLEX).

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The following case, which recently came under my notice, illustrates one of the rarer complications of suppurative otitis media.

Private J. W. B., aged 21, was admitted to Bramshott Military Hospital on 11th April 1916, suffering from pain in the right ear, accompanied by purulent discharge. He stated that, although in childhood he had a running ear, there had been no discharge since the age of 10, but only an occasional earache if he caught cold.

The present attack commenced three weeks ago, and since then, while the discharge has gradually lessened, severe pain in the ear and side of the head has continued.

Temperature 100·2°; pulse 80; no mastoid tenderness; no giddiness; no nystagmus.

Hearing tests—Watch heard only on contact; whisper at 2 feet; Rinne negative.

On examination the inner half of the right meatus was found to be intensely red, and likewise the tympanic membrane. There was a large postero-inferior perforation through which protruded small polypi. Discharge slight, muco-purulent, and non-fetid.

Left ear—Hearing normal; tympanic membrane indrawn.

13th April.—He complains of a stabbing pain at the back of his right eye, and of double vision. The earache is still present, though intermittent. There is an internal strabismus of the right eye, and the movement of abduction cannot be carried out. He was seen by Lieut. E. H. Cameron, who confirmed the diagnosis of complete paralysis of the sixth nerve, and reported that the optic discs were of normal appearance.

15th April.—Patient feels more comfortable, though he has been sleepless and looks ill and tired. There is still throbbing pain in the ear, radiating over the side of the head and into the eye. The pain is aggravated when he moves the eyes. No tenderness. The paralysis is unchanged (Fig. 1). Temperature 98·8°; pulse rather slow, ranging from 50 to 68.

23rd April.—The pain behind the eye has become more severe.
The paralysis remains unchanged. The condition of the ear has not improved, in spite of careful conservative treatment, and there is still deep-seated pain in the ear, but no mastoid tenderness.

Caloric test—On syringing the right ear with cold water, nystagmus towards the left was produced in sixty-five seconds, indicating an intact labyrinth.

24th April.—Radical mastoid operation was performed. The mastoid process was of a distinctly "pneumatic" type, so much so indeed that it was difficult to know where to stop in operating, as compact bone was nowhere encountered. Most of the cells contained sticky muco-pus, of which unfortunately no culture was obtained. The attic and aditus were found to be filled with granulations and small polypi. The ossicles were not carious. A small area of dura, which was exposed, appeared to be healthy. It was carefully separated for a short distance from the petrous bone, to which it was firmly adherent, but no pus was found in this situation. The operation was then completed in the usual manner.

25th April.—Pain at the back of the eye very severe, necessitating the use of morphia. Much troubled with persistent hiccough. Temperature 101°.

27th April.—The pain is almost gone and he feels distinctly better. No hiccough. A slight, but distinct, abducent movement of the eye is now possible. Pulse and temperature normal.

20th May.—Patient now feels well and able to go about. The wound is healed and the ear cavity looks clean, though not yet dry. He still feels pain when he moves the eye, especially in the outward direction. He is now able to abduct the eye a little, but still suffers from diplopia on looking towards the right, and is obliged to wear a shade. He has been granted one month's sick leave.

4th July.—The ear is dry and clean. The ocular paralysis has improved so that almost full abduction is now possible, but this movement causes pain, especially in a bright light (Fig. 2). He can now read and dispense with the shade indoors. He only occasionally suffers from diplopia.

18th September.—Following his discharge from the Army, the patient has gone to live at home in the country, and he writes: "I feel much better. My ear is quite well but my right eye aches sometimes when I am tired."

12th March 1917.—In reply to my inquiry he writes: "I am feeling like my old self again. I have no pain, but sometimes I
Fig. 1.—15th April 1916.

(The white spot on the right eye is a flaw in the photograph.)

Fig. 2.—4th July 1916.

(The white spot on the right eye is a flaw in the photograph.)

The Photographs illustrate the Condition of the Eye Before and After the Mastoid Operation, the Patient having been directed to look towards the Right.
have the double sight. The ear is quite well, and I am now able to do light work on a farm.”

Otogenic paralysis of the sixth cranial nerve is a distinctly rare condition.

Gradenigo of Turin, in his paper on the subject, describes the symptom-complex as “an acute middle-ear suppuration accompanied by intense unilateral headache and paralysis of the abducent nerve.”

As in the case above described, the otitis is frequently an exacerbation of a chronic otitis media.

Further complications, such as oculomotor paralysis, labyrinthitis, sinus thrombosis, meningitis, etc., are found in about 50 per cent. of the cases quoted in literature.

Gradenigo has collected fifty-three cases, only five of which were examined post mortem, so that pathological data on the subject are scanty. Acute meningitis was the cause of death in all five cases. In three of the cases a localised abscess was found at the apex of the petrous bone; in the remaining two, a carious focus in the same situation. The path of infection from the tympanum to the petrous apex was demonstrable in two cases. In two cases the bone was remarkably “pneumatic” in structure.

The pathology of the condition, in Gradenigo’s opinion, consists in a spread of infection from the tympanic cavity along the cells which surround the bony part of the Eustachian tube, towards the apex of the petrous temporal. Here the sixth nerve is closely related to the bone and, as it traverses the narrow cleft known as Dorello’s space, is readily liable to suffer from the effects of pressure.

Dorello’s space is a triangular osseo-fibrous canal bounded by the petrous apex, the posterior clinoid process, and the petro-sphenoidal ligament. In this region the sixth nerve is extradural and isolated from other nerves, and it is easy to see how it may be pressed upon and involved in suppuration affecting the apical pyramidal cells.

Since Gradenigo’s publication Wilkinson has described a case of otitis with abducent paralysis, which proved fatal from meningitis. Post mortem revealed an abscess cavity at the apex of the petrous temporal, and the track of infection from the tympanum, along the cells surrounding the Eustachian tube, to the carotid canal, and thence to the area of spongy or cellular bone at the apex of the pyramid, was clearly demonstrable in a section.
Wilkinson suggests that if one could with certainty diagnose such an abscess, it might be approached and drained by stripping the dura from the roof of the petrous bone.

In the case here reported I attempted to do so, but discovered no pus, and although the persistent pain (denoting irritation of the Gasserian ganglion) led me to operate, it is possible that spontaneous recovery would have resulted without operation.

This tendency to spontaneous recovery is illustrated in a number of recorded cases.

Barr, for example, has described two cases of Gradenigo syndrome occurring in boys, and presenting features of remarkable similarity. Both suffered from chronic otitis media, and, in addition to the paralysis of the sixth nerve, there was in both cases double optic neuritis. In each case operation revealed extensive mastoid disease with cholesteatoma and peri-sinus abscess. Complete recovery from the abducens paralysis took place in about four months, while the optic neuritis passed off in six months, leaving normal vision.

Muecke has reported a case of lateral sinus thrombosis with paralysis of the sixth nerve. Operation was followed by complete recovery.

Two cases are cited by MacNab, in children aged 8 and 10 respectively. Both were cases of acute post-influenzal otitis. The patients complained of intense temporal pain and diplopia on looking towards the affected side. In one case a large "apical" cell full of pus was entered during the mastoid operation, in the other no apparent cause of eye symptoms could be found. Recovery from the paralysis took place in both instances about six weeks later.

Gradenigo's explanation of the pathology of the condition has not been universally accepted, and some observers are inclined to regard the abducens paralysis as the result of a toxic neuritis, while others attribute the symptoms to "reflex paralysis by way of the vestibular nerve."

In the existing state of our knowledge, however, the view stated by Gradenigo would appear to carry most weight and probably is the true explanation of the majority of the cases.

Both abducent nerves may be affected, as in the case observed by Mayo Collier. This was a chronic otitis media in which the removal of an aural polypus was followed by acute mastoiditis, double optic neuritis, and paralysis of both external recti. A radical mastoid operation was performed, and the case did well,
but the paralysis and optic neuritis did not improve. The case was regarded as one of basal meningitis.

A somewhat similar case was seen by Mounier; while there are instances in literature of otitis accompanied by paralysis of the sixth nerve on the opposite side (Furet).

Those bilateral and contra-lateral cases, however, differ both clinically and pathologically from the type described by Gradenigo, and their exact etiology is not yet clear.

References.—1 Gradenigo, Arch. f. Ohrenheilk., vol. lxxiv. 2 Wilkinson, Journ. of Laryngol., August 1914. 3 Barr, Brit. Med. Journ., 26th September 1908. 4 Muecke, Proc. of Roy. Soc. of Med., Otological Section, 21st November 1913. 5 MacNab, Journ. of Laryngol., September 1915. 6 Mayo Collier, ibid., October 1901. 7 Mounier, Internat. Centralbl. f. Ohrenheilk., 1910. 8 Furet, Ann. des malad. de l'oreille, 1908.