SPONTANEOUS AIR VENTRICULOGRAPHY

By WILLIAM J. O'CONNELL (Portsmouth)

Introduction

A 54 year old motor mechanic (Mr. R. S.) underwent operative excision and closure of a long-standing post-aural sinus in *February 1958*. Two weeks post-operatively he unwittingly performed a Valsalva manœuvre which resulted in a temporary "black-out". Progressively over a further two-week period his wife noticed impairment of the patient's memory, alertness and expressive ability. The addition of frontal headache and precipitate vomiting quickly led to his re-admission. Plain skull skiagrams *before* lumbar puncture revealed "air" in the cerebral ventricles. The clarity was so excellent that a smooth-walled cyst could be distinguished in the lateral part of the left temporal lobe freely communicating with the ventricular system.

The left lateral film of that set of skiagrams is reproduced (Fig. 1).

The history, presentation and subsequent neurosurgical treatment will be dealt with in detail.

Aural History

Left otorrhœa for two years from 1944 to 1946. Treated conservatively by his own doctor until the onset of left (lower motor neurone type) VIIth nerve paralysis prompted reference to an aurist. Within one month of the onset of that facial palsy a simple mastoidectomy was performed by Mr. Cowper Tamplin at Gosport Hospital on *July 1st, 1946*. Unfortunately no operative report with findings can be traced.

Following this operation a sinus persisted in the upper end of the mastoidectomy wound. Being a phlegmatic individual (by no means below par mentally) he lived with this inconvenience until in *November 1957*, he was referred to Mr. J. A. Seymour-Jones at Portsmouth. His only complaint was of a persistently recurrent—often copious—mucoid discharge from the sinus. In retrospect he could recall neither significant otalgia nor labyrinthine symptoms. Clinically, apart from the sinus, no significant abnormality was revealed: the left facial muscles were functioning albeit with some crossed innervation. Radiologically no air cells remained in the left temporal bone whereas its opposite number showed its mastoid air cell system to be well aerated.

Audiometry showed a high-tone loss on the left for air conducted sounds.

Aural Treatment

A preliminary course of out-patient treatment was instituted. No discharge had occurred from the sinus for several weeks prior to operative closure on *February 28th*, 1958.

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A combined post-aural/endaural incision was made. The middle ear was not entered. The posterior bony meatal wall was not reduced. A little clear mucus was noted as being present in the partially sclerosed mastoid cavity. No granulation tissue or cholesteatoma was found. The skin-lined fistula was excised. The cavity was packed with gelatine sponge plus antibiotic powder. The wound was closed with interrupted vertical mattress sutures without drainage.

Post-operative progress was smooth. The wound had soundly healed by first intention prior to his discharge home on the tenth day.

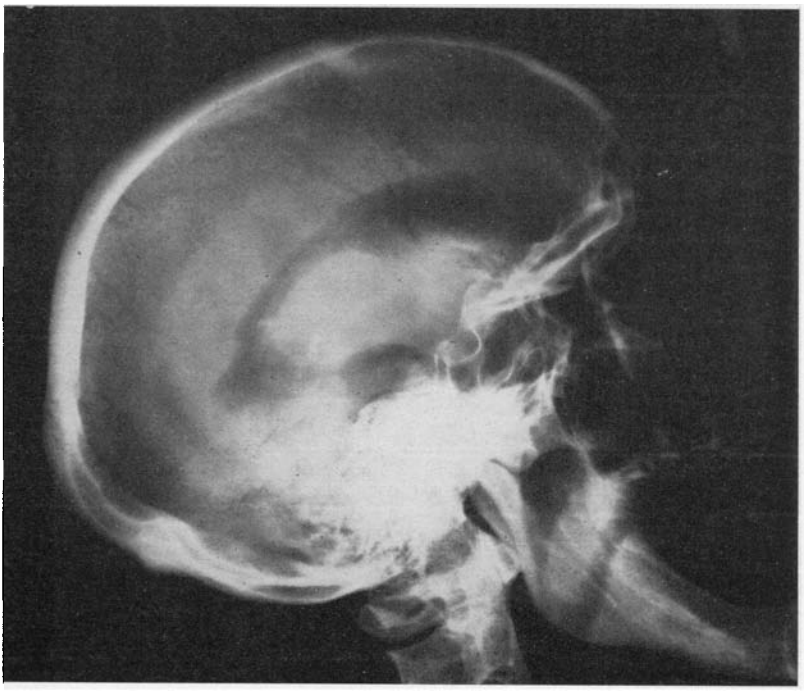


FIG. 1.
Spontaneous air study of cerebral ventricles.

Complication

It was four days later that the black-out noted earlier occurred. The patient was sitting in a chair when he blew his nose violently as was his wont on rare occasions. The loss of consciousness was not instantaneous but followed some few minutes later. He did not really link the two incidents until direct questioning after the skiagrams were available. The transient loss of consciousness left the patient subjectively perfectly well, but it was the progressive loss of memory that his wife noticed particularly. The patient also wrote a letter to his daughter which was nonsensical. Various phrases in it were reiterated in such a fashion as to make the whole incomprehensible.

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Increasing drowsiness and the onset of signs of raised intracranial pressure led to the patient's re-admission on *March 28th, 1958.*

Presentation

Markedly disorientated, drowsy but co-operative, apyrexial. Blood pressure 130/90 mm/Hg.

Slight *right* lower facial palsy of upper motor neurone type present. No other localizing sign except expressive dysphasia in a right-handed man was detected.

There was no sign of infection in the left ear: tympanic membrane intact.

No other physical abnormality could be detected, but the patient described a peculiar sensation of "something" travelling from the occiput to left parietal region whenever he moved. He preferred therefore to remain quite still lying on his right side. This bizarre symptom was to persist until neuro-surgical exploration. X-rays taken at this point. Subsequently a lumbar puncture was performed with due caution using a fine bore needle. The pressure was raised to 250 mm. The specimen appeared normal and indeed showed no abnormal constituents, on full examination. Culture was sterile. Despite the removal of only a minimal quantity of cerebrospinal fluid for examination there was a marked subjective improvement. The patient became more alert and was free of headache almost immediately. His transfer to a neuro-surgical unit was arranged for *April 2nd, 1958.*

Neuro-Surgical Exploration

Undertaken on *April 8th, 1958*, there having been no change in the patient's improved condition on transfer. Repeat radiology on *April 4th, 1958*, was reported as follows: "Spontaneous air studies demonstrate asymmetry of the body and anterior horns of the lateral ventricles, the right being considerably larger than the left. A smooth walled cyst communicating with the ventricular system is seen in the left temporal lobe laterally." L.V.P.

Mr. Wylie McKissock explored the left middle fossa through a temporal scalp flap and quadrilateral bone flap. The dural tension was normal (a general anæsthetic was administered) and an oblong dural flap was formed thus enabling elevation of the temporal lobe. A dural defect in the outer third of the petrous temporal region was found. The defect measured $\frac{3}{4}$ cm. in sagittal diameter and $\frac{1}{2}$ cm. in width.

The brain was separated from the defect by diathermy. The dura mater was then separated from the base of the skull and at the site of the dural defect a cholesteatoma was found lying in a cavity in the petrous bone. It was evident that the cholesteatoma must have been adherent to the overlying brain. After removal of the cholesteatoma the cavity remaining measured 1 cm. $\times$ $\frac{3}{4}$ cm. $\times$ $\frac{3}{4}$ cm. The bone defect was covered with a sheet of muscle taken from the temporal muscle. The dura was then laid back in place and the dural defect covered with a piece of gelatin sponge after which the left temporal lobe was allowed to come down in contact with it.

The above was followed by meticulous hæmostasis and then closure of the dural, periosteal and scalp flaps in layers.

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Progress

The post-operative recovery was uneventful, the patient having been established on a regime of antibiotics and anti-convulsants pre-operatively.

On return to his parent hospital from the neuro-surgical unit the patient was well subjectively with his slight right facial palsy still present but with his expressive dysphasia improving daily. He thought his taste for finer flavours was impaired but his sense of smell could not be faulted with the usual test materials.

The subsequent course was of continued improvement with eventual return to his work as a motor fitter and mechanic. No air present on final skull skiagram (*July 1958*).

Summary and Discussion

A case history is given relating the sequence of events following upon closure of a post-aural sinus in a man aged 54 years. It is considered likely that he introduced air into his intracerebral ventricular system by performing Valsalva's manœuvre. A cholesteatoma of aural origin was adherent to the brain substance of the left temporal lobe. It is interesting in retrospect to wonder if cerebrospinal otorrhœa had given rise to the discharge which caused him to seek advice after tolerating the persisting sinus for 11 years.

Carbon dioxide production is alleged to occur in cholesteatosis but the size of the cholesteatoma found in the petrous temporal bone in this case would seem to make discussion on that basis rather nebulous.

Although not convincingly demonstrated at operation a communication must have existed between the mastoid cavity and the site of dural erosion. No further "air" entered the cerebral ventricles after the site of dural erosion had been sealed with a muscle graft.

The patient was indeed fortunate that intracerebral infection had not occurred. He was fit and at work in *February 1960*, with no sequelae.

My grateful thanks are due to Mr. J. A. Seymour-Jones for his kindly encouragement and permission to present this case history; and to Mr. Wylie McKissock for his permission to publish the neuro-surgical details.

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