assessment by the clinicians concerned. Radiological evaluation by a panel was not possible, and therefore, although the data give a provisional impression of the course of the disease in these patients, the figures are not comparable with those based on independent radiological assessment, for example, in Table II.

TABLE XIV.—Condition at 12 Months Related to Condition on Admission

Group	Total	Improvement	No Change	Deterioration	Death
S	55 100%	31 56%	4 7%	8 15%	12 22%
C	52 100%	16 31%	5 10%	7 13%	24 46%

The difference in mortality between the two groups is statistically significant.

Summary

One hundred and seven patients with acute progressive bilateral pulmonary tuberculosis, unsuitable for collapse therapy, were studied in a clinical trial of streptomycin.

The supply of streptomycin available during the investigation was limited. The type of disease selected was one considered hitherto unsuitable for any form of treatment other than bed-rest. Bed-rest accordingly was the treatment given to one group of 52 patients (C), while 55 patients were treated with bed-rest plus streptomycin (S). Patients were assigned to one or the other group by random selection, and only after acceptance as suitable for the trial.

The period of observation for each patient, under conditions laid down for the trial, was six months.

S patients received 2 g. of streptomycin intramuscularly daily in four injections at six-hourly intervals. No toxic effects necessitated stopping treatment, but vestibular disturbance was common.

At the end of six months 7% of S patients and 27% of C patients had died. Considerable improvement radiologically was noted in 51% of S cases and 8% of C cases. Slight or moderate improvement was noted in 18% of S cases and 25% of C cases. Apart from those who died, deterioration was seen in 18% of S cases and 34% of C cases.

The main difference between S and C series is among the patients clinically acutely ill on admission: thus, among patients having on admission evening temperatures of 101° F. (38.3° C.) or over, 13 of 24 S patients and two of 19 C patients showed improvement radiologically.

More S patients than C patients showed clinical improvement, but the difference between the two series is smaller than in respect of radiological changes.

Improvement in S cases was greatest in the first three months. After the end of this period many S cases began to deteriorate.

At the end of six months examinations for tubercle bacilli were negative in eight S cases and two C cases. The best results in S cases were seen in the first months of treatment.

Results of tests for streptomycin sensitivity of infecting strains are given for 41 cases. In 35 cases tests revealed *in-vitro* resistance from 32 to over 8,000 times that of the original strain or the standard H37Rv. In most cases streptomycin resistance emerged in the second month of treatment. It seems probable that streptomycin resistance is responsible for much of the deterioration seen in S cases after first improvement.

An addendum gives the results at one year after admission.

The work of this investigation fell particularly heavily on the nursing staff and laboratory technicians of the centres concerned, and grateful acknowledgment is due to them for their assistance throughout the trials.

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SUDDEN DEATH DUE TO EPENDYMOMA OF CEREBELLO-PONTINE ANGLE

REPORT OF TWO CASES

BY

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Sudden death has been described in many cases of sub-tentorial tumours, but such an occurrence is almost invariably preceded by symptoms of raised intracranial pressure severe enough to induce the patient to seek medical advice some months before death. In the first case described here the patient gave a history of mild illness for only two days, whilst in the second case the patient continued at work until the day before his death. The presence of an intracranial tumour was not suspected during life in either case.

Bailey, Buchanan, and Bucy (1939) point out that sudden death may occur in cases of ependymoma of the fourth ventricle, but they describe such an occurrence only after lumbar puncture or manipulations of the head. Neither of these procedures was carried out in the present cases.

Case 1

A girl aged 2 was in good health until two days before her death, when she appeared unwell and was constipated. She was taken to her doctor, who prescribed an aperient; next day she was better and able to take her food satisfactorily. On the following day, however, she suddenly had a fit, made a choking noise, and died in a few minutes.

At necropsy a firm, pale, lobulated tumour with a smooth surface and crenated edge and measuring 4.3 by 3.7 cm. was found on the inferior surface of the left lobe of the cerebellum, being related laterally to the medial surface of the left petrous bone. Superiorly the tumour reached and compressed the lower border of the pons, and inferiorly the medulla and the upper part of the cervical cord were partially encircled and thrust towards the right. The tumour reached a point 4 cm. below the lower border of the pons and 1.2 cm. to the right of the midline. The left cerebellar hemisphere was compressed.

The left eighth cranial nerve ran into the mass, whilst the left vertebral artery, which lay on its surface, was partially embedded in its substance. The whole was covered by the arachnoid mater, which could be moved freely over it. There was evidence of raised intracranial pressure, with flattening of the convolutions of the cerebrum and bulging and thinning of the infundibulum, but the lateral ventricles appeared to be normal in size. No other lesions were found post mortem.

Histologically, the tumour had the appearance of an epithelial type of ependymoma (Fig. 1). The cells composing it contained round or oval nuclei showing rather coarse chromatin granules. Many of these cells formed canals with empty lumina lined by a single layer of cuboidal or columnar epithelium with basal nuclei, whilst others were arranged in rosettes around coils of cell processes. There was a complete absence of a basement membrane separating the rosettes from the surrounding stroma. The blood vessels were thin-walled, and in some areas the tumour cells were arranged around them, their processes extending to the vascular endothelium. The stroma consisted of a fibrillary network.

Case 2

A boy aged 16 had suffered from headaches and occasional vomiting for two months but remained at work until the day before his death. He then complained of very severe headache and went to bed, where he was found dead the following day.

At necropsy a firm lobulated swelling, similar to that seen in Case 1, and measuring 6.2 by 4 cm., was found lying in the right cerebello-pontine angle on the inferior surface of the right cerebellar hemisphere. Superiorly it compressed the pons

FIG. 1.—Section from tumour of Case 1, showing epithelium-lined canals. ($\times 210$.)

and extended over the right middle cerebellar peduncle to a point 0.8 cm. above the lower limit of the pons, whilst inferiorly it passed through the foramen magnum and partially encircled the cervical cord, reaching a point 0.7 cm. to the left of the midline. The tumour pressed upon the medulla, displacing it to the left, and compressed the right cerebellar hemisphere. The right vertebral artery lay between the tumour and the overlying arachnoid mater, whilst the right eighth cranial nerve was embedded in the substance of the mass. No other lesions were found post mortem.

Histologically (Fig. 2) the tumour was much more cellular than that described in Case 1. The cells resembled astroblasts,

FIG. 2.—Section of tumour from Case 2, showing typical rosette formation. ($\times 150$.)

but the nuclei were round or oval, with a coarse chromatin network. In many areas they were arranged in rosettes around coils of fibrils, sometimes with a thin-walled blood vessel in the centre. In no parts could epithelium-lined canals be found. This is the histological picture of a cellular type of ependymoma.

Comment

These two cases showed ependymomas of similar macroscopic appearance, Case 1 being of the epithelial type and Case 2 of the cellular type (Kernohan and Fletcher-Kernohan, 1937). Each tumour occupied one cerebello-pontine angle and exerted pressure on the pons, medulla, and cerebellum.

Ependymomas most often arise in the fourth ventricle, and their tendency to extend into the cerebello-pontine angle has been pointed out by Courville (1945). Having reached the basal cistern they may spread widely over the inferior surface of the cerebellum and around the medulla and cervical cord until their size is such as to cause pressure and give rise to symptoms. In a small percentage of cases sudden death may occur. When such a catastrophe as haemorrhage into a tumour occurs the cause of death is obvious (Wedd, 1942), but in the majority of cases of subtentorial tumours it is obscure.

Craig (1933) has stated that sudden collapse in patients with cerebellar tumours is usually due to respiratory failure, and both he and Werden (1939) describe the successful removal, under artificial respiration, of such tumours when acute respiratory failure had occurred. On account of the anatomical positions of the neoplasms described in this paper, showing definite pressure upon the medulla and upper cervical cord, the addition of a moderate rise of intracranial pressure could easily precipitate acute respiratory failure. There is, however, no evidence in these cases of a definite cause for sudden raising of the pressure.

Grant, Webster, and Weinberger (1941) point out that convulsions are often seen in addition to the usual signs of raised pressure, and Webster and Weinberger (1940) conclude that these are due to cerebral anaemia.

It is possible that a sudden strain may in some way cause an increase of intracranial pressure great enough to give rise to a convulsion. It is perhaps significant that the only symptom of ill-health in Case 1 was constipation, and this may have predisposed to the convulsion which immediately preceded death.

Typical cerebellar fits, characterized by head retraction, extended arms and legs, irregular pulse, and pyrexia with clouded consciousness, are believed to be due to compression of the bulbar centres (Bailey, 1933). It seems possible that such a fit was the explanation in these cases, although usually there is a history of similar convulsions which become longer in duration and more severe until one finally ends in death.

Summary

Two cases of sudden death due to ependymomas in the cerebello-pontine angle are described.

Acute respiratory failure, cerebral anaemia with convulsions, and cerebellar fits are discussed as possible causes of death.

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