to cases of disease. In order thoroughly to do so, and give fuller value to this work, we feel that more controls should be obtained (a difficult matter), that more cases of acute and recent psychoses of various kinds are required, and that the examination of these cases on repeated occasions and on their convalescence is necessary.

The technical work of Dr. Stanford and Mr. Wheatley, of our chemical research laboratory, upon which the above information is based, is contained in the following papers, published in the *Biochemical Journal*, vol. xix, No. 4, 1925 :

(*a*) " The Estimation of Phosphorus Compounds in Blood."

(*b*) " The Distribution of Phosphorus Compounds in Blood."

(*c*) " The Estimation of Calcium Compounds in Blood."

Our thanks are due to our colleagues, Drs. Walker and Grossman, for help in the matter of withdrawal of the fluids necessary for the work detailed.

References.

(1) *Archives of Neurology and Psychiatry*, August, 1922.

(2) "Vorl. Mitteilung," *Klin. Woch.*, November 4, 1924, No. 45

(3) *Compt. Rend. Soc. Biol.*, 1923, lxxxix, p. 49.

(4) " The Inorganic Constituents of the Blood in Certain Pathological Conditions": a report to the Medical Research Council, *Lancet*, May 31, 1924.

(5) *Journ. Biol. Chem.*, 1921, xlvii, pp. 475–481.

(6) *Ibid.*, 1920, xliii, pp. 35–42.

(7) *Biochem. Journ.*, 1924, xviii, pp. 855–7.

(8) *Brain*, 1924, xlvii, No. 3.

(9) *Journ. Biol. Chem.*, 1925, lxv, p. 101.

(10) *Zeitschr. f. d. ges. Exp. Med.*, Bd. xlv, heft 5–6, 1925. (Abstracted in *Klin. Woch.*, No. 37 of September 10, 1925.)

The Cerebro-spinal Fluid in Encephalitis Lethargica. By Allen Hancock, *M.C.*, M.R.C.S., L.R.C.P., D.P.H., D.P.M., Assistant Medical Officer, London County Mental Hospital, Bexley.

Encephalitis lethargica, or epidemic encephalitis as it is now usually called, is becoming more generally recognized throughout the world, and while diagnosis is usually easy in those cases with a clear history, and who show the " encephalitic syndrome " to a marked degree, much confusion has arisen in the case of some patients who have shown clinical features which have led observers to arrive at a diagnosis of this disease when later investigations have shown that this conclusion has not been a correct one. On

https://doi.org/10.1192/bjp.72.296.58 Published online by Cambridge University Press

the other hand, some cases suffering from encephalitis lethargica, in one of its many clinical forms, have been erroneously diagnosed as suffering from some other disease or, perhaps, the nature of the complaint has remained obscure. Literature on the subject contains many references to such doubtful cases, and among others which have presented difficulties from their clinical picture, mention has been made of acute anterior poliomyelitis, tuberculous meningitis, cerebral syphilis, general paralysis, disseminated sclerosis, alcoholic poisoning and cerebral tumour.

The examination of the cerebro-spinal fluid is everywhere fully recognized as being of the greatest importance in all such cases, and it is for this reason that it is felt that the following results, obtained from a series of cases of epidemic encephalitis, may be of interest.

The table set out below shows the findings obtained in 34 cases of this disease. The work was done in the Pathological Laboratory of the Maudsley Hospital, and to Dr. Golla, the Director, I am indebted for permission to carry out the examination, and for his help in obtaining cases. These were patients who may be regarded as having reached the chronic stage of their disease, and who show periods from the onset varying from five years to four months, the majority being from nine to twelve months. There are 10 females and 13 males in the series, and their ages range from 11 to 50 years. The table shows the various clinical types of cases examined. Of the 23 cases examined, 10 were patients in mental hospitals, while 7, although not certified, were either in-patients at the Maudsley, or were attending the Out-patient Department of the same hospital. 4 were from hospitals other than mental hospitals.

The lumbar route was in all cases employed. The physical characters of all the fluids did not show any abnormality, being clear and colourless, and only in 3 cases did it escape in increased pressure. The cell-count showed no increase above 5 cells per c.mm. in any of the fluids.

Pandy's test was positive in only one case; this was one of five years' duration, and was of the Parkinsonian type; 2 other cases showed faint reactions, but 20 of the series were negative. Only 5 cases showed a protein content above 40 %.

The Wassermann reaction was in all cases negative.

The colloidal gold reaction (Lange) showed some change in 10 of the 23 fluids examined. These changes were in all cases slight, were usually to "1" or "2," or in 1 case only was a change up to "3" shown. The changes that did occur will be seen in the table to have taken place in two or three of the middle tubes, but from these results there is no reason to believe that in this disease any

https://doi.org/10.1192/bjp.72.296.58 Published online by Cambridge University Press

https://doi.org/10.1192/bjp.72.296.58 Published online by Cambridge University Press

The Cerebro-spinal Fluid in Encephalitis Lethargica.

Case.	Sex.	Age.	Pressure.	Pandy's test.	Total protein, mgrm. %.	Wassermann reaction.	Colloidal gold reaction, Lange.	Sugar % (0·04 to 0·06 % normal).	Chloride % (0·70 to 0·76 % normal).	Duration.	Clinical type.
1	F.	31	..	—	35	Negative	*Nil*	..	..	15 months	Parkinsonian.
2	M.	30	..	+	200	,,	0000111000	0·055	0·725	5 years	,,
3	F.	16	..	—	60	,,	0000111100	0·082	0·725	1 year	,,
4	M.	12	Normal	—	35	,,	*Nil*	0·08	0·73	4 months	,,
5	F.	25	,,	—	45	,,	1112332110	..	..	12 ,,	Depressed.
6	F.	13	,,	—	35	,,	*Nil*	0·071	..	13 ,,	Lethargic (naughty child).
7	F.	12	,,	—	35	,,	,,	0·071	..	9 ,,	Parkinsonian.
8	F.	16	,,	Faint	45	,,	,,	0·061	0·703	7 ,,	,,
9	M.	48	,,	,,	50	,,	0001100000	0·078	..	9 ,,	Depressed.
10	M.	15	,,	—	35	,,	0001100000	..	..	11 ,,	Parkinsonian.
11	M.	19	,,	—	35	,,	*Nil*	0·05	0·71	3 years	,, with Apache type.
12	M.	26	,,	—	35	,,	0122110000	..	..	1 year	,,
13	F.	26	,,	—	35	,,	0011100000	0·057	0·72	9 months	,, suicidal.
14	F.	21	,,	—	35	,,	*Nil*	0·063	0·697	9 ,,	,,
15	F.	35	,,	—	35	,,	,,	0·051	0·690	17 ,,	,,
16	F.	36	,,	—	35	,,	,,	0·06	0·666	3 years	,,
17	M.	11	,,	—	35	,,	,,	0·053	0·707	9 months	Naughty child, suicidal.
18	M.	23	Increased	..	..	,,	0000221000	0·053	0·692	3 years	Parkinsonian.
19	M.	21	,,	—	35	,,	0000010000	0·053	0·608	1 year	,,
20	M.	50	Normal	..	..	,,	0000112110	0·055	0·682	5 years	,,
21	M.	30	Increased	—	35	,,	*Nil*	0·063	0·687	12 months	Apache.
22	M.	43	Normal	—	35	,,	,,	0·064	0·710	12 ,,	Sleepless.
23	M.	26	,,	—	35	,,	,,	0·068	0·68	4 years	Parkinsonian.

Cases 1–4 not certified. Cases 5–11 not certified, but were under treatment at the Maudsley Hospital.
Cases 12–23 certified insane and in mental hospitals.
Character of fluid : Clear and colourless in all cases. Cells : In no case above 5 per c.mm.

definite type of curve is usually obtained which is of value from a positive point of view. On the other hand, this test, like the Wassermann, by showing a negative result, will eliminate other diseases which may be suspected when making a diagnosis in doubtful cases.

The sugar content was estimated in 19 of the fluids, the method employed being Calvert's blood-sugar method, adapted for cerebro-spinal fluid. The results here support the view that an increase in sugar in the cerebro-spinal fluid is frequently found in epidemic encephalitis. It was found that in 58 % of the cases the sugar present was above ·06 % In 5 of these it was above ·07 %, and in 2 of the fluids a content above ·08 % was found. In no case was the figure lower than ·05 %. Although the sugar content varies in many conditions, the importance of these figures in the disease under discussion lies chiefly in the fact that the sugar does not in any case show a decrease in amount, as is the case in tuberculous meningitis, which may present a clinical picture similar to that found in encephalitis lethargica.

The chlorides present were estimated in 16 of the cases. In no case was any great variation found, and none were raised above ·76 %, which has been regarded as the maximum normal figure. If the lowest normal figure is taken as ·70 %, it is found in this series that a figure below this is shown in only 9 of the cases, and in these there is only a small diminution, which may indicate a slight meningeal infection, but in none is it found below ·60 %, as is usually the case in tuberculous meningitis. The chloride estimation, therefore, as in that for sugar, may give results helpful in diagnosis when the clinical findings are common to other diseases.

The conclusions arrived at from the fluids examined are:

(1) Examination of the cerebro-spinal fluid in doubtful but suspected cases of encephalitis lethargica is of the greatest importance.

(2) The constant negative findings of the Wassermann reaction, Pandy's test, Lange, and an absence of increase in the cell content will exclude many conditions which may give rise to confusion.

(3) When a negative Wassermann reaction and a negative Lange has been found, the sugar and the chloride content of the fluid may be of value in differentiating epidemic encephalitis from other diseases, especially tuberculous meningitis.

(4) It is essential that the methods employed should be the same in all cases.

https://doi.org/10.1192/bjp.72.296.58 Published online by Cambridge University Press