

SHORT COMMUNICATIONS

Aseptic Meningitis due to Frater Type Virus in Ontario

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DURING the late summer and early fall of 1959 and 1960, a viral agent was isolated on 14 occasions from 12 patients with clinical diagnoses of suspected poliomyelitis or aseptic meningitis. This virus was not typable by the routine procedure using antisera to all the known enteroviruses, reoviruses and adenoviruses. Conversely, antisera prepared in rabbits to two of the isolates in turn failed to neutralize any of the above stock viruses which could be grown in tissue culture. None of the viruses recovered before 1959 or after 1960 were found to be serologically related to this new type. The 12 patients involved were residing in several different localities of Ontario, namely, Toronto, Hamilton, St. Catharines, Niagara Falls, Kitchener, Peterborough, Cochrane and Fort William.

In general, the common symptoms and signs were headache, diarrhea, vomiting, malaise, muscular pain, stiff neck, fever, in some cases positive Kernig's sign, hyporeflexia of limb joints, high cell count (mostly lymphocytes) and elevated protein in cerebrospinal fluid.

TABLE I.—CLINICAL DIAGNOSIS, AGE AND SEX OF PATIENTS, SOURCE OF VIRUS ISOLATION AND SEROLOGICAL EVIDENCE

Clinical diagnosis	Age (years)	Sex	Virus isolated from		Antibody titre	
			Stool	C.S.F.	Acute	Convalescent
Abortive polio...	2½	M	+		—	1:16
Suspected polio...	4	M	+			
Suspected polio...	5	F		+		
Suspected polio...	6	M	+			
Suspected polio...	8	F	+	—		
Viral infection...	12	M	+			
Viral infection...	14	F	+			
Aseptic meningitis	17	F		+		
Aseptic meningitis	19	F	+			
Aseptic meningitis	25	F	—	+	—	1:128
Suspected polio...	28	F	+	+		
Aseptic meningitis	36	M	+		—	1:64

In Table I a summary of the clinical diagnoses, the age and sex of patients and other pertinent data is given. As is seen in the table, the age of the patients ranged from 2½ years to 36 years. Seven of the patients were females and five were males. The 2½-year-old boy and the 28-year-old female were son and mother, both being ill at the same time. The father was the first in the family to contact the infection and was admitted to the hospital with a provisional diagnosis of poliomyelitis. Regrettably, no specimens were submitted from the patient. The 4-year-old and the 6-year-old boys were brothers; again, both were ill at the same time.

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ABSTRACT

During the summer and fall of 1959 and 1960 a virus was isolated on 14 occasions from the stool or cerebrospinal fluid or both of 12 patients with a clinical picture of non-paralytic poliomyelitis or aseptic meningitis. The patients were from eight different localities in Ontario. The isolated virus was not neutralized by antisera to any of the known enteroviruses, reoviruses or adenoviruses, nor did antiserum to the isolate neutralize any of these viruses. Antiserum to Frater virus, however, did neutralize this isolate and in turn was itself neutralized by antiserum to this virus. Frater virus was isolated in Scotland from cases of aseptic meningitis during the same period in 1959 and 1960. In Ontario this virus was not encountered before 1959. Isolation of the virus from cerebrospinal fluid and demonstration of immunological response in the patients establish its etiological significance. Biological characteristics indicate that it belongs to the ECHO group.

The virus was isolated on primary monolayer rhesus monkey kidney tissue culture either from the specimen of cerebrospinal fluid or stool or both (Table I). Paired sera were available from only three patients, although isolation of the virus from cerebrospinal fluid is in itself sufficient proof that the isolated virus was the etiological agent. In the three cases in which serum specimens were available, no antibodies were demonstrable in the acute phase specimens. In the convalescent phase sera, on the other hand, the homologous antibody titre in one case was 1:16, in another 1:64 and in the third 1:128, proving that there was a definite immunological response to the virus in question.

To obtain some idea about the frequency of infection with this virus, two-phase sera of patients from whom no virus was isolated were examined for the presence of antibodies to this virus. These specimens were from clinically similar cases occurring during the same periods in 1959 and 1960 and in the same general area. Immunological response was demonstrated in 18 of a total of 98 patients.

For detailed study of the virus, one strain isolated from the cerebrospinal fluid of a patient was chosen as a prototype and designated as No. 1733, this being our laboratory number of the specimen. The strain was plaque-purified before use. In all the tests 100 TCID₅₀ of the virus and 20 units of the antisera were employed. The virus was not neutralized by any of the antisera to the three types of poliovirus, to Coxsackie A types 1-19 and 21, to all six types of Coxsackie B and to all 28 types of ECHO virus. Antisera to the three types of Reovirus and to Adenovirus types 1-17 also failed to neutralize the virus. To make the picture more or less complete, antisera to herpes, measles, mumps, eastern and western equine encephalomyelitis and lymphocytic choriomeningitis viruses were also included in the test. As was expected, though not shown in the table, these sera also failed to neutralize the virus.

Antiserum to No. 1733 virus prepared in rabbit failed to neutralize Coxsackie A types 9, 13, 18 and 21 or any other viruses mentioned above. On the other hand, the No. 1733 antiserum neutralized a strain of Frater virus, which was kindly supplied by Dr. I. B. R. Duncan (Table II).

TABLE II.—RESULTS OF NEUTRALIZATION TEST WITH NO. 1733 IMMUNE RABBIT SERUM

Virus (100TCID ₅₀)	No. 1733	Polio 1-3	Coxsackie Types						Frater virus
			A 9, 13, 18, 21	B 1-6	ECHO 1-28	Reo 1-3	Adeno 1-17		
Serum No. 1733 (20 units)	+	-	-	-	-	-	-	+	

The antibody titre of No. 1733 antiserum was approximately the same when titrated against both No. 1733 virus and Frater virus. This preliminary experiment, therefore, indicates that No. 1733 virus is either identical with or closely related to the Frater virus.

This virus new to Ontario has all the characteristics common to ECHO viruses. After final analysis it most likely will be added to this already extensive group. In the meantime, this virus could be included with the viruses capable of causing aseptic meningitis.

It is of interest to note that the Frater virus was isolated also in 1959 in Scotland, where at the time there was an extensive epidemic of aseptic meningitis.¹

REFERENCE

1. DUNCAN, I. B. R.: *Lancet*, 2: 470, 1960.

Radiological Examination of Meckel's Diverticulum

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THE radiological examination carried out to demonstrate a suspected Meckel's diverticulum is an uncertain procedure.

Various series of autopsies have established this as one of the more common intestinal abnormalities. The frequency of its occurrence is reported as follows: Kittle, Jenkins and Dragstedt,¹ 0.5%; Jay *et al.*,² 1.1%; and Harkins,³ 1.3%. Johnston and Renner⁴ and Maguire⁵ emphasize that this anomaly causes great difficulty in diagnosis and constitutes a serious hazard to health. In children bleeding is the most frequent symptom, while in adults obstruction and perforation are more common.⁶

The inability to re-define such an abnormality, in spite of its previous radiographic identification, points up this difficulty and is illustrated in the following situation.

The radiological examination described herein was carried out on a 58-year-old man who had the chief complaint of transient mid-abdominal pain for several years. On the four-hour follow-through of a routine gastric barium meal, a barium-edged gas-filled pouch (Fig. 1) was noted in the subhepatic region. On repeat examination some four days later, this apparent sac was identified in the left mid-abdomen (Fig. 2). These widely

ABSTRACT

The lack of success in filling a known Meckel's diverticulum with either gas or barium suspension emphasizes the limitations of radiological examination. The flexibility and length of this structure predispose to torsion and narrowing of the lumen. Nevertheless, the occasional successful identification of this abnormality warrants the relatively simple radiographic examination required.

separated positions were considered to be an index of the length of the structure involved. A further study was initiated a few days later in an attempt to fill the structure more completely and to obtain the ultimate in radiographic detail. However, on this occasion, in spite of varied positioning, neither gas nor barium could be induced to enter. This difficulty in filling the diverticulum exemplifies the limitations of radiological examination.

At operation, a sac (Fig. 3) some five inches in length extended upward from its anchor point approximately 22 inches above the ileo-cecal valve.

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