Summary

Succinylcholine is a safe relaxant for E.C.T.

It can be used to abolish the convulsion completely; even with the doses necessary to do this the patient's recovery from the fit is always rapid.

Succinylcholine produces a slight rise of blood pressure which is generally unimportant. If necessary, this can be controlled by blocking the autonomic ganglia.

When complete muscular relaxation is advisable succinylcholine can be administered with safety without any elaborate system of dosage. In such cases the presence of a fit can be detected by the simple manœuvre described.

We wish to thank Dr. H. C. Beccle, physician-superintendent, for his advice and encouragement, and for permission to publish. We are grateful to our nursing staff for their help and forbearance over the additional labour we have imposed on them. We are indebted to Allen & Hanburys Ltd. for the supply of "hexathide" used in this investigation.

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CANICOLA FEVER

A HUMAN CASE IN NORTHERN IRELAND

BY

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In 1931 Klarenbeek and Schüffner (1933) isolated *Leptospira canicola* from the urine of a dog. This discovery was soon followed by the recognition of *L. canicola* infections in man (Dhont *et al.*, 1934). Baber and Stuart (1946) reported the first human infection in England; Joe and Sangster (1951) published the first cases in Scotland, although Stuart (1938), in a survey of Glasgow tripe-workers, had found agglutinins in low titre to *L. canicola* in the serum of a woman who gave no history of illness. In the four-year period 1947–50 70 cases were diagnosed in England and Wales (Broom, 1951). Figures given by Alston (1951) show that 25 cases occurred in 1949 and 33 in 1950.

Broom (1951), in a review of leptospirosis in England and Wales, drew attention to the fact that no human case of canicola fever had yet been reported from any part of Ireland, although his survey of the incidence of the disease in Dublin dogs had shown the infection rate in that city to be as high as in England.

The case recorded here is, we believe, the first serologically proved human infection with *L. canicola* reported from Ireland.

Case Report

A muscular and well-nourished man aged 36 was admitted to a surgical unit of the Belfast City Hospital on February 1, 1952. Eight days before admission he complained of feverishness and shivering attacks of abrupt onset. He was forced to give up work six days before admission, and he took to bed one day later. He then developed pains in the legs, lumbar regions, and right renal angle; these were severe and disturbed sleep. Other symptoms were colicky pains in the right hypochondrium and epigastrium, loss of appetite, vomiting, tiredness, photophobia, and very severe frontal headache. Frequency of micturition, dysuria, and oliguria caused him to summon his medical attendant, who visited him on January 29 and found his temperature to be 102° F. (38.9° C.) and the urine to contain a heavy cloud of albumin. A tentative diagnosis of acute pyelitis was made and treatment by oral sulphatriad instituted. The pyrexia promptly subsided, but nausea and vomiting became troublesome, and admission to hospital was arranged.

On admission his temperature was 98° F. (36.7° C.), pulse 104, and respirations 22. Clouding of consciousness was considerable; there was no neck rigidity, and Kernig's sign was negative. The face was flushed and the conjunctivae were markedly congested and suffused. Jaundice was absent. A patchy erythema was noted on the chest, also labial herpes. The tongue was coated. Slight tenderness was elicited over the right upper abdomen, the liver and spleen were not palpable, and the renal angles were free. The urine was acid and contained a trace of albumin with scanty red blood cells but no pus or organisms. On the day after admission the temperature rose to 99.2° F. (37.3° C.), but afterwards remained subnormal.

The patient was seen at this stage by one of us (A. C. H.), and the possibility of leptospiral infection was discussed. He was transferred to a medical unit for further investigation, although clinical recovery was rapid and uneventful. Discovery of a positive leptospiral agglutination prompted an exhaustive inquiry into the history of the case, and it was found that the patient's dog had sickened and died after a few days' illness, during which the patient had tended the animal and handled it a great deal. The patient first felt unwell about three days subsequent to the dog's death. He worked as a labourer in a bakery which was infested by rats and required periodical deratting. One such campaign had occurred about a week before the present illness.

The patient insisted on being discharged on February 11, before an effective penicillin course could be completed. Shortly after leaving hospital the muscular pains reappeared and a pustular rash developed on his face. He returned to hospital on his doctor's advice two weeks after his initial discharge. On this occasion his general condition seemed satisfactory, and the limb pains rapidly subsided. He was given a penicillin course (2,000,000 units daily, intramuscularly, for 12 days) and the laboratory tests were repeated. The leptospiral agglutinations of the other members of the household and of three fellow workers were examined.

Agglutination Tests

The technique of the agglutination tests was Broom's (1948) modification of that of Schüffner and Mochtar (1927). The first specimen of blood, taken on the 12th day of illness, agglutinated *L. icterohaemorrhagiae* and *L. canicola*, both to titres of 1 in 300. (In the early stages of leptospirosis equal or nearly equal titres are common.) Subsequent specimens, taken over a period of weeks, gave agglutinations which showed a falling away of the heterologous titre, while the homologous titre remained high (see Table I).

It will be seen that the second specimen of blood serum (taken on the 19th day of illness) gave agglutination in higher titre for *L. canicola*; this serum was sent to Dr. J. C.

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TABLE I.—*Leptospiral Agglutination Tests*

Duration of Illness	Reciprocal of Titres	
	L. icterohaemorrhagiae (Strain Jackson)	*L. canicola* (Strain Utrecht)
12th day ..	300	300
19th ,, ..	1,000	300. ± at 1,000. Trace at 3,000
48th ,, ..	300. Trace at 1,000	3,000
66th ,, ..	100	1,000. Trace at 3,000

Broom for confirmation. In view of the nearly equal titres for both *L. icterohaemorrhagiae* and *L. canicola*, a cross-absorption test was carried out. Dr. Broom's result is shown in Table II, clearly demonstrating *L. canicola* as the infecting organism.

In addition, agglutination reactions against *L. icterohaemorrhagiae* and *L. canicola* were performed on blood samples from the patient's wife and eight children, and from three of his workmates. All results were negative.

TABLE II.—*Results of Cross-absorption Test*

	Reciprocal of Titres	
	L. icterohaemorrhagiae	*L. canicola*
Unabsorbed	1,000	1,000. Trace at 3,000
Absorbed:		
L. icterohaemorrhagiae	0	300. Trace at 1,000
L. canicola	0	0

0 = Negative in all dilutions from 1/30 upwards.

Other Laboratory Investigations

The blood urea was 100 mg. per 100 ml. on May 4, 44 mg. on May 7, and 38 mg. on May 26. On May 5 the white blood cells numbered 16,300 per c.mm. On May 27 the cerebrospinal fluid (examined after readmission) was normal, and the erythrocyte sedimentation rate 4 mm. in one hour (no E.S.R. done on first admission). On May 28 a blood count showed: haemoglobin, 13.3 g.% (90% Haldane); red cells, 4,400,000 per c.mm.; white cells, 6,600 per c.mm.; haematocrit, 42%; mean corpuscular volume, 96 μ^3; mean corpuscular haemoglobin concentration, 32%; normal film. Liver-function tests: serum bilirubin, normal; thymol turbidity, 4 units; alkaline phosphatase, 7 units per 100 ml.; plasma proteins—albumin 5.6 g.%, globulin 2.4 g.%, total 8 g.%; bromsulphthalein, normal (no retention of dye). The Wassermann reaction was negative.

Animal Inoculation.—After the urine had been made alkaline to litmus a guinea-pig was inoculated intraperitoneally with 2 ml. of the centrifugalized deposit (33rd day of illness). The animal remained well and was sacrificed 22 days later: no leptospires were seen by direct microscopy and none were isolated by culture. Failure to isolate the organism was probably due to the fact that the guinea-pig is not highly susceptible to infection with *L. canicola* (Mackay-Dick and Watts, 1949; Whitehouse, 1952, and others). Also, the patient's premature departure prevented the collection of a urine specimen at the optimum time. The patient had earlier received several injections of penicillin, which may have been lethal to the leptospires.

Summary

The occurrence of a case of canicola fever in Ireland is reported. Infection was probably by dog's urine. The case presented characteristic clinical features—namely, abrupt onset with rigors, muscular pain, headache, photophobia, and gastro-intestinal and renal upset. Jaundice was absent. Recovery was rapid.

We wish to thank Dr. J. C. Broom, of the Wellcome Research Institution, London, for his advice and for carrying out the cross-absorption test. We are indebted to Dr. A. H. Diamond for his help with the early clinical details, and to Dr. Mary Uprichard, resident medical officer, Belfast City Hospital, for her painstaking work on the case. Acknowledgment is also due to Dr. V. D. Allison, Director of Laboratory Services, Northern Ireland Hospitals Authority, for his interest in the laboratory work.

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TWO EXAMPLES OF THE -D-/-D- GENOTYPE IN AN AMERICAN FAMILY

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This report deals with unusual findings in both the red blood cells and serum of a 48-year-old white woman (Mrs. V. W.) suffering from tuberculosis. In 1940 she received one bottle of blood following the first stage of a thoracoplasty. No transfusions were required for the two operations performed several months later. In May, 1952, she submitted to partial lobectomy, during which procedure four bottles of blood were administered. Eight days after the operation her serum was found by one of us (O. B. B) to be incompatible with 72 random Group O bloods. The only blood found to be compatible was that of the patient's brother, J. C.

The Red Cells of Mrs. V. W.

The blood groups of the patient (Mrs. V. W.) are: O, NsNs, P+, Lu(a−), kk, Le(a− b+), Fy(a+), Jk(a−), Tj(a+), and Mi(a−); the blood groups of her brother (J. C.) are the same save that he is MNSs and Jk (a+). Only the Rh grouping presented any difficulty.

The red cells of Mrs. V. W. and of her brother were strongly agglutinated by anti-D sera; though not agglutinated by anti-c sera they were only weakly agglutinated by a powerful anti-C serum. The clue to the situation was revealed when it was found that saline suspensions of both samples of red cells were agglutinated by incomplete anti-D. This called to mind the remarkable case of Mrs. B., whose genotype was -D-/-D- (Race, Sanger, and Selwyn, 1950, 1951).

Subsequent investigation showed that the Rh genotypes of Mrs. V. W. and of her brother were indeed -D-/-D-. Saline suspensions of the two samples of red cells were agglutinated by three complete anti-D sera, by 14 incomplete anti-D sera, by five anti-C sera which also contained incomplete anti-D, and by one anti-E serum which also contained incomplete anti-D.

*Dr. R. K. Waller has died since the completion of this report.

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