Lesson of the Week

Paralytic poliomyelitis: a forgotten diagnosis?

E J BELL, M H RIDING, N R GRIST

Control of poliomyelitis by vaccines has made its diagnosis unfamiliar in Britain and other developed countries. Disappearance of this disease may become more apparent than real if poliomyelitis is forgotten and if possible cases do not receive prompt virological investigations. Recent events in several countries with good control programmes remind us that eradication should not be taken for granted and that both individuals and certain groups within well protected populations may still be vulnerable.¹⁻³ When possible cases are encountered investigations should be started without delay. Clear cut evidence is needed to unmask imperfections in the control programme or in the vaccine, possible antigenic variation of poliovirus beyond the range of immunity conferred by current vaccines, or paralysis caused by viruses other than polioviruses.^{4,5}

Paralytic poliomyelitis still occurs in the United Kingdom and possible cases should be investigated without delay

Case reports

Case 1—A 19 year old male student with a possible history of one dose of oral vaccine as a child experienced an acute episode of vomiting and diplopia. This was followed by autonomic dysfunction affecting the bowel, bladder,

TABLE 1—Virological findings in six paralytic illnesses

Case No	Age and sex	Time after onset	Virus isolated	Neutralising antibody titres				
				P1	P2	P3	CA7	CB
1	19 M	10 months	NT	1024	512	≥1024	0	0
2	39 M	4 months	NT	512	512	64	NT	0
		7 months	NT	512	128	64	NT	0
3	48 F	3 weeks	NT	256	64	512	NT	0
		5 months	NT	128	<64	128	NT	0
4	24 F	14 days	NT	64	256	1024	NT	0
		15 days	NT	128	512	2048	NT	0
		1 month	NT	64	256	1024	NT	0
		2 months	NT	64	64	512	NT	0
5	11 months F	14 days	P2	64	<64	<64	NT	NT
		5 weeks	NT	64	128	<64	NT	NT
6	11 months M	5 days	CB2	<64	64	<64	NT	<64 (CB2)
		2 months	NT	<64	64	<64	NT	128 (CB2)

P1=Poliovirus type 1; P2=poliovirus type 2; P3=poliovirus type 3.

CA7=Coxsackievirus type A7; CB=Coxsackievirus types B1-B6; CB2=Coxsackievirus type B2.

NT=Not tested.

which, if unrecognised, might bring a vaccine into disrepute. The rare cases of vaccine associated paralysis particularly merit full and prompt investigation.

During the past four years we encountered six cases which illustrate the problem and some of the difficulties which arise from delayed suspicion and investigation.

Regional Virus Laboratory, Ruchill Hospital, Glasgow G20 9NB

E J BELL, PHD, MRCPATH, head of Enterovirus Reference Laboratory (Scotland)

Scottish Serum Bank, Ruchill Hospital, Glasgow G20 9NB

M H RIDING, MSC, technical assistant

Communicable Diseases (Scotland) Unit, Ruchill Hospital, Glasgow G20 9NB

N R GRIST, FRCP, FRCPATH, emeritus professor of infectious diseases, University of Glasgow

Correspondence to: Dr Bell.

and sexual activity and loss of sweating. He had lost weight, and because of residual symptoms serological investigation was undertaken. Unusually high titres of poliovirus neutralising antibodies were found (table 1) and a delayed diagnosis of paralytic poliomyelitis was made.

Case 2—A 39 year old male steelworker, who had had a single injection of inactivated vaccine more than 20 years previously, was referred to the outpatient department with a three month history of weakness in both legs, low back pain, and weight loss. He had weakness of the hip and girdle muscles, and ankle and knee jerks were absent but plantar responses were normal. Results of serological tests showed unusually high titres of antibody to types 1 and 2 poliovirus with fourfold falling titres to type 2. A retrospective clinical diagnosis of paralytic poliomyelitis was made.⁶

Case 3—A 48 year old female nurse, with a history of incomplete vaccination by injection many years previously, developed a severe headache and transient lower motor neurone palsy of the VIIIth nerve three weeks after a holiday in the Canary Islands, during which she had been swimming. Over the next five months she improved, and a high, fourfold falling titre of type 3 poliovirus antibody was found in sera received from her doctor, indicating a diagnosis of paralytic poliomyelitis.

Case 4—A 24 year old housewife, who was unvaccinated and had been in contact with a neighbour's children who had recently received oral vaccine, developed left hemiparesis with a headache, neck stiffness, and visual dysfunction. She improved during the next month. Results of serological

investigations showed unusually high titres of antibody to type 3 poliovirus, which fell substantially over the next two months.

Case 5—A baby girl developed a paralytic illness two days after her first dose of oral vaccine. She was referred to a paediatrician and type 2 poliovirus was isolated from faeces collected 14 days after she had received the vaccine. A rising titre of type 2 antibody was also found, but the time intervals did not support a diagnosis of paralysis by vaccine virus (see below).

Case 6—A baby boy had a sudden onset of transient weakness of his right arm two days after his first dose of oral vaccine. He was referred to a paediatrician and Coxsackie B2 virus was isolated from faecal samples collected three and four days after the onset of illness. Serological tests showed homotypic antibody response to the Coxsackie B2 virus but no seroconversion to other Coxsackie B serotypes or to polioviruses.

Table I gives details of the virological findings.

Discussion

Despite the inadequate evidence in cases 1-4, the lack of early faecal samples from which to attempt virus isolation, and the incomplete and often late collections of serum samples, antibody

TABLE II—Poliovirus neutralising antibodies found in patients with paralytic illnesses, 1978-85

Year	No tested	No with titres of ≥ 512 or fourfold or greater rise
1978	54	4
1979	39	3
1980	51	2
1981	44	2
1982	39	1
1983	55	3 (2)*
1984	23	1 (1)
1985	18	1 (1)
Total	323	17 (5%)

*Numbers in parentheses refer to cases in table I.

response to poliovirus antigens was shown by the falling titres in cases 2-4 and suggested by the unusually high antibody titres found in cases 1 and 4. These titres must be interpreted against the background of diagnostic testing, in which we found titres of 512 or greater in only 17 (5%) of 323 patients with paralytic illnesses who were tested in 1978-85 (table II).

The combined clinical and virological evidence for a diagnosis of paralytic poliomyelitis is most convincing in cases 2 and 3, and this diagnosis seems at least possible in cases 1 and 4, although the clinical histories are atypical. The laboratory findings in case 4 indicate recent stimulation by poliovirus, possibly through the intermediacy of vaccinated child contacts, but this alone does not

prove that poliovirus caused the illness. Poliovirus infections are often non-paralytic or silent,⁷ and this same proviso applies to case 1.

Because of the known incubation period, the association of paralytic illness with recent exposure to oral vaccine is not considered aetiologically significant unless an interval of 7-30 days has elapsed in the case of a recipient of vaccine or 7-60 days from the receipt of vaccine by a contact.⁸ Even then, the association may be coincidental unless virological evidence suggests otherwise.

Cases 5 and 6 exemplify coincidental association with oral vaccination, with time intervals far too short for the vaccine to have been responsible for the illnesses. It is understandable that antibody response to the vaccine was detectable, and successful bowel colonisation by the type 2 component was shown in case 5. In case 6 the evidence of Coxsackie B2 infection provides an alternative cause for the illness, as previously found by us⁴ and others. Failure to detect either vaccine poliovirus in the faeces of this infant or an antibody response to poliovirus may be the result of in vivo interference by the pre-established Coxsackie virus, as previously noted with Coxsackie A7 virus.⁹

For the maintenance and improvement of control of poliomyelitis, as well as for the peace of mind of doctors and patients, it is important not only to encourage the use of available vaccines but also to avoid delay in the virological investigation of possible cases of poliomyelitis, since delay can destroy the chance of achieving solid proof or disproof of the diagnosis. The public health and sometimes medicolegal importance of these cases requires clinical alertness and a quick response both from doctors of first contact and from specialists to whom such cases may be referred. None of those in our series were specialists in communicable diseases.

We thank Dr A D B Harrower (case 2) and other clinicians, who used our diagnostic service and provided information about these cases, and Dr G Kudesia for virological investigations in case 6.

References

- 1 Bijkerk H. Surveillance and control of poliomyelitis in The Netherlands. *Rev Infect Dis* 1984;6(suppl 2):S451-6.
- 2 Kim-Farley RJ, Rutherford G, Lichfield P, et al. Outbreak of paralytic poliomyelitis in Taiwan. *Lancet* 1984;ii:1322-4.
- 3 World Health Organisation. Outbreak of poliomyelitis. *Weekly Epidemiological Record* 1985;60:258-9.
- 4 Gear JHS. Non-polio causes of polio-like paralytic syndromes. *Rev Infect Dis* 1984;6 (suppl 2):S379-84.
- 5 Grist NR, Bell EJ. Paralytic poliomyelitis and non-polio enteroviruses: studies in Scotland. *Rev Infect Dis* 1984;6 (suppl 2):S385-6.
- 6 MacRury S, Harrower ADB, Bell EJ. Poliomyelitis in an adult male. *Scott Med J* 1985;30:174.
- 7 Spicer CC. The incidence of poliomyelitis virus infection in normal children aged 0-5 years. *J Hyg (Camb)* 1961;59:143-59.
- 8 WHO Consultative Group. The relationship between acute persisting spinal paralysis and poliomyelitis vaccine—results of a ten-year enquiry. *Bull WHO* 1982;60:231-42.
- 9 Grist NR. Further studies of Coxsackie A7 infection in the West of Scotland. *Lancet* 1965;ii:261-3.

(Accepted 10 April 1986)

What are the latest available treatments suggested for infertility where no definite abnormality or "block" is found in either party? Is the use of oral contraception for three months worth trying?

The proportion of cases in which infertility is "unexplained" varies according to the amount of investigation undertaken. In a centre where routine tests included endocrine investigation of the woman, seminal analysis, postcoital and sperm-mucus tests, and laparoscopy infertility remained unexplained in 28% of cases.¹ These patients formed the largest group of couples (the next commonest problem being defective sperm function) and included cases with minor defects of doubtful importance, such as oligospermia, minor endometriosis, or minor adhesions.¹ The many possible causes of unexplained infertility include the "luteinised unruptured follicle" syndrome (in which the ovum fails to leave the follicle even though the ovarian cycle is otherwise normal), occult spontaneous pregnancy, undiagnosed problems with the sperm, and immunological abnormalities.² Among infertile couples pregnancy often occurs without treatment.³ In

unexplained infertility of less than three years' duration, over 80% of couples achieved a pregnancy within 18 months of presenting to a clinic even though no specific treatment was given; and 30% of couples who presented after more than five years of unexplained infertility achieved a pregnancy within 18 months.¹ Because of this high spontaneous pregnancy rate, claims for any particular treatment must be viewed with caution. There is no evidence that a short interval of ovarian suppression with oral contraception causes "rebound" fertility afterwards. It has been suggested that three approaches are currently acceptable: await spontaneous pregnancy, the "empirical" use of clomiphene, or in vitro fertilisation.—JAMES OWEN DRIFE, senior lecturer in obstetrics and gynaecology, Leicester.

- 1 Hull MGR, Glazener CMA, Kelly NJ, et al. Population study of causes, treatment, and outcome of infertility. *Br Med J* 1985;291:1693-7.
- 2 Pepperell RJ, McBain JC. Unexplained infertility: a review. *Br J Obstet Gynaecol* 1985;92:569-80.
- 3 Collins JA, Wrixon W, Jones LB, Wilson EH. Treatment-independent pregnancy among infertile couples. *N Engl J Med* 1983;309:1201-6.