POLIOMYELITIS AT BIRTH DUE TO TRANSPLACENTAL INFECTION

REPORT OF A CASE

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Although the occurrence of intra-uterine poliomyelitis was debatable for many years, evidence has been accumulated that such infection does occur. Indeed, the knowledge that the viruses of other infectious diseases including variola, varicella, morbilli and vaccinia have been shown to cross the placenta, strongly suggests that poliomyelitis and other enteroviruses behave in a similar fashion. Evidence has been presented for intra-uterine infection with an entero-virus other than poliomyelitis, namely, a coxsackie B-group virus in an infant dying with meningo-encephalitis and acute diffuse myocarditis.[1] Proof of a stage of viraemia in poliomyelitis, reported by Ward *et al.*,[2] has drawn attention to the likelihood of intra-uterine infection in a foetus born of a mother in the acute stage of poliomyelitis. In this paper we describe a case of such infection in an infant born to a mother suffering from paralytic poliomyelitis.

During the period October 1954 to December 1957, 581 cases of poliomyelitis in Europeans were treated at the Johannesburg Fever Hospital. Of these 403 cases were suffering from paralytic poliomyelitis and 178 from non-paralytic poliomyelitis. The major epidemic was due to a virulent strain of Type I virus but in 1957 Type III virus was responsible for 20% of cases.

CASE REPORT

A European woman aged 26 was admitted to hospital on 25 June 1956 with an illness of 12 days duration characterized by back ache and vomiting for 7 days and thereafter pain in the head and neck. Tonsillectomy had been carried out many years ago. Gestation was estimated to be of 32 weeks duration. One of her 2 children, a boy aged 3, had been admitted to this hospital 8 days previously with symptoms of paralytic poliomyelitis of 4 days duration. Type I poliomyelitis virus was isolated from his stool.

The obstetrical history of the patient included a Caesarean section in 1952 for placenta praevia and a forceps delivery in 1955. Both infants were healthy. On examination the patient was found to have stiffness of the neck and tightness of the ham-

strings with moderate weakness of the proximal muscle of the left upper and left lower extremities. The size of the uterus was compatible with a gestation of 32 weeks. There was no progression of paralysis after admission.

Laboratory investigations on admission were as follows: Blood count: Haemoglobin 13·5 g.%, WBC 22,000 per c.mm., polymorphonuclears 89·5%, lymphocytes 9·0% and monocytes 1·5%. Cerebrospinal fluid: Polymorphonuclears 24 per c.mm., lymphocytes 42 per c.mm., RBC 150 per c.mm., protein 48 mg.% and sugar 46 mg.%. No bacteria were isolated. Poliomyelitis and coxsackie virus were not isolated from the stool.

Normal labour commenced on 30 June and the patient was delivered of a 5½ lb. female infant. The baby gave a small gasp and failed to breathe. The pharynx was suctioned orally by the sister in charge. Respiration was assisted manually by the use of a Drager Poliomat apparatus. The heart continued to beat normally until death occurred after 1½ hours. Lumbar puncture carried out after the infant's death produced a C.S.F. which was found to contain RBC 2,720 per c.mm., polymorphonuclears 384 per c.mm., lymphocytes 253 per c.mm. and protein 244 mg.%. Type I poliomyelitis virus was isolated from the infant's stool and from specimens of brain, spinal cord and heart tissue at the Poliomyelitis Research Laboratories.

Thirteen days later the nursing sister who had suctioned the child's pharynx was admitted to hospital with severe paralytic poliomyelitis. Type I poliomyelitis virus was isolated from her stool.

DISCUSSION

Intra-uterine infection can be accepted in the case presented since the infant was born with paralytic poliomyelitis due to Type I virus. Although virus was not isolated from the mother, the clinical evidence established beyond doubt that her illness was paralytic poliomyelitis, and the isolation of Type I virus from one of her children suffering from paralytic poliomyelitis a few days before her own illness commenced can be taken as confirmatory.

The first concrete example of intra-uterine poliomyelitis was reported in 1954 by Schaeffer *et al.*[3] Their case appears to have provided the first demonstration of poliomyelitis virus in both placenta and foetus infected during pregnancy during the viraemia stage of the mother's illness.

Swarts and Kercher[4] reported the isolation of Type I poliomyelitis virus from the cerebrospinal fluid of both a mother and her newborn child.

Barsky and Beale[5] reported on 6 infants born to mothers suffering from poliomyelitis. These were drawn from a group of 51 pregnant poliomyelitis patients during 1953 admitted to hospitals in Winnipeg and occurring among a total of 1,158 poliomyelitis patients treated. Meconium and cord blood were examined for poliomyelitis virus. In 3 infants who survived no virus was isolated from stool or cord blood. In 3 stillborn infants Type I virus was isolated from stool but not from cord blood. All the mothers were at, or nearly at, full term on delivery. These authors consider it probable that cases of infection in infants are missed when virus studies are not carried out.

Shelekov and Habel[6] showed that both an apparently healthy infant born in a respirator, and the mother, who suffered from acute poliomyelitis, were infected with Type I poliomyelitis virus. Intra-uterine infection was suggested by the finding of virus in the placental villi and in the rectal ampulla of the infant at delivery. This is probably the first recorded example of an infant born in the acute stage of maternal poliomyelitis who suffered from subclinical poliomyelitis. Antibody titrations were carried out on mother and infant. The mother's serum neutralized Type I virus when undiluted 7 days before delivery and the titre rose to 1 in 256 in 2 months, remaining at that level after 5 months. The infant's antibody in cord serum was low at birth, the titre being 1 in 4 against Type I poliomyelitis virus, but at 2 months and at 5 months the level was 1 in 256.

SUMMARY

A case of intra-uterine poliomyelitis due to transplacental infection with Type I poliomyelitis virus is described.

Part of the available literature on the transplacental transmission of poliomyelitis is summarized.

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REFERENCES

1. Kibrick, S. and Benirschke, K. (1956): New. Engl. J. Med., **255**, 883.
2. Ward, R., Horstmann, D. M. and Melnick, J. L. (1946): J. Clin. Invest., **25**, 284.
3. Schaeffer, M., Fox, M. J. and Li Chen, P. (1954): J. Amer. Med. Assoc., **155**, 248.
4. Swarts, C. L. and Kercher, E. F. (1954): Pediatrics, **14**, 235.
5. Barsky, P. and Beale, A. J. (1957): J. Pediat., **51**, 207.
6. Shelekov, A. and Habel, H. (1956): J. Amer. Med. Assoc., **160**, 465.