severe cases with a single dose. Relatively high carbohydrate diets were used (250 g.) and some extraordinarily high doses of G.I. are quoted; one case received 200 units of G.I. in a single dose (Bauman).

The present investigation is concerned only with the place, if any, of G.I. in the treatment of diabetic patients. To have any value it must be shown to have advantages over either S.I. or P.Z.I. in single daily doses. Lawrence (1943) suggests that G.I. is not significantly different from P.Z.I., but results in the present series do not agree with this conclusion. G.I. has been found to be more active than P.Z.I., often with embarrassing results, as the frequency of insulin reactions has been the greatest difficulty in reaching an adequate single daily dose.

With the dietetic regime used in this clinic globin insulin has a limited place in treatment. It is suitable for mild or moderately severe cases requiring less than 30 units daily, and only for those who are regular in their dietetic habits. The absence of local reactions may be an indication for its use instead of P.Z.I.

Summary

The results of treatment with G.I. in 36 diabetic patients are described. The greatest drawback to its use has been the frequency of hypoglycaemia. G.I. is considered to have a limited place in the treatment of mild and moderately severe diabetes.

I would like to thank Dr. A. P. Thomson and Dr. G. H. Knight, under whose care these patients were treated.

REFERENCES

- Andrews, G. B., and Groat, W. A. (1940). *N.Y. St. J. Med.*, **40**, 913.
Bauman, L. (1939). *Amer. J. med. Sci.*, **198**, 475.
— (1940). *Ibid.*, **200**, 299.
Duncan, G. G., and Barnes, C. E. (1941). *Ibid.*, **202**, 553.
Lawrence, R. D. (1943). *British Medical Journal*, **2**, 103.

A CASE OF PARAPLEGIA AFTER CEREBROSPINAL MENINGITIS

BY

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Paraplegia is one of the many nervous complications of cerebrospinal meningitis, and may be organic or functional (Rolleston, 1919). Most cases occur during the course of the acute phase of the disease and gradually tend towards recovery, although permanent paraplegia is recorded. The pathology may be pressure on the cord due to exudate, haemorrhagic or purulent, and not matting of adhesions or a diffuse meningomyelitis (de Massary and Chatelin, 1910). Lesions localized both to the brain and to the spinal cord have been described (Ribadeau-Dumas *et al.*, 1938).

Onset of paraplegia after the acute phase of the disease has passed off does not seem to have been recorded, but a case of syringomyelia occurring four months after cerebrospinal meningitis has been observed (Guillain *et al.*, 1939). The case here reported is therefore unique in that it occurred one year after the acute phase of the meningitis, and was due to organized adhesive meningitis causing diminution of the blood supply to the mid-dorsal area. Division of these adhesions presumably restored the blood supply, and function very slowly recovered. It must be excessively rare for any spinal compression case to make complete recovery after an interval of 1½ years from the removal of the obstruction, but such is the fact in this case, and the only departure from normal demonstrable in this patient now is a scar on her back.

Clinical History

A child about 12 years old was admitted to Lurgan and Portadown District Hospital isolation ward on March 29, 1940, suffering from acute meningitis. While no meningococci were cultivated, the C.S.F. was slightly turbid and contained pus cells, and was thought to be definitely meningococcal. She was treated with a full course of sulphapyridine orally and antimeningococcal serum intravenously. Her affection ran a subacute course and she was in hospital 5½ weeks, being discharged cured on May 14, 1940.

In March, 1941, the patient began to have difficulty in walking. She first noticed that her right foot was trailing and catching the ground so as to trip her. The weakness gradually increased in both legs. The only other symptom was difficulty in starting micturition. She was admitted to Lurgan and Portadown District Hospital on

May 7, 1941, paralysed in both legs. On examination she was well nourished and in good general condition.

The fundi were normal, and above the waist she was normal in every respect. There was a spastic paresis of both legs, without local wasting. The right leg was more affected than the left. She was unable to sit up from the lying position without assistance. Sensation to light touch was preserved in both legs anteriorly and posteriorly. Appreciation of pain and temperature was lost below the middle of the thigh on both sides. Appreciation of vibration sense was lost below the knees. Muscle and joint sense seemed normal. The abdominal reflexes were absent. The right knee-jerk was brisker than the left. Ankle-jerks were present. Ankle clonus was present on the right side and plantars were bilaterally extensor. The C.S.F. was examined on May 8, 1941, when only a few drops of clear fluid came out under jugular compression. The test was repeated three days later, when, with difficulty, a larger specimen was obtained. It contained 250 mg. of protein per 100 c.cm., a trace of globulin, 700 mg. of chloride per 100 c.cm., 0.025% sugar, and no pus cells. The culture showed a few contaminants.

The sensation now altered, and for a time the patient's replies were unreliable. From the umbilicus upward, sensation was normal; but downwards from the umbilicus sensation became progressively worse until the mid-thigh was reached. From there to the periphery sensation was almost lost. Radiographs of the spine were normal.

On May 28 2 c.cm. of lipiodol was injected into the cisterna magna, and the opaque material was found to be held up at the lower border of the body of the 6th dorsal vertebra. Radiographs six days later showed no further descent of the lipiodol.

On July 3 a spinal exploration was carried out by Mr. W. W. Bassett. The spines of the 3rd to 9th dorsal vertebrae were removed. The dura was exposed and incised vertically, but the arachnoid failed to bulge out. It seemed as if the latter were adherent to the surface of the pia, for the usual "floating" appearance of the cord in the C.S.F. was not seen. The slit in the dura was extended downwards, but no other obstruction was found. About the level of the 7th dorsal vertebra the posterior aspect of the cord looked pale. The adhesions between the dura and arachnoid were separated by blunt dissection, and it was concluded that the lipiodol hold-up had been due to these adhesions. The dura was closed without opening the arachnoid. The patient made a good recovery from the operation, but no improvement occurred in the legs. On Aug. 1 it was noted that they were still spastic. Muscle and joint sense was gone. Vibration sense was present, reflexes were increased, and plantars were still extensor. Pressure sores developed on the skin of the heels.

No further recovery ensued, and the patient was transferred to her home to be nursed there. Nothing more was heard from her until Jan. 18, 1945, when she walked up to the hospital to allow me to examine her. Her subsequent history is interesting.

It is now 3½ years since the operation. Three months after leaving hospital sensation slowly began to return. She lay in bed unable to move for 1½ years after operation and then began to move her legs. Shortly after this she started to crawl around the house. This stage lasted three months, and then she got two sticks and walking improved further. The sticks were used until Sept., 1944, since when there has been no disability. Her longest walk up till now has been three miles, but she says she could go much further. Examination showed no spasticity in either leg and no wasting; co-ordination was normal. Sensation to all forms was normal. The reflexes were present and equal and the plantars were flexor. The cranial nerves and upper limbs were also normal. Apart from the healed wound on the back it would have been impossible to say that the patient had ever had spinal compression.

I am indebted to Mr. W. W. Bassett, F.R.C.S., surgeon at Lurgan and Portadown District Hospital, for his valuable help in this case.

REFERENCES

- de Massary, E., and Chatelin (1910). *Rev. neurol.*, **18**, 613.
Guillain, G., Mollaret, P., and Délay, J. (1939). *Bull. Mém. Soc. méd. Hôp. Paris*, **55**, 56.
Ribadeau-Dumas, L., Siguier, M., and Gharib (1938). *Pratique méd. franç.*, **19**, 35.
Rolleston, Sir H. (1919). *Lancet*, **1**, 541, 593, 645.

A report in the *Scotsman* states that the trustees of the Nuffield Provincial Hospitals Trust have agreed to make a substantial annual grant for a period of years towards the work of the rehabilitation department of Glasgow Royal Infirmary. The grant will be used to establish associated clinics in some of the outlying parts of Lanarkshire and neighbouring counties. It has been found that many patients attending the department did not complete their treatment at the Infirmary owing to difficulties and expenses of travel, and the new clinics should be of great value in encouraging patients to attend for the follow-up treatment and regular examination essential to the restoration of injured workers to full capacity for work. The facilities of the clinics will be available to all patients irrespective of the hospital they may be attending.