Electrocoagulation of Cord and Nerve Roots in the Treatment of Spasms of Bladder and Lower Limbs

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One of the most severe complications in paraplegia is spasm of the bladder which at times becomes so severe that even in spite of indwelling catheters or cystostomy, obstruction is experienced at the ureteric orifices and as a result, hydroureters and damage to the kidneys result. Frequently co-existent with spasms of the bladder there are severe and sometimes painful spasms of the legs which aggravate the patient’s disability and interfere severely with nursing care, often leading to the development of pressure sores.

Numerous neurosurgical procedures have been adopted in the past for combatting the above complications of paraplegia. Of those most widely practiced, alcohol injection and excision of segments of the cord should be mentioned. The refinements described by Bradford have made injection of alcohol into the lumbosacral theca a relatively safe and effective measure. This procedure has been used frequently in our unit.

While injections of alcohol have, in our experience, proved quite satisfactory, occasional failures have been experienced when repeated injections had to be performed, and because of arachnoiditis each repeated injection gave a lesser effect. A case will be described in which a different procedure was used after an initial failure with injections of alcohol.

Case Report

Mr. P.M., a 45-year-old male, was seen at the V.A. Hospital, Houston, with a history of traumatic paraplegia of T11 for 4 years. At the time of admission the patient was using a Foley catheter. He had had a bilateral vasectomy and a transurethral resection of the prostate and neck of the bladder in 1960.

Examination showed a pyrexia, which was found to be caused by epididymitis, and paraplegia which appeared to be to the level of T11. In spite of the paraplegia, the patient complained of painful sensations in both legs of a diffuse, burning, aching nature which varied at times, but which were quite constant. He also had spasms in his lower limbs which were quite sudden and unpredictable and which were accompanied by exacerbation of pain. It should be noted that the patient had no sensory perception to stimulation below the T11 segment.

Course. After treatment of the infection the patient had severe spasms of the bladder, and it was therefore felt by the Urology Service that an alcohol rhizotomy should be performed.

He was transferred to the Neurosurgical Service and two successive alcohol rhizotomies were performed with the Bradford technique.

Shortly after the injections of alcohol, a vesicotomy was performed, but within a period of weeks severe spasms of the bladder developed again. In view of the fact that two injections of alcohol had resulted in abolition of the spasms for a period of only 10 weeks, it was decided that a more permanent procedure was indicated.

Test of New Procedure. Rather than perform a laminectomy and excise the conus medullaris with all the roots in this area, a new procedure was developed and tested on the spinal cord of a live dog. The procedure consisted of introducing a large-bore needle into the spinal canal and through it an insulated stainless-steel stylet, the stylet having been threaded previously through a tube of Teflon which had been stripped from a Teflon-coated wire. Fig. 1 shows the Teflon-coated stylet with two rectangular bends at the upper end to keep the Teflon tubing in place, the two ends of the stylet being bare, and a 13-gauge needle. Diathermy current was applied through it. It was found that satisfactory coagulation of the spinal cord could be achieved in the animal. This was relatively independent of the size of the stylet.

Operation. The patient was prepared for the procedure. A general anesthetic was used. The 4½”, 13-gauge needle was introduced into the theca until it struck the body of the vertebra, then withdrawn slightly, and approximately 3 mm of the stylet were left exposed to act as a coagulating electrode, while the usual diathermy
plate was applied to the buttocks of the patient. Coagulation diathermy was applied to the stylet, using the 35 setting on the Bovie machine and using 10 bursts of coagulation, each lasting 5 to 10 sec. Towards the end of this procedure steam could be seen issuing from the spinal needle around the stylet, confirming that destructive heat was being generated.

While the coagulation was being applied, considerable jerking of the legs was noted but with each successive application of the current, the jerking diminished until at the last application the jerking was more in the nature of a twitching response.

It appeared that this was probably enough destruction in the region of the conus but in view of the fact that the patient also had dysesthesias in his lower limbs, it was decided to perform a further lesion just above the level of the paraplegic denervation. The needle and stylet were introduced in the same fashion at the level of T7-T8 and again destructive coagulation was performed in the manner described before. Again, when steam was seen to issue from the needle, the procedure was discontinued.

**Course.** Following recovery from anesthesia the patient felt quite well, experienced only a mild headache and had a low pyrexial reaction which passed within 48 hours.

No difficulties were encountered with the sites of puncture and the patient was discharged from the hospital after a period of observation lasting 1 month following the coagulation. At this time he had no evidence of any recurrence of spasms of the bladder or legs. However, the dysesthesias in his lower limbs recurred soon after the operation, though at a reduced level, this being estimated a 50 per cent improvement by the patient.

The patient was seen again 3 months following the procedure of coagulation and at that time his state was entirely stable. He had not had any recurrence of spasms of the bladder. There were no spasms of the lower limbs but the dysesthesias remained unchanged, i.e., somewhat improved but still troublesome.

**Summary**

A method of electrocoagulation of parts of the spinal cord and nerve roots has been described. This method was found to be useful in a case of persistent spasms of the bladder and lower limbs, after two preliminary injections of alcohol had produced only a temporary benefit.

The procedure is simple and easy to perform. Materials are easily available and can be made up in a few minutes without any special instruments. The result thus far has been satisfactory and without any obvious undesirable side effects.

**Reference**