SUBARACHNOID ALCOHOL BLOCK IN PARAPLEGIA
ITS BENEFICIAL EFFECT ON MASS REFLEXES AND BLADDER DYSFUNCTION*
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Involuntary reflex spasm of the paralyzed muscles is present to some degree with most patients following permanent injury to the spinal cord. The etiology of these powerful muscular contractures remains a mystery. Likewise, the absence of this mass reflex in some patients is equally difficult to explain.

Immediately after injury a period of so-called spinal shock exists, during which the paralysis is of a flaccid character. Some weeks later reflex activity reappears and may progress to marked hyperactivity and involuntary muscular spasms. At times the reflex spasm, evoked by simply touching the skin over the paralyzed area, may be so powerful that it is physically impossible for the examiner to overcome the strength of the muscular contractions.

Why are these mass reflexes so important in the management of the paraplegic patient as to justify the injection of absolute alcohol in large amounts into the subarachnoid space? Every paraplegic patient’s greatest desire is to walk, even though it may be only with the aid of braces and crutches. The mass reflexes serve as a formidable obstacle to this achievement. The patient cannot maintain an erect position even if he is physically able to handle crutches with his arms and shoulders. Flexion deformities are frequent, often with secondary structural contractures. These add to the patient’s discomfort and increase the danger of trophic ulcers. Control of ulcerated areas, much less repair, is impossible if the deformities persist.

Reflex spasm frequently involves the pelvis and abdomen. The urinary problem is increased because of reflex bladder spasm. If a urinal is used, violent spasms may result in more frequent wetting of the bed, thus adding to the patient’s discomforts and the nursing problems. Abdominal spasms are a source of great annoyance to the patient, at times painful, and greatly interfering with his rest and sleep.

Anterior rhizotomy has been used to relieve mass flexion reflexes with excellent results in selected cases. The procedure consists in section of the anterior spinal nerve roots from the 10th thoracic through and including the 1st sacral nerve root bilaterally. Thus, the spastic paralysis of a spinal cord lesion is converted into the flaccid paralysis of a lower motor neuron lesion.

Technically, this procedure is successful in overcoming the disabling

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spasticity, but from the patient’s standpoint the method has much to be
desired. Even though the lesion is known to be complete, the patient still
lives in hope that some return of function will occur, or that science will yet
learn some new method of utilizing the powerful muscular strength being
wasted in reflex contractions. He can hardly be condemned for the latter
idea, as the combination of voluntary paralysis with excessive involuntary
muscular power is difficult for him to accept.

Section of the motor nerve roots does away with all hope of recovery.
The psychic trauma must be great, and this element of the patient’s illness
must not be neglected. If the spinal cord lesion was not anatomically com-
plete at the time of local exploration, no one can honestly assure a patient
within the first 2 or 3 years that some degree of recovery is impossible, even
though experience would make the prospect negligible. Every patient has
heard of someone who has had slight return of function after a long period
of complete paralysis.

From the surgical standpoint, rhizotomy is satisfactory, but identifica-
tion of the proper nerve roots is not as simple as generally considered. Mun-
ro’s concept of the last dentate ligament as a guide to the 1st lumbar nerve
root has not been supported by recent anatomico-surgical studies.4,9

There was a definite need of a simpler method that would achieve the
same result as rhizotomy; in other words, a procedure for paraplegics that
is comparable to alcohol injection for major trigeminal neuralgia.

Subarachnoid alcohol injection fulfills the desired criteria. The method
is simple, requiring only a lumbar puncture. Systemic effects are negligible,
and the relief of spasticity is immediate.

Subarachnoid injection of alcohol has been employed for years for con-
trol of pain, but the amounts used have never been sufficient to control
spasticity except for the recent work of Pudenz and Nourse,14 whose data are
soon to be published.

Selection of patients for alcohol injection was based on the severity of
the mass reflex and the status of their urinary bladder. No patient was con-
sidered a candidate for injection if he had any degree of voluntary bladder
control or if he had developed a reasonably satisfactory type of automatic
bladder function.

All patients injected had a complete paraplegia of both legs of at least
1 year’s duration with no evidence of improvement in their motor function.

Pre-injection studies include a complete check2 of testing the bulbo-
cavernosus reflex, the amount of residual urine, cystoscopic, cystometric,
sphincterometric and cystographic examinations (as part of urographic stud-
ies) with and without spinal anesthesia.* Spinal anesthesia in connection
with these examinations proved to be of value for the future prognosis of
the respective bladder conditions. The importance of cystography in the

* These examinations were carried out by Dr. Stanley H. Moulton. A description of method and
detailed study of results is being prepared.