SELECTIVE SACRAL NEUROTOMY FOR HUNNER'S ULCER

T. H. MASON, M.D., G. L. HAINES, M.D., AND B. W. LEVERSEE, M.D.

Neurosurgical and Urological Services, Ellis and St. Clare's Hospitals, Schenectady, New York

(Received for publication April 28, 1958)

Chronic interstitial cystitis with ulcers in the summit of the bladder was described by Hunner in 1915. Individuals, so afflicted, presented long histories of frequency of urination and jabbing knife-like pain in the lower abdomen. Occasional leukocytes or red cells were found in the urine. A most thorough cystoscopic inspection was necessary in order to detect the ulcers, because of their position in the vertex of the bladder wall. Various therapeutic procedures were utilized without sustained relief.

A review of the literature indicates that the natural history is one of chronic increasing interstitial cystitis with gradual diminution in capacity of the bladder. The exact etiology is obscure. On cystoscopic examination the mucosa bleeds and cracks with increased distension. The total volume is usually not more than 150 cc. Surgical excision, fulguration, and elimination of foci of infection, as well as direct chemotherapy are palliative in nature. The utterly miserable existence of these individuals, suffering with deep abdominal pain and voiding hourly, presents an exacting problem.

The physiological basis for interruption of the sacral nerves to improve the function of the bladder has been corroborated by numerous investigators. Heimburger et al. demonstrated by procaine injections that the anterior division of the third sacral nerve rendered the dominant innervation to the human bladder. It has long been proven that sympathetic innervation does not significantly alter function of the bladder in man. Meirowsky et al. included the sacral nerves in their rhizotomies for spastic paraplegia and established bladder automation in most cases. Patton and Schwartz were of the opinion that the spastic and painful impulses entered the sacral nerves and traveled to the internuncial pool of the spinal cord. Efferent stimuli ensued over the sacral and lumbar nerves. A reduction in the number of impulses by nerve-root interruption reduced the maximal effect in the spinal cord and diminished the intensity of the efferent stimulation reaching the neck of the bladder. They claimed that the validity of this could be tested by the effectiveness of the sacral nerve section for spastic neurogenic bladder.

A neurosurgical approach to Hunner's ulcer was stimulated by Moulder and Meirowsky. The latter had worked extensively with paraplegics and had shown that the spastic, small-volume bladder could be restored to an adequate size by selective section of the sacral nerve. Prior to surgery, nerve blocks at the S2, S3 and S4 foramina provided sufficient information regard-
SELECTIVE SACRAL NEUROTOMY FOR HUNNER'S ULCER

ing increased capacity to warrant section of the desired nerves. Moulder and Meirowsky applied this technique to Hunner's ulcer with an excellent immediate result and this was reported in 1956.\textsuperscript{13}

**TECHNIQUE**

Maximal increase in bladder capacity was determined by selective procaine blocking of the S2, S3 and S4 nerves in pairs on succeeding days. Twenty-gauge spinal needles were inserted to the margins of the desired sacral foramina. A radiograph was taken to determine their exact sites. Three cc. of 2 per cent procaine were injected bilaterally after the needles had been advanced through each foraminal diaphragm. The bladder was distended to its maximal point of tolerance, 15 minutes after the blocking procedure. The filling volume was compared with the pre-anesthetic capacity. Cystometric fluctuations were recorded with each procedure. The S3 combination provided the best response in each patient.

The operation consisted of a midline sacral incision with reflection of the paraspinous muscles. The S2, S3 and S4 foramina were enlarged with curettes and the Kerrison punch. Each posterior branch of the sacral nerve was preserved when possible and gentle traction upon it elevated the larger anterior division within the fatty tissue of the sacral canal (Fig. 1). The nerve at this point is distal to the ganglion and encased in perineurium and epineurium. Careful dissection allowed this deep

![Fig. 1. Posterior branch of the third sacral nerve elevated on a blunt hook after foraminal enlargement. Anterior division comes into view with this maneuver. (Postmortem dissection)](image)