

SELECTIVE SACRAL NEURECTOMY IN INTERSTITIAL CYSTITIS WITH A MINIMUM 18 MONTHS FOLLOW-UP*

WILLIAM A. MILNER, M.D., F.A.C.S. and WILLIAM B. GARLICK, M.D., F.A.C.S.
Albany Medical School and Hospital, New York State, USA

In the past, far advanced interstitial cystitis carried almost no hope for cure except by cystectomy with associated uretero-sigmoidostomy or diversion of the urine to the skin. The fact that a certain number of patients accepted this rather than go on with their disease was proof positive of the discomfort they had suffered. The purpose of this paper is to merely carry the follow-up a bit farther on cases reported by one of us at the American Urological Meeting a year ago. Most things are of value only if they are capable of standing the 'test of time'.

We have followed the rule that this operation should be reserved for the grade-III classification of Hand, also employed by Engel, Meads and O'Connor. This grade represents the most advanced stage of the disease, where the lesions are usually diffuse and fissure readily on distension; the bladder capacity is usually greatly reduced. All of our cases fell into this classification and all had received all of the known therapies without more than just transient relief.

A. M. Meirowsky, of the department of neurosurgery at Vanderbilt University School of Medicine, by personal letter to our late Professor of Neurosurgery, Dr. Eldridge Campbell, informed him of 2 cases of Hunner's ulcer treated by differential sacral neurotomy. Dr. M. K. Moulder of the Department of Urology suggested this and worked with Dr. Meirowsky to pioneer this procedure on selected cases. A report of this work was published in the *Journal of Urology* about 2 years ago.

Meirowsky discovered, some time previously, while working with paraplegics, that differential sacral neurotomy increased bladder capacity through a reduction in the parasympathetic outflow to the detrusor and of the sacral somatic outflow. The results of these studies prompted his experiments with Hunner's ulcer.

Our department of neurosurgery, headed by Dr. Eldridge Campbell until his untimely death, and later by Dr. Robert

Whitfield, became interested in the problem. We were most happy to find some sort of relief for a small group of people with this miserable disease for which we had been able to do practically nothing except occasional transient palliation—and this was very occasional.

Our series consists of 6 patients, all grade-III according to Hand, who were studied and operated upon between December 1955 and February 1957. All were female. The range in age was from 35 to 69, with an average age of 54. Their symptoms had been present between 5 and 12 years, with an average of 9.2 years. All had severe pain. All had had the large variety of treatment prescribed but only one had had a partial cystectomy. Two had gross hematuria. In every instance, the ulcers had been observed cystoscopically on several occasions.

Cases indicated for this procedure consist of those with Grade III lesions in which all known methods of treatment have failed save cystectomy, and in which nerve blocks produce a definite increase in bladder capacity.

METHOD

Pre-operative Observations. Before operation, selective blocks of the sacral nerves were made under radiographic control. Bladder capacity was determined before and after

TABLE I. OBSERVATIONS AT THE TIME OF BLOCK

Patient	Nerves blocked	Bladder Capacity (c.c.)		Bladder Pressure (mm. water)	
		Before	After	Before	After
1. B.H.	S3	45	170		not measured
2. H.I.	S3	30	200	600	430
3. M.P.	S3	175	200	320	240
4. C.A.	S3	290	380	170	160
5. R.S.	S3	25	60	240	220
6. A.H.	S3	85	175	220	250

block, and the intravesical pressure at maximum distention was also established. The results are recorded in Table I. Operation was not advised in those cases where there was little increase in capacity following block, in accordance with Meirowsky's work.

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Operative Exposure. A mid-line incision was made over the sacrum. The musculature was stripped back beyond the sacral crests bilaterally. The sacral foramina were identified by reference to the spinous process of the 5th lumbar vertebra. The 2nd and 3rd sacral foramina were unroofed, the nerves (anterior primary rami) freed and, in the 4 later cases, the 2nd and 3rd sacral nerves stimulated in turn, while cystometrographic observations were made. A member of the group estimated by digital examination the contractions of the anal sphincter and of the levatores ani. This stimulation of the nerves at the time of operation, was an innovation conceived by Dr. Campbell after the first 2 cases had been done, for he felt that this would aid in selecting the proper nerves to be sectioned. The 3rd sacral nerves were sectioned and a small piece removed to prevent regeneration, in all 6 cases. Hence the term 'neurectomy' rather than 'neurotomy'.

Observations at Operation. Table II records the results of stimulation of S2 and S3 in the last 4 cases. In 2 instances S2 gave marked bladder response but in the other 2 only

TABLE II. OBSERVATIONS AT OPERATION

Patient	Nerves stimulated bilaterally	Change in Bladder Pressure (mm. water)	Rectal Sphincter Spasm	Contraction of Levator Ani	Nerves divided bilaterally
2. H.I.	S2	320-450	marked		
	S3	320-380	slight		S3
4. C.A.	S2	none	marked	none	
	S3	200-600	none	moderate	S3
5. R.S.	S2	none	none	moderate	
	S3	240-600+	marked	none	S3
6. A.H.	S2	380-440	slight	slight	
	S3	380-600	slight	marked	S3

No stimulation cases 1-3.

S3 had any effect on the bladder. S2 seemed to have more effect on the contractions of the rectal sphincter and levator ani but no conclusions can be drawn from this small experimental group.

RESULTS

Table III records the post-operative results, as far as the bladder is concerned, in the first few weeks following opera-

TABLE III. POST-OPERATIVE RESULTS (BLADDER)

Patient	Nerves divided	Bladder Capacity (c.c.)		Frequency		Healing of Ulcer
		Pre-op.	Post-op.	Pre-op.	Post-op.	
1. B.H.	S3	45	180	10 min.	4 hr.	Yes
2. H.I.	S3	30	300	20 min.	3 hr.	Yes
3. M.P.	S3	175	200	15 min.	3 hr.	No
4. C.A.	S3	290	300	1 hr.	6 hr.	Yes
5. R.S.	S3	25	75	10 min.	2½ hr.	Yes
6. A.H.	S3	85	195	30 min.	4 hr.	Yes

tion. Frequency and pain were relieved in all the cases except one and she was improved as far as frequency was concerned but still had some pain and an unhealed ulceration. All the other bladders showed good capacity and no evidence of ulceration.

Table IV shows the post-operative neurological deficits. In spite of some diminution in rectal sphincter tone, there

TABLE IV. POST-OPERATIVE DEFICITS

Patient	Rectal Sphincter Tone—% of normal	Rectal Incontinence	Neurologic Deficit
1. B.H.	75%	none	none
2. H.I.	75%	none	Hypalgesia, lateral left thigh
3. M.P.	75%	none	Hypalgesia, S3. Absent gluteal reflexes
4. C.A.	50%	none	Perineal numbness subjective
5. R.S.	75%	none	Absent ankle jerks
6. A.H.	75%	none	none

was no rectal incontinence. Hypalgesia and perineal numbness were present in some patients. This hypalgesia was not severe and disappeared after a few weeks. Not one patient complained of this pain, for this was so minor compared to the previous vesical difficulties. None of the patients had residual urine or any difficulty voiding.

Table V represents a follow-up of the patients 1 year ago. It will be noted that the results have been excellent in all but one case. Interestingly enough, this patient (case 4), while not under our supervision, developed an ulcer in her urethra with almost complete loss of the urethra up to the vesical neck. A suprapubic cystotomy was done to preserve the

TABLE V. FOLLOW-UP

Patient	Time post-op. (months)	Bladder Capacity (c.c.)	Frequency	Healing of Ulcer	Symptoms
1. B.H.	17	450	4 hrs.	Yes	none
2. H.I.	14	375	3 hrs.	Yes	none
3. C.A.	12	300	3½ hrs.	Yes	none
4. M.P.	11	150	2 hrs.	No	Pain Bleeding none
5. R.S.	13	160	3 hrs.	Yes	none
6. A.H.	6	430	4 hrs.	Yes	none

vesical neck from further ulceration and to control haemorrhage, which had been severe, and strangely enough her bladder has now nearly healed of her previously present Hunner's ulcer. Some time in the near future, when the ulcer is entirely healed in the urethra, it is hoped a reconstruction of the urethra can be accomplished.

All of the other 5 patients have been checked regularly and there has been no recurrence of ulcer and no diminution of bladder capacity. One of the patients complains of a few symptoms of frequency without any objective findings to substantiate the cause.

This is a small series with a short follow-up, but at the present time the results warrant a continuance of this procedure in selected cases. As more and more cases are treated by this procedure, our knowledge will increase and the evaluation of the treatment can then be estimated. It may be necessary in some cases to section S2, as has been done in certain neurogenic bladders. We are indebted to Drs. Moulder and Meirowsky for initiating this procedure and to Drs. Campbell and Whitfield for so ably carrying on this work.

SUMMARY

1. Six patients having undergone post-sacral neurectomy for the cure of interstitial cystitis are reported.
2. In all cases blocking of the 3rd sacral nerve contributed to the bladder detrusor activity.
3. In 2 cases blocking of the 2nd sacral nerve contributed to bladder detrusor activity and in 2 cases produced no response.
4. In 5 cases there has been complete healing of the lesions with return of bladder capacity to normal, and no return of symptoms. In one case the result has not been 100% but there has been definite improvement.
5. It would seem that after an average of 24 months one should be able to state that post-sacral neurectomy is definitive and the treatment of choice for all interstitial cystitis falling into Grade-III classification.

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