

A NEW TECHNIQUE FOR SURGICAL CORRECTION OF VESICoureTERAL REFLUX

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ABSTRACT

For more than 2 decades a major problem in pediatric urology has been the medical and surgical management of vesicoureteral reflux. Many effective surgical procedures have been advocated and used. A new surgical technique, particularly effective in patients with megatrigrone, has been used in 38 children and adults with excellent results. The technique involves a single stitch that imbricates the trigone, effectively lengthening the intramural segment of terminal ureter.

For about 25 years the medical and surgical management of vesicoureteral reflux has been a topic of primary interest, particularly in pediatric urology. Numerous surgical techniques have been used, the majority of which are successful in eliminating reflux. The more widely applied techniques include the Politano-Leadbetter method,¹ the procedure advocated by Gregoir and Van Regemorter,² and Lich and associates³ and, more recently, the operation described by Cohen.⁴ In all of these procedures the juxtavesical ureter must be dissected free and thoroughly mobilized. A new technique that is simple and rapidly accomplished without mobilization of the distal ureter is described.

The evolution of this surgical technique is based upon several considerations. It is recognized that lateral ectopia and megatrigrone frequently are associated with vesicoureteral reflux.^{5,6} In the presence of megatrigrone there is an increased distance between the ureteral orifices and the vesical outlet. The anatomical investigations of Gil Vernet indicate that the intrinsic muscular fibers of the transmural ureter may provide sphincteric action in preventing reflux.⁷⁻⁹ These observations, confirmed by Ruano and associates,¹⁰ suggest that preservation of the investing musculature of the terminal ureter may be important in reflux prevention.

TECHNIQUE

The principles of the operative technique are shown schematically in figure 1. The terminal ureters, including the intrinsic musculature, are advanced across the trigone. Traction sutures demonstrate the mobility of the ureters for this maneuver. At completion of the procedure the ureteral orifices lie near the midline, the length of intramural submucosal ureter has been increased, and the intrinsic and extrinsic musculature of the terminal ureters has been preserved.

The procedure involves a transverse Pfannenstiel incision with a transverse cystotomy, exposing the base of the bladder (figs. 2 to 4). Indwelling ureteral catheters are placed for the duration of the procedure and traction sutures are taken at each ureteral orifice to effect subsequent approximation of the ureters. A transverse incision is made through the mucosa across the superior aspect of the trigone between the ureteral orifices. The mucosa is then elevated from the underlying musculature of the trigone and base of the bladder. A single nonabsorbable (3-zero polypropylene or other nylon) mattress suture then is taken at the base of each ureter, including the periureteral sheath of Waldeyer and the intrinsic ureteral musculature, avoiding perforation of the ureteral mucosa. When this stitch is secured the ureters are advanced and approximated near the midline, increasing the intramural length of

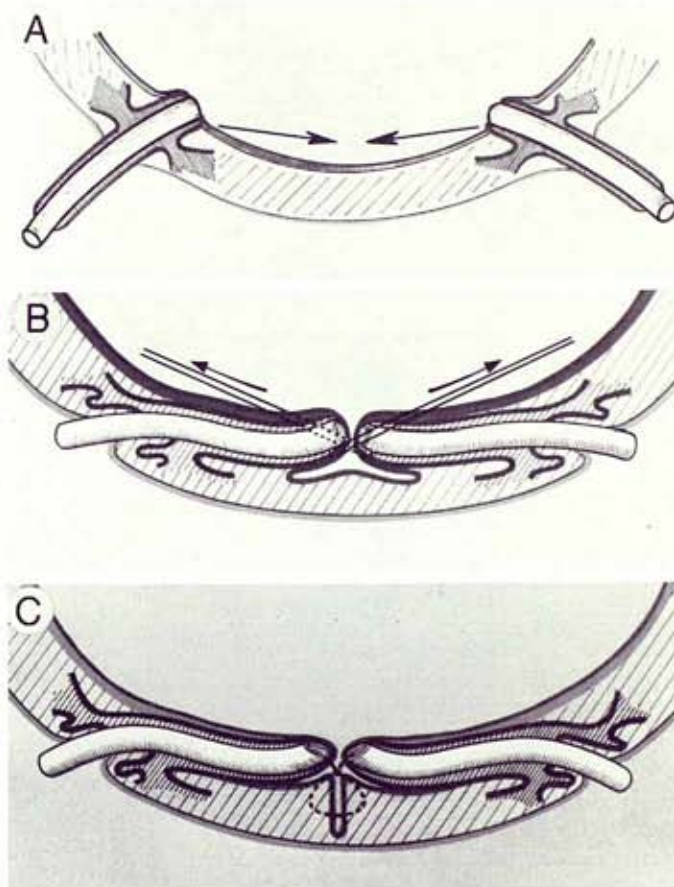
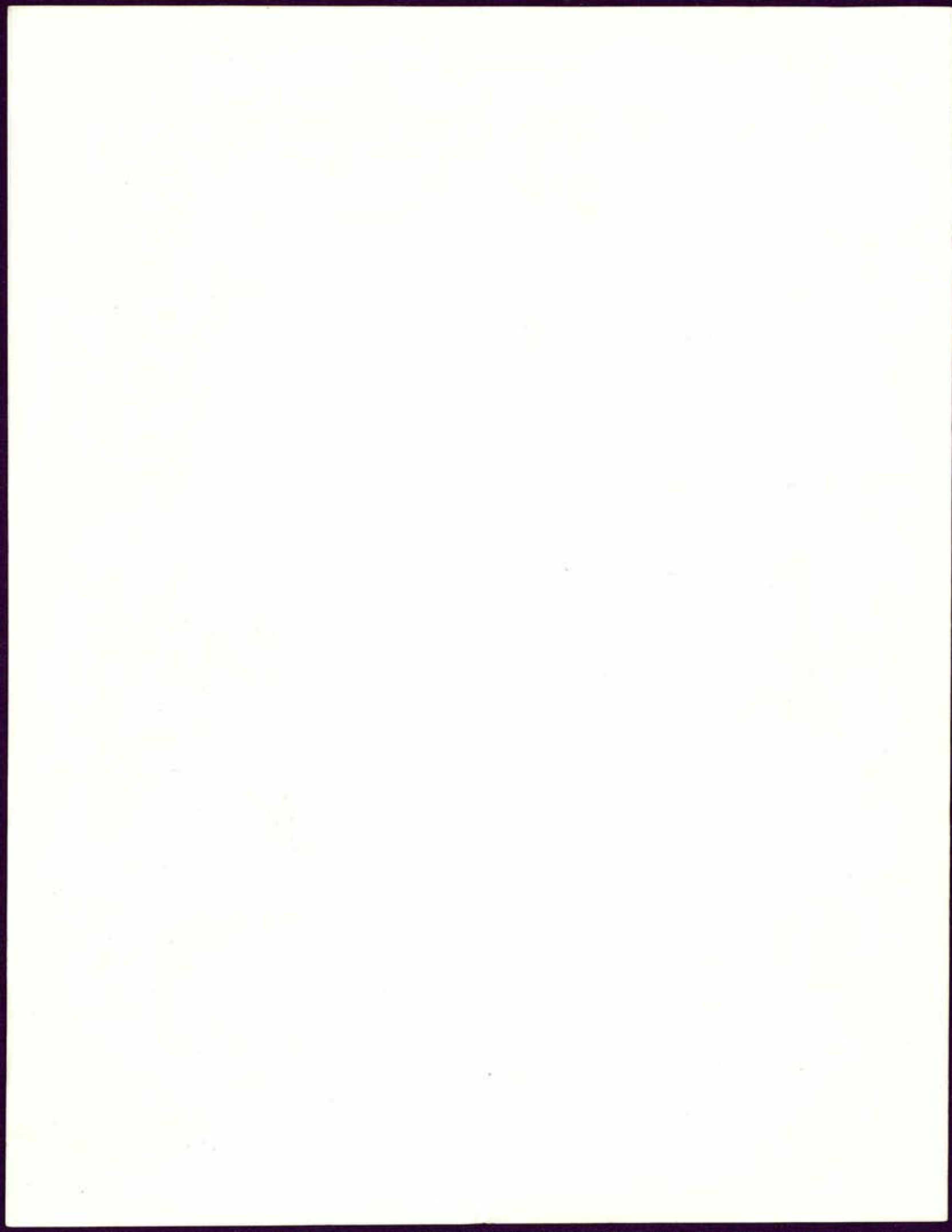


FIG. 1. Schematic representation of technique. A, principle involves advancing ureters across trigone. B, traction sutures are used to demonstrate desired result. C, on completion ureteral orifices are in close proximity near midline and submucosal length of ureter has been increased, preserving intrinsic and extrinsic periureteral musculature.

each distal ureter. The single nonabsorbable suture is then buried by placing 2 additional sutures of absorbable material (2-zero polyglycolic acid) through the bladder mucosa and musculature. Finally, the mucosa is approximated vertically with multiple interrupted fine absorbable sutures, ureteral catheters are removed, a Foley catheter is positioned, and the bladder and suprapubic incisions are closed in routine fashion.

DISCUSSION

This technique has been used indiscriminately in cases of unilateral and bilateral reflux, in almost all instances for cor-



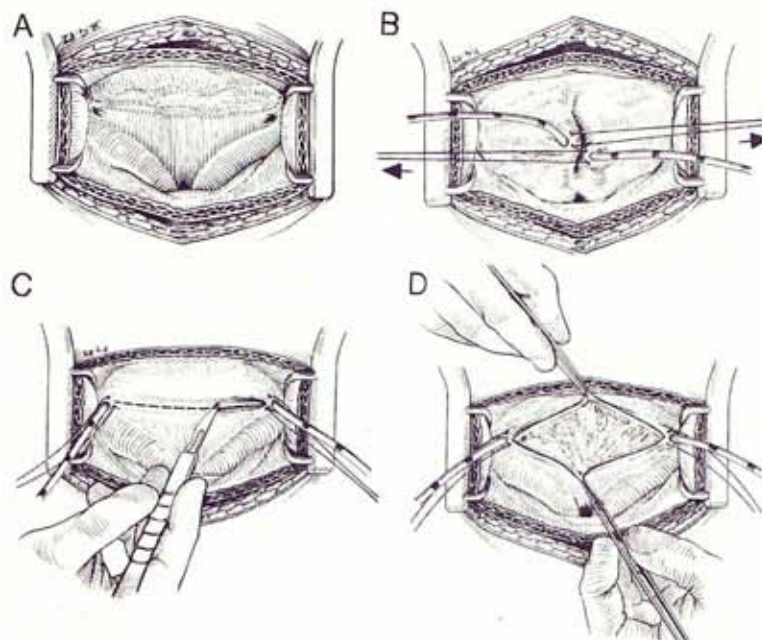


FIG. 2. A, transverse cystotomy exposes trigone. B, with indwelling ureteral catheters, traction sutures approximate orifices. C, mucosal incision is across trigone. D, mucosa is elevated from underlying muscle fibers.

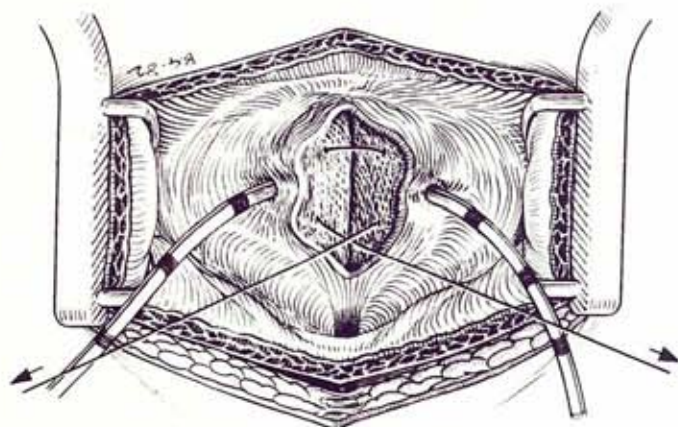


FIG. 3. Trigone is imbricated by securing single suture

rection of primary (congenital) vesicoureteral reflux. Essentially, all grades of reflux, including grades III and IV, have been corrected by this technique. The method has not yet been used in instances of neuropathic bladder associated with reflux but it may be speculated that it would be equally efficacious in such instances.

From July 1981 to July 1983, 20 adults and 18 children were operated upon for correction of reflux by this technique. Followup studies at 3 to 6 months included cystoscopy, voiding cystourethrograms and excretory urography. Success was judged by absence of reflux, absence of obstruction and satisfactory clinical course. Among the 38 cases 36 were successful and 2 were failures. The 2 failures were early cases in which the imbricating mattress suture in the trigone was of absorbable material and apparently disrupted, allowing the ureters to retract to the original position. In both cases reoperation using a nonabsorbable nylon mattress suture was readily accomplished and was successful.

The advantages of this technique include simplicity and rapidity of accomplishment, as well as the development of a satisfactory length of submucosal ureter with preservation of the intrinsic musculature of the distal ureter. The procedure

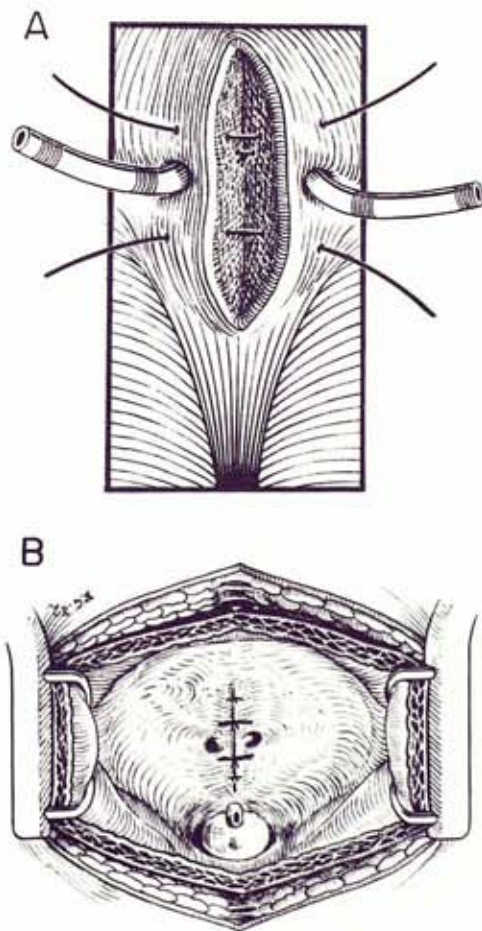


FIG. 4. A, knot of nylon suture is buried beneath absorbable sutures. B, after closure of mucosa, ureters lie near midline at completion of operation with removal of ureteral catheters and placement of Foley catheter.

can be recommended as a logical and physiological method for correction of vesicoureteral reflux.

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EDITORIAL COMMENT

The author is an outstanding surgeon and has made another valuable contribution. Through the medium of a surgical motion picture I have had an opportunity to see him accomplish this procedure and it is, indeed, simple and rapidly accomplished. He reports total success in

the first 38 patients, although 2 required reoperation using the same method. This is remarkably good, although virtually all of the widely used surgical methods for correction of reflux now provide success, as measured by correction of reflux without causing obstruction, in 95 per cent or more of all cases.

The author embraces the concepts of intrinsic ureteral muscular function proposed by his father, Prof. Salvatore Gil-Vernet, and this is in part reminiscent of the early observations of Hutch.¹ The technique itself further reminds us of the concept of intravesical intussusception encompassed in the antireflux procedure proposed by Williams and associates.² In addition, advancement across the trigone is an essential part of the distal tunnel ureteral reimplantation method of Glenn and Anderson.³

One might express concern that there will ultimately be failures in patients operated on by this technique, either initially or later due to lateral drift of the ureters. Furthermore, not all ureters so advanced may have sufficient transmural length to prevent reflux despite satisfactory technical accomplishment of the procedure. Finally, one might worry about the nonabsorbable suture migrating to the mucosal surface to provide a focus for infection or a nidus for stone formation. Despite these considerations, this interesting technique might well be used by other surgeons for further evaluation.

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