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Pudendal Nerve Injury Induced Intrinsic Sphincter Deficiency and Urinary Incontinence

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CASE PRESENTATION

A 23-year old lady had suffered from urinary incontinence since she was 8 years old after an accident involving a perineal stab wound through the left side of perineum. The stab wound penetrated her urinary bladder but did not damage the urethra or vagina. Stress urinary incontinence (SUI) during walking or coughing developed after that accident. Since that time, she needed to use pads to prevent soiling by urine. She had received a collagen urethral injection twice, at the 15 and 16 years of age, but this treatment failed to solve the problem. Laparoscopic bladder neck suspension had also been performed after a collagen injection at 18 years of age and this procedure had also failed.

The patient was referred to our clinic for further evaluation and treatment. Physically, she was generally healthy without any neurological signs. Anal tone was normal but urine leakage was noted when she performed a coughing or a Valsalva maneuver. Cystoscopy revealed an incompetent bladder neck and relaxed urethral sphincter on the left side. There was no mucosal folding or spontaneous sphincter contraction on command (Fig. 1). A videourodynamic study was arranged. Normal bladder sensation, capacity, and compliance were noted during the filling phase. However, an incompetent bladder neck was noted when the bladder was full (Fig. 2). A stress test at a volume of 300 mL was performed and a low abdominal leak point pressure (37 cm water) was detected (Fig. 3). The voiding pressure was normal and the flow rate was 26 mL/s without any postvoid residual (Fig. 2).

Under the impression of a pudendal nerve injury induced intrinsic sphincter deficiency, a pubovaginal sling procedure using polypropylene mesh was performed. The sling was placed at the middle portion of the suburethral space and the sling was tied with moderate tension to ensure urethra competent (Fig. 4). After removal of the Foley catheter on the next day, the patient regained continence without compromising her voiding efficiency.

DISCUSSION

Isolated pudendal nerve injury associated with ipsilateral intrinsic sphincter deficiency is an uncommon cause for SUI in women. The urethral sphincter is innervated by pudendal nerves from both sides. Penetrating injury through perineum may cut the pudendal nerve and this will result in a loss of urethral tone on the ipsilateral side. Although the pudendal nerve on the contralateral side is intact, urethral resistance is now inadequate to control the increase in intravesical pressure at full bladder. During the day, the pelvic floor muscle tone might be adequate to allow urinary continence; however, it will not be adequate during sleep when the pelvic floor muscles relax. Since collagen urethral injections to increase urethral resistance were not successful, a suburethral sling to compress the urethra and help a resumption of urinary continence was necessary. The image studies of this case reflect the pathophysiology of pudendal nerve injury and intrinsic sphincter deficiency.

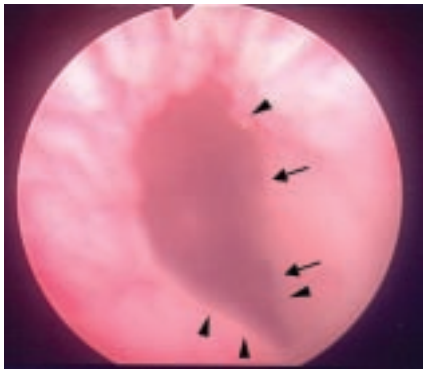

Fig. 1. Cystoscopy reveals an incompetent bladder neck and relaxed urethral sphincter on the left side (arrows). There was no mucosal folding (arrow heads) or spontaneous sphincter contraction on command.

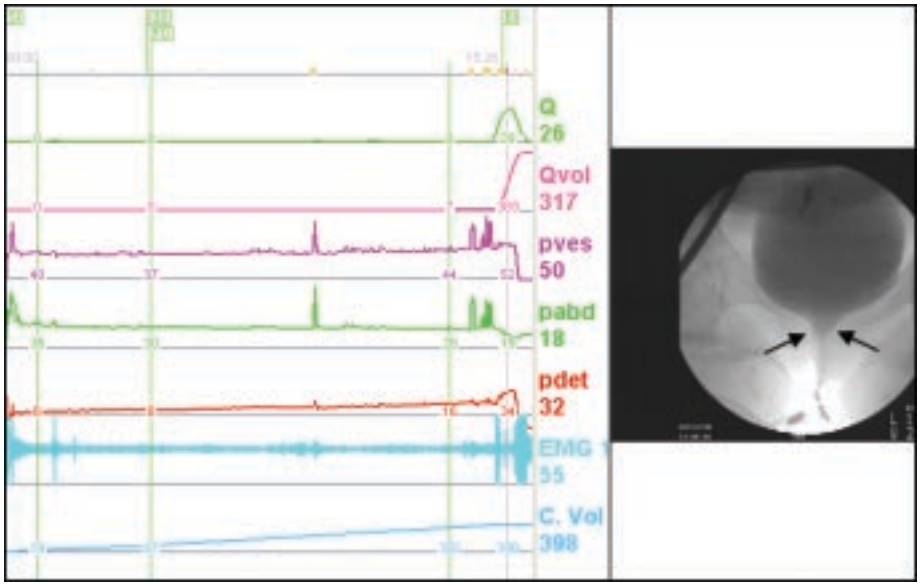

Fig. 2. An incompetent bladder neck (arrows) was noted during the filling phase. The bladder was normal during the filling and voiding phases.

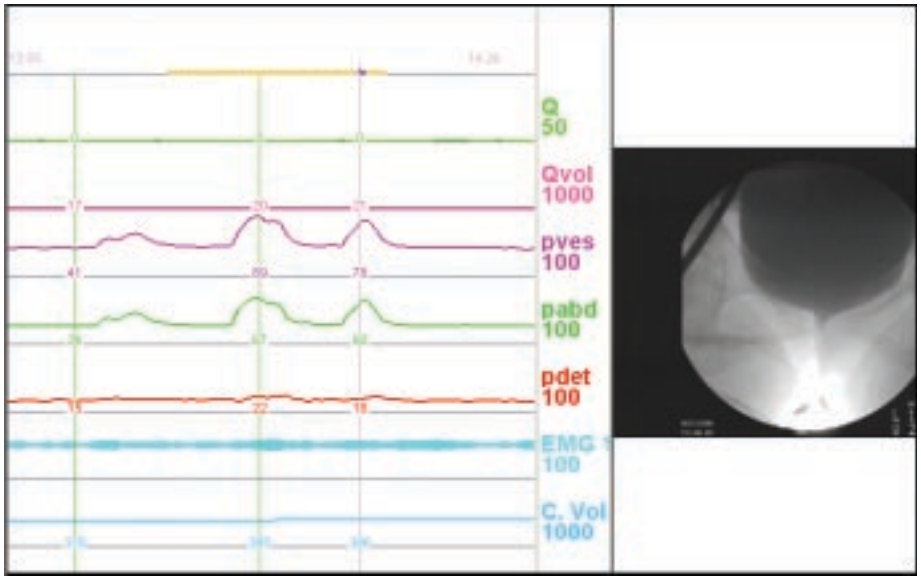

Fig. 3. Low abdominal leak point pressure was noted during a cough stress test.

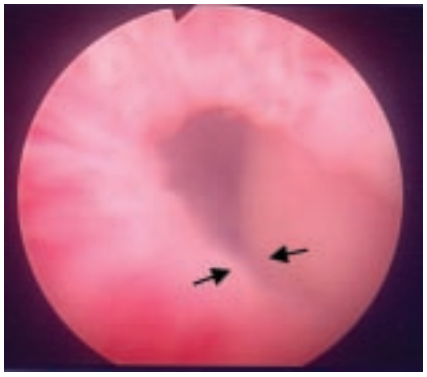

Fig. 4. The urethral lumen became narrower after placing a suburethral sling at the middle portion (arrows). Although the bladder neck remained incompetent, the urethral resistance of the mid-urethra has increased and this ensured urinary continence.