Case Report

The Placement of a Single-Incision Mini-Sling for the Treatment of Complete Intrinsic Sphincter Deficiency in an Adolescent Female: A Case Report

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Abstract

Introduction
Intrinsic sphincter deficiency (ISD) is associated with a patient history of urethral injury or childbirth. Suburethral sling placement for ISD has been found to be beneficial in patients with this diagnosis. ISD in the pediatric population is rare and surgical management may prove difficult. ISD requires intensive counseling on available treatment options for this unique population.

Case Presentation
This report is on the use of the single-incision mini-sling for complete ISD in an adolescent patient. The patient was a 15-year-old nulligravid female who was found to have idiopathic complete intrinsic deficiency based on a multi-channel urodynamic study. Despite conservative management, the patient opted for a surgical option instead. The patient underwent a single-incision mini-sling placement. At 3- and 6-month postoperative follow-up visits, the patient reported a subjective cure of stress urinary incontinence.

Conclusion
Single-incision mini-sling is a minimally invasive surgical technique that may be a feasible treatment option to reduce urinary incontinence in pediatric patients with a diagnosis of ISD.

Keywords
urinary incontinence; stress; intrinsic sphincter deficiency; suburethral slings; adolescent; female; case reports

Introduction
Stress urinary incontinence (SUI) in female teenagers is not uncommon, especially in those who are active and participate in sports with significantly increased intra-abdominal pressure. The prevalence of this condition ranges from 5.7%-80%.[1] These young women commonly experience embarrassment and psychosocial complications in relation to their SUI.[2] The first-line treatment strategy for these patients is pelvic floor physical therapy, which tends to be significantly helpful in symptom resolution.[3] This treatment is in contrast to SUI that is caused by intrinsic sphincter deficiency (ISD). Also known as Type III SUI, this pathology is more commonly seen in older individuals and those who have had prior vaginal deliveries.[4] When ISD is encountered in the pediatric population, it is most frequently associated with spina bifida, sacral agenesis, trauma to the spine, and surgical injuries.[5] The definitive treatment for ISD is usually surgical, with one of the options being the placement of a mid-urethral sling, either synthetic, autologous, or cadaveric. However, the implantation of synthetic slings for ISD is not commonly seen in the pediatric population, and limited data is available.[5]

Although sling placement may not serve as a contraindication to subsequent vaginal birth, more data is needed to establish the optimal timing of conceiving following the surgery. Additionally, Bergman et al showed obesity served as a risk factor for the recurrence of SUI following vaginal delivery in those with prior sling placement.[6] In these cases, each patient needs to be counseled extensively on the possibility of the future failure of the surgery. Failure is not commonly encountered since most patients undergoing this type of surgery are finished with childbearing or are post-menopausal.[4]

The following report will present the case of a 15-year-old nulligravid young woman with idiopathic complete urethral ISD, as shown by urodynamic studies. We aim to reveal that adolescent females with complete intrinsic sphincter deficiency may benefit from surgical management of SUI after extensive counseling and failure of non-surgical options.

Case Presentation

A 15-year-old nulligravid female was referred to our urogynecology clinic with a history of insensible and continuous urinary incontinence. The patient had a body mass index of 35 with no other past medical history and no neurological disease or spinal cord injury. Physical examination revealed a normal Pelvic Organ Prolapse Quantification exam. The patient underwent a tampon dye test and computed tomography (CT) urogram, which were both negative for evidence of a urogenital fistula. No urethral abnormality was noted on the CT scan. After ruling out a fistulous tract, the patient underwent a multi-channel urodynamics study with free uroflow, voiding cystometry, a provocative stress test to assess leak point pressure, and a urethral pressure profile evaluation. The study revealed a mean maximal urethral closure pressure of only 1 cm H_2O (Normal >20 cm H_2O[7]), indicative of complete intrinsic sphincter deficiency. Due to the age of the patient, conservative treatment options were initially pursued with both vaginal estrogen and 2 rounds of periurethral bulking. Adequate coaptation was noted in both rounds of periurethral bulking. However, this treatment only achieved transient resolution for her. After extensive counseling with the patient and her mother, the patient opted for definitive treatment with the placement of a mid-urethral sling. She underwent uncomplicated placement of a single-incision mini-sling and cystoscopy under general anesthesia. At her 3- and 6-month postoperative follow-ups, the patient reported a subjective cure of her SUI.

Discussion

A PubMed search for “intrinsic sphincter deficiency in adolescence” resulted in 4 publications that reported on the use of a variety of surgical management options for ISD in pediatric populations.[2,8-10] However, none of these studies comment on the use of the single-incision mini-sling device that we implemented in our case. A subsequent PubMed search for “mini-sling pediatrics” resulted in only an Argentinian study by Garcia et al that showed positive outcomes with mini-sling placement in pediatric patients with neurogenic sphincter incompetence.[11]

As previously described,[12] surgical management of pediatric SUI has included retropubic slings, pubovaginal slings, and artificial urinary sphincters. Retropubic slings have typically been the sling of choice for most adult patients with ISD due to outperforming their transobturator counterparts.[13] Newer data suggest that the single-incision mini-sling is a minimally invasive technique with good outcomes for ISD and may serve as a viable option for these cases, as transobturator and retropubic slings are associated with higher pain scores and bladder injury risk, respectively.[14]

This is a single case report that introduces the use and 6-month success of the single-incision mini-sling for a pediatric female patient with the diagnosis of ISD. Although longer-term data is necessary, the findings of this case report may prove beneficial in the development of management guidelines for stress urinary incontinence due to intrinsic sphincter deficiency in the rare setting of female teenagers. Additional case reports and studies are needed to further evaluate the safety and efficacy of this type of sling device in these young females struggling with this difficult diagnosis.

Conclusion

It remains crucial that physicians continue to tailor management to the patient’s goals of care before moving forward with any type

of surgical treatment for this unique patient population. We need to continue to counsel these young patients on the implications of the surgery and what it may entail for future family planning and routes of delivery if desired.

Conflicts of Interest

The authors declare they have no conflicts of interest.

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