

## Urethral Laceration at the Time of Spontaneous Vaginal Delivery

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### Abstract

Urologic injury during gynecologic procedures should be avoided at all costs. Should they occur, prompt management is key as is recognizing them to prevent further sequela. Proper exposure and management by an experienced surgeon are key in this rare situation. A 26-year-old G4P3003 at 38 weeks and 1-day gestational age presented for induction of labor secondary to chronic hypertension and ultimately experienced a large urethral laceration at the time of vaginal delivery. The urethral injury was initially attempted to be repaired right after delivery then ultimately was repaired on the next day in multiple layers until watertight closure was reassured. Urethral injury occurs rarely at the time of vaginal delivery. Immediate identification and repair of the injury is crucial to manage the condition.

**Keywords:** Vaginal Delivery; Urethra Laceration; Lower Urinary Tract Trauma; Postpartum Hemorrhage; Laceration Repair

### Introduction

Injury to the lower urinary tract is relatively uncommon during vaginal delivery. Prompt recognition and early management can significantly reduce morbidity and mortality. Blunt trauma accounts for almost all traumatic urethral injuries and the majority associated with pelvic fracture. The female urethra consists of only the posterior urethra and is rarely injured [1]. Total number of urethral injury accounts for less than 1% of emergency department visits. Urethral injuries are typically never life threatening. Most are iatrogenic injuries caused by high energy mechanisms. Female urethral trauma most commonly occurs as an obstetrical complication accounting for 10.3 per 1000 vaginal deliveries [2]. This report presents a large urethral laceration at the time of vaginal delivery and its management.

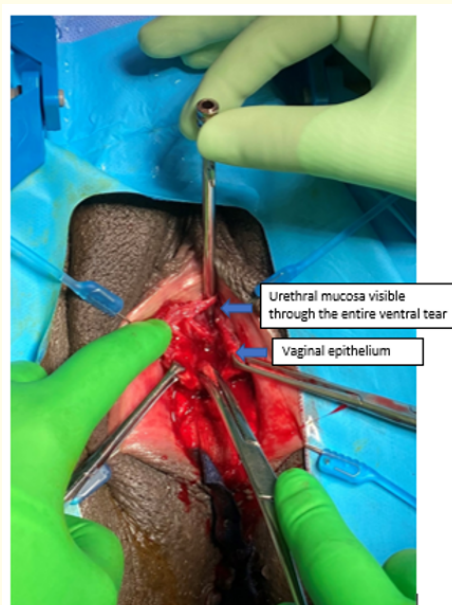
### Case Presentation

A 26-year-old, gravida 4 para 3-0-0-3 at 38 weeks and 1 day presented to the labor floor for scheduled induction of labor for chronic hypertension. Her past medical history includes type II diabetes, obesity (body mass index 37 kg/M<sup>2</sup>), intermittent mild asthma, spinal muscular atrophy carrier with unknown paternal status, and Group B Streptococcus bacteriuria. Her surgical history includes dilation and curettage. Her induction of labor was managed by prostaglandin E<sub>2</sub>, followed by misoprostol, mechanical dilation via Cook Catheter, artificial rupture of membranes and pitocin. During the induction of labor, her blood pressures remained stable with systolic blood pressures 120-150s and diastolic pressure 60-90s. Serum glucose levels were elevated throughout the latent phase of labor and managed with insulin drip in the active phase. The patient delivered a viable male infant weighing 7 pounds 4 ounces via spontaneous vaginal delivery after spending roughly two hours in active labor on Day 2 of her induction. The urinary Foley catheter was not removed until crowning of the fetus was noted due to rapid cervical dilation. Estimated blood loss (EBL) during the delivery was 200 mL. Persistent moderate vaginal bleeding was noted over the course of an hour with additional 192 mL of blood loss measured by weighing saturated pads. Subse-

quently another 200 mL of blood loss occurred despite attempt with bimanual exam and uterotonics (800mcg of rectal misoprostol and Pitocin). The patient was taken to the operating room (OR) for exam under anesthesia. The transurethral catheter could not be placed due to distorted anatomy and continuous bleeding. Exam under anesthesia revealed a 2cm posterior urethral laceration. The urinary catheter was placed into the bladder and urethral mucosa was attempted to be reapproximated with 3-0 absorbable suture in a running locking fashion until hemostasis was achieved. A gentle curettage was performed to remove retained products from the uterus. Cervix and vagina were carefully examined with no evidence of lacerations. One gram of tranexamic acid intravenously (IV) was also administered. EBL was 1000 mL at the end of the procedure for a total EBL of 1600 mL. Due to large EBL (> 1,500 mL), IV antibiotics was given for 24 hours. At the completion of the procedure, the urinary catheter was remained in situ, draining clear yellow urine. Urogynecologist was contacted for further evaluation and management of the urethral laceration.

### Management

On the following day, after informed consent was obtained by Urogynecologist, the patient was taken to OR for exam under anesthesia, urethral laceration repair with/out graft, and cystourethroscopy. Exam under anesthesia revealed edematous external female genitalia with partially reapproximated ventral urethra with a visible urinary catheter through the urethral tear defect. The urethral meatus defect was also noted (See *Picture 1*). The uterus, cervix and vaginal walls were within normal limits for postpartum status. After removing the urinary catheter, cystourethroscopy was performed using a 30-degree scope, revealing that the entire length of the posterior and left lateral urethra lost its integrity all the way up to the level of the posterior bladder neck. The bladder mucosa and ureteral orifices appeared to be intact. After cystourethroscopy removal, the urethral lumen was identified using a metal urinary catheter then previously placed sutures on the ventral perspective of urethra were removed. The surrounding tissue around the urethral defect appeared to be healthy with excellent vascularization. Decision was made to proceed to multilayer, watertight closure of the urethral defect, without using graft material. The urethral mucosal edges were identified then reapproximated using absorbable suture in an interrupted fashion, followed by the urethral muscularis layer closure and periurethral fascial layer closure. Watertightness was reassured from the urethral defect, after backfilling the bladder. The vaginal epithelium layer was then reapproximated using absorbable suture in a running fashion. The urethral meatus defect was also repaired. Cystourethroscopy revealed well-reapproximated urethral mucosa without stricture. The final presentation after the repair is presented in *Picture 2*. The patient was discharged on the same day with a transurethral catheter with a legbag training and prophylactic antibiotics by mouth. In addition, the patient was instructed to get a postoperative voiding cystourethrogram (VCUG) in 2 weeks before returning to clinic for the foley removal. However, the patient was not compliant to the recommendations. On Postop Day #15, VCUG was completed without proper urethral evaluation at the time of the study. The study was re-planned however patient developed urinary tract infection: consequently, the foley was removed on Postop Day #20 in office. Patient admitted to noncompliance with antibiotic therapy prescribed on hospital discharge. She was instructed to [1] take antibiotic by mouth, [2] keep a voiding diary, and [3] follow up in 2 weeks. However, she has been lost to follow up.



**Picture 1:** Urethral mucosa visible through the entire ventral tear.



**Picture 2:** The final presentation after repair of the urethral laceration.

### Result and Discussion

Although urethral lacerations are uncommon after spontaneous vaginal delivery, they can result in postpartum hemorrhage as well as other potential complications like urethrovaginal fistula, if not repaired properly. Since the successful initial repair is paramount to avoid possible sequela from the urethral tear, it is important to involve Urogynecologist/Urologist to manage the condition. Up to our knowledge, there is little data available on incidence of urethral laceration at the time of vaginal delivery, although it is known to have urethral injury at the time of blunt trauma or pelvic fracture [1]. Urethral injuries are variable varying from complete transections to contusions. Treatment plans should be developed based on the classification and description of urethral injury: Type 1: posterior urethra is stretched but intact, Type 2: pure posterior urethral injury (partial or complete) with a tear of the membranous urethra above the urogenital diaphragm, Type 3: combined anterior and posterior urethral injury (partial or complete) with the involvement of the urogenital diaphragm, Type 4: bladder neck injury with extension into the urethra with Type 4a: Injury of the base of the bladder with periurethral extravasation, and Type 5: pure anterior urethral injury (partial or complete) [3]. The presenting patient had Type 2 complete posterior urethral injury. Proper repair is needed to prevent complications from unrepaired and poorly repaired tears such as urethrovaginal fistulas and urethral strictures. It is also important to identify and prevent postpartum hemorrhage in this setting. Transurethral catheter should be removed prior to the second stage of labor to avoid urethral stress. This case also identifies the need for a systematic approach to postpartum hemorrhage. The initial urethral tear was overlooked which contributed to a postpartum hemorrhage. When examining for trauma, a thorough exam should be completed to avoid delayed management of lacerations and control blood loss.

Management of urethral lacerations is surgical repair by multilayered water-tight closure. If not addressed in the timely manner, urethral disruption can cause urinary retention which in return can lead to hydronephrosis and subsequently upper urinary tract damage. For this reason, it is critical to prioritize bladder decompression [2]. Once an open injury is identified, it should be surgically repaired appropriately by a specialist. Immediate recognition is key to decrease the rate of complications after injury.

### Conclusion

It is important to manage patients with a urethral laceration with multilayered water-tight closure at the time of injury. A multidisciplinary approach involving urologist/urogynecologist is critical to ensure proper repair of urethral laceration to decrease the risk of developing sequela.

### Declaration of Patient Consent

The authors certify they have obtained the verbal patient consent. The patient has given her verbal consent for her images and other clinical information to be reported in the journal. The patient understands her name and initial will not be published and due to efforts will be made to conceal her identify, but anonymity cannot be guaranteed.

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Nil.

### Conflicts of Interest

There are no conflicts of interest.

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