

## CASE REPORT

# Simultaneous Uterine and Urinary Bladder Rupture in an Otherwise Successful Vaginal Birth After Cesarean Delivery

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Uterine rupture is the primary concern when a patient chooses a trial of labor after a cesarean section. Bladder rupture accompanied by uterine rupture should be taken into consideration if gross hematuria occurs. We report the case of a patient with uterine rupture during a trial of labor after cesarean delivery. She had a normal course of labor and no classic signs of uterine rupture. However, gross hematuria was noted after repair of the episiotomy. The patient began to complain of progressive abdominal pain, gross hematuria and oliguria. Cystoscopy revealed a direct communication between the bladder and the uterus. When opening the bladder peritoneum, rupture sites over the anterior uterus and posterior wall of the bladder were noted. Following primary repair of both wounds, a Foley catheter was left in place for 12 days. The patient had achieved a full recovery by the 2-year follow-up examination. Bladder injury and uterine rupture can occur at any time during labor. Gross hematuria immediately after delivery is the most common presentation. Cystoscopy is a good tool to identify the severity of bladder injury. [*J Chin Med Assoc* 2010;73(12):655–659]

**Key Words:** bladder rupture, cesarean section, uterine rupture, vaginal birth

## Introduction

Vaginal birth after a prior low transverse cesarean section (VBAC) is considered a safe and effective alternative to elective repeat cesarean delivery if the obstetric indications for the prior cesarean delivery and/or new indications are not present. Whether or not the outcome of VBAC will lead to maternal benefits or result in catastrophic obstetric complications depends on the success or failure of labor. Uterine rupture, compared with other complications, has received the most attention because of its associated morbidity and mortality, particularly in the fetus. The risk of uterine rupture ranges from 0.5% to 9%, depending on the type and location of the previous uterine incision.<sup>1–5</sup> Cases of bladder rupture, accompanied by uterine rupture, have been rarely reported. We report a gravida undergoing VBAC complicated by uterine and bladder rupture during the late second stage of labor.

## Case Report

A 39-year-old, gravida 2, para 1 woman at 38 weeks of gestation presented to our delivery unit with labor pain. Her first pregnancy resulted in a cesarean section for fetal distress at 33 weeks of gestation in Thailand. The type of uterine incision she had was unknown. She then conceived spontaneously 6 years later and received regular antepartum examinations at a local obstetrics clinic.

At 37 weeks of gestation, she was referred to our hospital because she requested a trial of labor. On admission, the cervical os was dilated to 3 cm. In the ensuing 5 hours, the labor progressed without incident and she successfully delivered a healthy female baby vaginally, who weighed 3,015 g with Apgar scores of 9 and 10 at 1 and 5 minutes, respectively. Continuous electronic fetal monitoring revealed no signs of fetal distress. The labor was not augmented. Following repair of the episiotomy, gross hematuria was noted



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**Table 1.** Previously reported cases of bladder rupture during vaginal birth after a prior cesarean section

Authors	Age (yr)	Obstetric history	Delivery	Augmentation	Fetal weight (g)/ Apgar score	Symptoms
Jones et al, 1991 <sup>14</sup>	Three of 8 patients with previous LTCS were complicated with uterine rupture & bladder laceration. All were repaired primarily.					
Spaulding, 1992 <sup>15</sup>	39	LTCS × 1	CS	Oxytocin	3,965/8 to >9	Variable deceleration, arrest of descent
	26	LTCS × 1	CS		-/3 to >8	Variable deceleration, arrest of descent
Hsu et al, 1992 <sup>16</sup>	34	CS × 1, VBAC × 3	SD	Cocaine	3,320/2 to >5	Chest pain, abdominal pain, gross hematuria
Dagher & Fishman, 1992 <sup>17</sup>	34	LTCS × 1, VBAC × 2	SD		-/-	Abdominal pain, hematuria at 2 d post delivery
Lee & Cass, 1992 <sup>18</sup>	34	LTCS × 1	CS	Oxytocin	3,750/8 to >9	Gross hematuria, fetal distress
Ewen et al, 1994 <sup>19</sup>	31	LSCS × 2	Outlet forceps			Urinary incontinence
Tuggy, 1995 <sup>20</sup>	34	CS × 3	CS		-/6 to >9	Abdominal pain, hematuria
Miklos et al, 1995 <sup>21</sup>	26	CS × 1	Low forceps SD	Prostaglandin, oxytocin	4,600/9 to >9	Variable deceleration, gross hematuria
Kattan, 1997 <sup>10</sup>	33	LSCS × 1, VBAC × 2	SD	Oxytocin	3,550/-	Heavy vaginal bleeding, hematuria, Foley catheter balloon in vagina
	27	LSCS × 1	SD		2,400/-	Heavy vaginal bleeding, hematuria, Foley catheter balloon in vagina
	28	LSCS × 1, VBAC × 1	SD	Oxytocin	3,000/-	Gross hematuria, cyclic hematuria, total incontinence
Forsnes et al, 2000 <sup>22</sup>	34	LTCS × 1	CS	Oxytocin	4,730/7 to >9	Bradycardia, loss of contraction pattern, gross hematuria
	26	LTCS × 1	CS	Oxytocin	3,240/7 to >8	Variable deceleration, gross hematuria, arrest of cervical dilatation
Webb et al, 2000 <sup>23</sup>	33	LTCS × 1	Low forceps delivery	Oxytocin	-/3 to >4	Variable deceleration, abdominal pain
Oteng-Ntim et al, 2002 <sup>24</sup>	41	LSCS × 1	CS		3,520/9 to >10	Variable deceleration, abdominal pain
Popli et al, 2002 <sup>11</sup>	26	LSCS × 2	Laparotomy		2 <sup>nd</sup> trimester	Cord prolapse though urethra
O'Grady et al, 2003 <sup>12</sup>	29	LTCS × 2	CS		2,633/7 to >9	Progressive oliguria, vernixuria, gross hematuria
Novi et al, 2004 <sup>25</sup>	38	LSCS × 1, VBAC × 1	CS	Oxytocin	3,750/7 to >9	Bradycardia, loss of station
Gupta et al, 2005 <sup>13</sup>	27	CS × 1	CS	Prostaglandin	-/-	Bradycardia, maternal tachycardia, meconium-stained urine
Atug et al, 2005 <sup>26</sup>	39	LTCS × 1	Laparotomy	Oxytocin	Fetal death at 21 wk	Gross hematuria, cystoscopy showed dead fetal head in bladder
Current case, 2010	39	CS × 1	SD		3,015/9 to >10	Gross hematuria, oliguria, abdominal pain

LTCS=low transverse cesarean section; CS=cesarean section with unknown scar type; - = data not reported; VBAC=vaginal birth after cesarean section; SD=spontaneous

Mobility	Management
Other details were not available.	
Posterior bladder wall & anterior vaginal wall rupture	2-layer closure, suprapubic catheter
Uterine scar dehiscence with extension to bladder	2-layer closure, suprapubic catheter for 10 d
Large defect in lower uterine segment & bladder	Hysterectomy, primary repair of bladder defect
Anterior lower uterine segment rupture, 5 × 8-cm bladder rupture	–
Lower uterine segment rupture, posterior bladder rupture, cervical laceration, vaginal laceration	Subtotal hysterectomy, 3-layer closure, Foley catheter for 2 wk
Lower uterine segment rupture, posterior bladder rupture, cervical laceration, vaginal laceration	Primary repair, urethra catheter for 4 d & suprapubic catheter for 10 d
Vertical tear in lower uterine segment & rupture of bladder dome	Primary repair
Anterior uterine wall defect 3 cm, 4 × 2-cm defect in posterior bladder wall	4-wk Foley drainage in vain, laparotomy for 2-layer closure of uterus & bladder with omental interposition
Rupture of uterine scar, cervix & vagina, rupture of posterior bladder wall to trigone, avulsion of lower end of right ureter	Primary repair & right ureter neocystostomy
Rupture of uterine scar, cervix & vagina, rupture of posterior bladder wall to bladder neck	Primary repair
Rupture of uterine scar & vesicovaginal fistula	Repair after 3 mo with omental interposition
Uterine scar rupture & rupture of posterior bladder wall to dome & vagina	3-layer bladder closure
Uterine scar, cervix & vaginal rupture, rupture of posterior bladder wall to dome & trigone	3-layer bladder closure, suprapubic catheter drainage
Large defect of lower uterine segment & bladder dome to trigone	Primary bladder closure, suprapubic catheter drainage for 10 d
Rupture of uterine scar & posterior wall of bladder dome to trigone	2-layer closure, suprapubic & urethral catheter drainage for 10 d
Uterine scar dehiscence & tear of bladder base	2-layer closure, catheter drainage for 7 d
Rupture of uterine scar & bladder dome	Primary closure, catheter drainage for 7 d
Rupture of uterine scar & bladder base	2-layer closure & urethral catheter for 5 wk due to vesicouterine fistula
Rupture of uterine scar, right upper uterine segment & bladder dome	2-layer closure
Rupture of anterior uterine wall & posterior bladder wall	2-layer closure, Foley catheter drainage
Rupture of uterine scar & posterior bladder wall	2-layer closure, Foley catheter drainage for 12 d

vaginal delivery; LSCS = lower section cesarean section.

during urinary catheterization; the urine was noted to be clear intrapartum.

In the following hour, the patient began to complain of progressive abdominal pain that soon became a persistent dull pain. Within 3 hours of delivery, the gross hematuria showed no sign of abating and urine output was decreasing. Cystoscopy was performed to determine the cause of hematuria. A direct communication between the bladder and uterus was identified. At the time of exploratory laparotomy, bloody ascites gushed out on entering the peritoneal cavity and a rent in the peritoneum at the junction of the bladder and uterus was visualized. After opening the bladder peritoneum overlying the vesicouterine junction, rupture sites over the anterior uterus and posterior wall of the bladder were discovered, measuring 3 × 4 cm and 5 × 1 cm, respectively. After completion of debridement and primary repair of both wounds, a Foley catheter was left in place for 12 days. The patient had achieved a full recovery by the 2-year follow-up examination.

## Discussion

The clinical presentations of concomitant uterine and bladder rupture at the time of VBAC are variable and depend on the time, location and type of uterine rupture that extends onto the adjacent organs. Severe signs and symptoms can result when a complete rupture occurs intrapartum, including a non-reassuring fetal heart tracing,<sup>6,7</sup> loss of the presenting part on pelvic examination, change in uterine shape, cessation of uterine contractions, abdominal pain, vaginal bleeding, and even maternal shock.<sup>8,9</sup> A MEDLINE search, using bladder rupture and uterine rupture as key words, revealed 23 such cases reported since 1991 (Table 1).<sup>10-26</sup> Gross hematuria is the most common sign of uterine rupture associated with bladder rupture. Other rare presentations such as vernixuria, meconium-stained urine, urinary incontinence induced by vesicouterine fistulas, fever, and urinary tract infections have also been noted.<sup>10-13</sup> The signs and symptoms directly correlate with the time of bladder rupture. If bladder rupture occurs intrapartum, amniotic content appears in the urine through a communication between the uterus and bladder. Our patient presented with gross hematuria, oliguria, and progressive abdominal pain following vaginal delivery, but she did not have fetal bradycardia or hematuria intrapartum, or profuse postpartum hemorrhage. We consider that the rupture occurred at the time of fetal expulsion. Because the rupture was located at the site of the previous uterine

scar, which was devoid of vascularity, significant postpartum hemorrhage did not occur.

Various risk factors in relation to uterine rupture during a trial of labor have been identified, including a classic uterine incision, induction with prostaglandins, single-layer closure of a prior uterine incision, an interpregnancy interval <18 months, and a prior preterm cesarean delivery.<sup>27</sup> The major hypothesis for uterine rupture related to a prior preterm cesarean delivery is poor wound healing in an undeveloped lower segment of the uterus. Even if the incision is transverse, it would likely encounter the same problems with adequate healing as a classical incision. In this patient, we speculate that the previous cesarean delivery at 33 weeks of gestation was the major risk factor for uterine rupture.

For estimating the likelihood of developing rupture of a scar during subsequent labor, some investigators have suggested using sonography as a tool for evaluating the risk of VBAC.<sup>27,28</sup> The thickness of the lower uterine segment measured by transabdominal or transvaginal sonography is correlated with the risk of rupture.<sup>28</sup> However, the critical cut-off value for a safe lower segment thickness is controversial. Bergeron et al<sup>28</sup> concluded that a full lower uterine segment <2.3 mm in thickness measured between 35 and 38 weeks of gestation is associated with a higher risk of complete uterine rupture during VBAC. To date, there have been no isolated bladder ruptures reported in gravidas undergoing VBAC. Therefore, in addition to the criteria issued by the American College of Obstetricians and Gynecologists in 2004, measurement of the full lower uterine segment thickness may be useful to evaluate the risk of simultaneous uterine and urinary bladder rupture.

The management of uterine and bladder rupture usually requires laparotomy because of fetal distress or an arrest of labor.<sup>10-13</sup> In VBAC patients, rupture results from traumatic separation of the dense adhesions between the uterus and bladder during labor. Thus, expectant management might result in poor healing, which in turn could lead to the formation of vesicouterine fistulas. Once suspected, cystoscopy should be performed to identify the bleeding source and possible bladder and uterine rupture.

In addition to uterine rupture, the possibility of bladder injury should be included in the patient's antepartum counseling for VBAC. Careful selection of candidates for a trial of labor is the most important issue to prevent an unwanted outcome.

In conclusion, bladder and uterine rupture should be considered, even after successful vaginal delivery, in VBAC patients without any signs and symptoms

intrapartum. Once gross hematuria occurs, a Foley catheter should be placed to monitor hematuria and urine output. If the hematuria persists and other associated symptoms occur, cystoscopy is a good tool to identify the severity of the bladder injury and to determine further management.

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