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CASE REPORT

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Unintended Consequences: Exploring Iatrogenic Injuries in Cesarean Section Deliveries

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Abstract

Cesarean delivery (CD), or C-section, which prevents injury and death in mothers and babies at higher risk of complicated deliveries, like any surgery, does carry a risk of complications. By reviewing the medical literature and analyzing documented CD cases, we examined the spectrum of iatrogenic injuries, including unintentional injuries, affecting both maternal and neonatal outcomes. This case report describes iatrogenic bladder damage after CD in a 31-year-old woman who had a previous emergency CD two years ago. This case calls for a comprehensive approach to minimize iatrogenic risks and optimize maternal and neonatal well-being during repeat CD.**(International Journal of Biomedicine. 2024;14(1):179-181.)**

Keywords: Cesarean delivery • iatrogenic injuries • bladder injury

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Introduction

Cesarean delivery (CD) has become a routine and often life-saving intervention in obstetric care, providing a safe means to deliver infants when vaginal delivery poses risks to the mother or the baby. However, like any surgery, a C-section does carry a risk of complications. Among the array of potential adverse events, iatrogenic injuries, particularly those involving the bladder, represent a significant concern in the realm of maternal health.

Bladder injuries during C-section are considered iatrogenic when they result from accidental damage caused by medical intervention rather than underlying pathological conditions. The proximity of the bladder to the lower uterine segment, the area commonly incised during CD, puts it at risk of injury. Although advances in surgical techniques and an improved understanding of anatomy have reduced the incidence of iatrogenic BI, they remain a notable complication.

Iatrogenic bladder injury is a rare complication during C-section, with an event rate ranging from 0.08% to 0.94%. It was noted that the frequency of bladder injury is higher in women with repeated CD (58.5%) than in women with primary C-sections (41.2%).[1]

Iatrogenic bladder injuries during CD can manifest in various forms, ranging from minor tears to more severe complications, such as bladder perforations.[2] The consequences of such injuries can be significant, impacting both short-term recovery and long-term pelvic health. Immediate complications may include urinary tract infections, hematuria, and impaired bladder function, while long-term effects may involve chronic pain, incontinence, or the formation of fistulas.

Several factors contribute to the risk of iatrogenic bladder injuries during C-section.[3] These include variations in pelvic anatomy, surgical experience, emergencies requiring rapid interventions, and cases involving conditions like placenta previa or extensive adhesions. Understanding these factors is crucial for developing strategies to prevent or minimize such injuries.

Case Presentation

A 31-year-old woman, after CD, was admitted to the ward of the Clinic of Obstetrics and Gynecology for monitoring. The patient had a previous emergency CD two

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years ago. Postoperatively, the ureteric catheter was pulled out by the end of the first day in the intensive recovery room. Immediately after the catheter was pulled out, the patient complained of abdominal pain and abdominal distension. Routine ultrasonography showed moderate abdominal free fluid (Figure 1).

Fig. 1. *Routine ultrasonography: Moderate abdominal free fluid.*

Based on laboratory results (Blood test: WBC - 10.5×10^3/μL, RBC - 3.11×10^6/μL, Hb - 8.4 g/dl, HCT - 25.3 %, platelets - 266 $\times10^3$/μL, C-reactive protein -189.8 mg/L, blood urea nitrogen - 6.67 mmol/l, serum creatinine - 155.0 μmol/L) and symptoms, the patient was advised of the need for immediate catheterization. The unit continued postoperative recovery interventions, including thrombosis and bleeding prevention, maternal monitoring, and wound care (monitoring C-section incision for any infection).

An urgent abdominal and pelvic CT scan with contrast was performed to reveal the origin of the free abdominal fluid. It showed no organ pathology except for only moderate free fluid in all parts of the abdominal cavity. After consultation at the urologist's request, renal ultrasonography was used and confirmed that there was no hydronephrosis and that the urinary bladder was empty, with the presence of a catheter.

The adnominal surgeon confirmed abdominal distension without acute abdomen and realized a punch biopsy of free abdominal fluid follow-up results with urea of 10.9 mmol/l and creatinine of 594.4 μmol/l; urinary urea 45.5 mmol/l, creatinine - 1244.4 mmol/l. After repeated consultation with a urologist, the diagnosis was made: "Iatrogenic bladder damage."

After four days of bladder catheterization, intravenous antibiotics, antianemic medications, a healthy diet, and hydration, the patient's condition improved significantly. Conventional ultrasound did not reveal free fluid in the abdominal cavity. Blood test: WBC - 9.1×10^3/μL, RBC - 4.02×10^6/μL, Hb - 10.6 g/dl, HCT - 34.3%, platelets - 385 $\times10^3$/μL, C-reactive protein - 52 mg/L, blood urea nitrogen - 3.9 mmol/l, serum creatinine: 70 μmol/L. The urethral catheter was maintained for 10 days of observation and treatment in the hospital. Blood test before discharge: C-reactive protein - 30.4 mg/L, blood urea nitrogen - 3.32 mmol/l, serum creatinine - 61.7 μmol/L Upon discharge from the hospital, an abdominal ultrasound revealed no free fluid in the abdominal cavity (Figure 2).

Fig. 2. *Abdominal ultrasonography upon discharge from the hospital: No free fluid in the abdominal cavity.*

Discussion

Bladder injuries following CD, though relatively uncommon, can have significant clinical implications. The incidence varies, with most injuries being minor and manageable, but severe cases can lead to substantial morbidity. Understanding the frequency and severity of such injuries is crucial for informing clinical practice and improving patient outcomes.[4] Several factors contribute to the occurrence of bladder injuries during CD. Anatomical variations, adhesions from previous surgeries, emergencies, and the surgeon's experience all play roles. Identifying these factors is essential for risk stratification and developing preventive strategies. For instance, preoperative imaging or thorough evaluation of a patient's surgical history may aid in anticipating potential challenges.[5] Immediate consequences of bladder injuries include urinary tract infections, hematuria, and impaired bladder function. These complications, if promptly identified and managed, can mitigate long-term consequences. However, more severe injuries may lead to chronic pelvic pain, urinary incontinence, or the formation of vesicovaginal fistulas, significantly impacting a woman's quality of life. Recognizing and addressing these issues promptly is crucial for minimizing the long-term impact on patients.[6,7] Preventing bladder injuries during CD requires a multi-faceted approach. Surgeons' awareness and meticulous surgical techniques are paramount.

Intraoperative cystoscopy, though not universally adopted, has been proposed as a valuable tool for real-time visualization of the bladder, aiding in the prevention and early detection of injuries. Additionally, improved preoperative planning, especially in complex cases, can contribute to minimizing the risk of bladder injuries.[8] Advancements in surgical techniques, such as lower-segment transverse incisions and careful dissection, aim to reduce the risk of bladder injuries. Utilizing minimally invasive approaches, such as laparoscopic or robotic-assisted C-section, may also offer advantages in terms of visualization and precision. However, these techniques require specialized skills and may not be suitable for all cases.[9] Postoperative vigilance is essential for early detection of bladder injuries. Monitoring for signs of urinary tract infection, persistent hematuria, or altered bladder function is critical. In cases where injuries are identified, prompt management, possibly involving consultation with urological specialists, is crucial to minimizing complications and ensuring optimal recovery.[10] Given the potential for bladder

injuries during CD, comprehensive patient counseling and informed consent are paramount. Expectant mothers should be educated about the possibility of such complications, the signs and symptoms, and the planned interventions to address them. This communication ensures that patients actively participate in their care and can make informed decisions.[11] Continued research into refining surgical techniques, adopting innovative technologies, and enhancing preoperative risk assessment is essential. Collaborative efforts between obstetricians and urologists can further contribute to comprehensive care strategies and improve outcomes for patients undergoing CD.[12]

Conclusion

Bladder injuries following CD are complex and multifactorial. Through a combination of improved surgical techniques, preventive measures, and vigilant postoperative care, surgeons can strive to minimize the incidence and impact of bladder injuries, ultimately ensuring the safety and well-being of mothers undergoing C-sections. Early diagnosis and therapy may prevent complications and loss of organs that may lead to morbidity and mortality. Also, it is crucial to inform patients correctly; pregnant women with secondary or emergent cesarean deliveries should be advised about the significant risk of inadvertent surgical complications.

Competing Interests

The authors declare that they have no competing interests.

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