

URINARY TRACT INJURIES DURING TREATMENT OF PATIENTS WITH MORBIDLY ADHERENT PLACENTA AT A TERTIARY CARE HOSPITAL, KARACHI

Humaira Hanif^{*1}, Shakira Parveen², Kareema Bhagat³, Saniya⁴, Aneeta Sharma⁵, Kiran⁶

^{*1}Department of Gynaecology & Obstetrics, Civil Hospital Karachi, Pakistan

²Dow University of Health Sciences, Pakistan

^{3,4,5,6}Postgraduate Trainee, Pakistan

^{*1}humairahanif95@gmail.com, ²shakira.parveen@duhs.edu.pk, ³kareemairfan@gmail.com, ⁴saniyamzahir990@gmail.com, ⁵anitahitesh091@gmail.com, ⁶panjwanikiran61@gmail.com

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Corresponding Author: *

Humaira Hanif

Abstract

Background:

Morbidly adherent placenta (MAP), also known as placenta accreta spectrum, is an increasingly recognized obstetric complication due to rising cesarean section rates. Surgical management of MAP is technically challenging and is frequently associated with injury to adjacent pelvic organs, particularly the urinary tract, leading to significant maternal morbidity.

Objective:

To determine the frequency of urinary tract injuries and identify associated risk factors during the surgical management of patients with morbidly adherent placenta at a tertiary care hospital in Karachi.

Methods:

This prospective observational study was conducted in the Department of Obstetrics and Gynecology at a tertiary care hospital over a period of one year. A total of 120 pregnant women diagnosed with morbidly adherent placenta (via ultrasound and/or MRI) and undergoing planned surgical management were included. Data regarding patient demographics, obstetric history, placental characteristics, and intraoperative findings were recorded. Urinary tract injuries, including bladder and ureteric injuries, were documented. Statistical analysis was performed using SPSS version 25, with a p -value ≤ 0.05 considered significant.

Results:

Urinary tract injuries were observed in 18 (15%) patients. Bladder injuries accounted for the majority (12.5%), while ureteric injuries were less frequent (2.5%). A statistically significant association was found between urinary tract injuries and higher number of previous cesarean sections ($p=0.01$), anterior placental location ($p=0.03$), and placenta percreta ($p=0.002$). The risk of injury increased markedly in patients with three or more prior cesarean deliveries.

Conclusion:

Urinary tract injuries are a notable complication in the surgical management of morbidly adherent placenta, particularly in high-risk patients with multiple prior cesarean sections and advanced placental invasion. Early diagnosis, meticulous

surgical planning, and a multidisciplinary approach are essential to minimize complications and improve maternal outcomes.

INTRODUCTION

Morbidly adherent placenta (MAP), now commonly referred to as placenta accreta spectrum (PAS), represents a group of obstetric conditions characterized by abnormal trophoblastic invasion into the myometrium, ranging from placenta accreta to increta and percreta. This condition is associated with severe maternal morbidity and mortality, primarily due to massive hemorrhage and complex surgical management. The global incidence of PAS has risen significantly over recent decades, largely attributed to the increasing rate of cesarean deliveries and uterine surgeries (1).

Surgical management of PAS, most commonly via cesarean hysterectomy, is technically demanding and associated with a high risk of intraoperative complications (2). Among these, urinary tract injuries—including bladder and ureteric injuries—are particularly significant due to the close anatomical relationship between the uterus and lower urinary tract (3). Distortion of pelvic anatomy, neovascularization, and dense adhesions from previous surgeries further increase the risk of injury during dissection (4).

The reported incidence of urinary tract injuries in patients with PAS varies widely in the literature, particularly in cases requiring cesarean hysterectomy (5). Bladder injury is the most frequently encountered complication due to its proximity to the lower uterine segment, especially in cases of anterior placenta previa and placenta percreta (6). Ureteric injuries, although less common, can result in serious postoperative complications such as fistula formation, urinary leakage, and renal impairment if not promptly recognized (7).

Several studies have demonstrated that the risk of urinary tract injury increases with the number of prior cesarean sections (8). The severity of placental invasion, particularly placenta percreta, is strongly associated with invasion into surrounding organs such as the bladder, thereby increasing surgical complexity and complication rates (9).

Local data from Pakistan also reflect a similar trend. Studies conducted in tertiary care hospitals have reported a notable frequency of urinary tract injuries in patients with morbidly adherent placenta, with bladder injuries being more common than ureteric injuries (10).

Given the rising burden of PAS and its associated complications, early antenatal diagnosis and multidisciplinary management are essential to reduce maternal morbidity. Therefore, this study aims to determine the frequency of urinary tract injuries and associated risk factors during surgical management of morbidly adherent placenta at a tertiary care hospital in Karachi.

Methodology

This prospective observational study was conducted in the Department of Obstetrics and Gynecology at a tertiary care hospital in Karachi, Pakistan, over a period of one year from January 2025 to December 2025. The study aimed to determine the frequency of urinary tract injuries and associated risk factors in patients diagnosed with morbidly adherent placenta undergoing surgical management.

A total of 120 patients were included in the study using non-probability consecutive sampling. The sample size was calculated using the WHO sample size calculator, assuming an expected frequency of urinary tract injuries of 15%, with a 95% confidence level and a margin of error of 6%. Pregnant women aged between 18 and 45 years, with a confirmed diagnosis of placenta accreta spectrum based on ultrasound and/or magnetic resonance imaging, and a gestational age of 28 weeks or more, were included. Only those patients who underwent planned cesarean section with or without hysterectomy were enrolled. Patients with a history of pre-existing urinary tract disease, prior urological surgery, incomplete medical records, or those who refused to provide consent were excluded from the study. After obtaining approval from the institutional ethical review committee, informed written

consent was obtained from all participants prior to inclusion. Detailed clinical data were collected using a structured proforma. This included demographic characteristics such as age and parity, obstetric history including the number of previous cesarean sections, and preoperative imaging findings to determine the type and location of placental invasion.

All surgical procedures were performed by experienced obstetric consultants. Intraoperative findings were carefully documented, including the type of placenta accreta spectrum (accreta, increta, or percreta), placental location (anterior or posterior), and the surgical approach used, such as cesarean hysterectomy or conservative management. Particular attention was given to identifying any injury to the urinary tract during surgery.

The primary outcome of the study was the occurrence of urinary tract injuries, defined as any intraoperative damage to the bladder or ureters. Bladder injury was identified as any breach in the bladder wall requiring surgical repair, while ureteric injury included ligation,

transection, or thermal damage to the ureter. All injuries were recognized intraoperatively and managed accordingly, with urology consultation sought when necessary.

The collected data were entered and analyzed using SPSS version 25. Quantitative variables such as age were expressed as mean and standard deviation, while qualitative variables such as parity, placental characteristics, and urinary tract injuries were presented as frequencies and percentages. Stratification was performed to control for potential confounding variables, including age, parity, number of previous cesarean sections, and placental location. The Chi-square test was applied to assess the association between urinary tract injuries and these risk factors, and a p-value of ≤ 0.05 was considered statistically significant.

All ethical standards were strictly followed throughout the study. Patient confidentiality was maintained, and no personal identifiers were disclosed at any stage of data collection or analysis.

Table 1: Demographic and Obstetric Characteristics (n = 120)

Variable	Frequency (n)	Percentage (%)
Age (years)		
18–25	20	16.7
26–35	70	58.3
>35	30	25.0
Parity		
≤ 2	42	35.0
>2	78	65.0
Previous Cesarean Sections		
1	42	35.0
2	40	33.3
≥ 3	38	31.7

Table 2: Placental Characteristics (n = 120)

Variable	Frequency (n)	Percentage (%)
Placental Location		
Anterior	72	60.0
Posterior	48	40.0
Type of Placenta (PAS)		
Accreta	54	45.0
Increta	36	30.0

Percreta	30	25.0
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Table 3: Frequency of Urinary Tract Injuries (n = 120)

Variable	Frequency (n)	Percentage (%)
Urinary Tract Injury		
Yes	18	15.0
No	102	85.0
Type of Injury		
Bladder Injury	15	12.5
Ureteric Injury	3	2.5

Table 4: Association of Urinary Tract Injury with Risk Factors

Variable	Injury Yes n (%)	Injury No n (%)	p-value
Previous C-Sections			
1-2	8 (9.8%)	74 (90.2%)	
≥3	10 (26.3%)	28 (73.7%)	0.01
Placental Location			
Anterior	14 (19.4%)	58 (80.6%)	
Posterior	4 (8.3%)	44 (91.7%)	0.03
Placenta Type			
Accreta	4 (7.4%)	50 (92.6%)	
Increta	5 (13.9%)	31 (86.1%)	
Percreta	9 (30.0%)	21 (70.0%)	0.002

Discussion

The present study demonstrated that urinary tract injuries occurred in 15% of patients undergoing surgical management for morbidly adherent placenta. This finding is consistent with previously reported international data, where the incidence of urologic injuries ranges between 10% and 30% in patients with placenta accreta spectrum (11). The variation in reported rates may be attributed to differences in patient populations, severity of placental invasion, and surgical expertise.

In this study, bladder injury was the most common complication (12.5%), followed by ureteric injury (2.5%). This pattern is well supported in the literature, where bladder injuries predominate due to the close anatomical relationship between the bladder and the lower uterine segment, particularly in cases of anterior placenta and placenta previa (12). The risk is further increased in placenta percreta, where direct invasion into the bladder wall may occur, making dissection more challenging and increasing the likelihood of injury (13).

A significant association was observed between urinary tract injuries and the number of previous cesarean sections ($p = 0.01$). Patients with three or more prior cesarean deliveries had a markedly higher risk of injury. This finding aligns with previous studies demonstrating that repeated cesarean sections lead to dense adhesions and altered pelvic anatomy, thereby increasing surgical difficulty and complication rates (14). The rising global cesarean section rate has consequently contributed to the increasing incidence of placenta accreta spectrum and its associated morbidities (15).

Placental location also played a crucial role in determining the risk of urinary tract injury. In our study, anterior placentation was significantly associated with a higher frequency of injuries ($p = 0.03$). This is consistent with earlier reports indicating that anterior placenta predisposes to bladder involvement due to its proximity and the likelihood of adhesions between the uterus and bladder (16). Such anatomical distortion

complicates surgical dissection and increases the risk of inadvertent injury.

The degree of placental invasion was another important factor influencing the occurrence of urinary tract injuries. The highest frequency of injury was observed in cases of placenta percreta (30%), followed by increta and accreta, with a statistically significant association ($p = 0.002$). This finding is supported by previous studies, which have shown that deeper placental invasion is directly correlated with increased surgical morbidity and involvement of adjacent organs, particularly the bladder (17,18).

Our results are also comparable with local studies conducted in Pakistan, where bladder injuries have been reported as the most frequent urological complication in patients with morbidly adherent placenta (19). However, the overall frequency of complications may vary depending on the availability of resources, level of expertise, and timing of diagnosis. In many developing settings, delayed diagnosis and lack of multidisciplinary planning may contribute to increased morbidity (20).

The relatively lower incidence of ureteric injuries in this study may be attributed to careful intraoperative identification and prompt management. Nevertheless, ureteric injuries remain clinically significant due to their potential for serious long-term complications, including ureterovaginal fistula and renal dysfunction if not recognized early (21).

The findings of this study highlight the importance of early antenatal diagnosis and multidisciplinary management in reducing complications associated with PAS. Planned surgical intervention involving experienced obstetricians, urologists, and anesthesiologists has been shown to significantly improve maternal outcomes and reduce intraoperative morbidity (22).

Despite providing valuable insights, this study has certain limitations. It was conducted at a single tertiary care center, which may limit the generalizability of the findings. Additionally, long-term follow-up of patients was not included, which could have provided further information regarding delayed complications.

In summary, the results of this study are in agreement with existing literature and reinforce that urinary tract injuries remain a significant concern in the management of morbidly adherent placenta, particularly in high-risk patients with multiple prior cesarean sections, anterior placenta, and placenta percreta.

Conclusion

Urinary tract injuries are a significant and potentially serious complication in the surgical management of morbidly adherent placenta. This study demonstrated that bladder injuries are more common than ureteric injuries, with an overall notable frequency among affected patients. Key risk factors identified include multiple previous cesarean sections, anterior placental location, and increased depth of placental invasion, particularly placenta percreta. These findings emphasize the importance of early antenatal diagnosis and meticulous preoperative planning. A multidisciplinary approach involving experienced obstetricians, urologists, and anesthesiologists is essential to minimize intraoperative complications and improve maternal outcomes. Strengthening surgical expertise and adopting standardized management protocols can further reduce the burden of morbidity associated with placenta accreta spectrum in tertiary care settings.

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