Urological complications following obstetric-gynecologic procedures at Sanglah General Hospital, Bali-Indonesia

Kadek Budi Santosa,1 Pande Made Wisnu Tirtayasa, Anak Agung Gede Oka

ABSTRACT

Background: Surgical complications are often inevitable despite advances and improvement in surgical skills and science. Objective: We performed a study to investigate the clinical features of urological injury following obstetric and gynecologic procedures. Methods: We identified the urological complications which arose during or following obstetric-gynecologic procedures at Sanglah General Hospital, Bali from January 2014 to July 2017. The retrospective data retrieved included details of the procedures, the sites of injury, the treatments, and the outcomes. Results: We had 41 patients with urologic complications following obstetric and gynecologic procedures. According to the medical records, 14 had a bladder injury, 6 had a ureteral injury, 3 had both bladder and ureteral injuries, 16 had a vesicovaginal fistula, and 2 had a ureterovaginal fistula. A total abdominal hysterectomy was the most common procedure underlying complications. The second most common was radical abdominal hysterectomy. All cases of bladder injury underwent a primary suturing during surgery without complications. Where the ureter was injured, 2 patients underwent primary suturing, 5 underwent Boari flap technique, 2 underwent end-to-end anastomosis, and 2 underwent laparoscopic ureteroneocystostomy. Vesicovaginal fistula (VVF) was mostly managed using the transvaginal approach with a tissue flap. The overall success rate of VVF repair was 75% after a primary repair. Conclusion: Bladder injuries were the most common urological injury during obstetric and gynecologic procedures. VVF management with various surgery techniques yields a good result.

Keywords: obstetric-gynecologic procedure complication, urological complication, bladder injury, VVF

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INTRODUCTION

The anatomical positions of female genital and urinary tracts are in close proximity. Therefore, a surgical procedure involving one of the two structures must always consider the potential of injury to the other. There have been improvements in gynecological and obstetric techniques in preventing urinary tract injury. In addition, should any injury occur, immediate recognition and repair have been emphasized.1 Thus, nowadays long-term complications happen less frequently.2 When the normal anatomy is altered by primary pathologic factors or when it is insufficiently identified during intraoperative complications, such as severe bleeding or pelvic adhesions, the risk of damage increases.3 There are acute and chronic urinary tract injuries related to obstetric and gynecologic procedures. Acute complications can be identified immediately during the operation. However, chronic complications can occur later on. The chronic complications include vesicovaginal fistula (VVF), ureterovaginal fistula, and ureteral stricture.

A gynecologist must accurately understand the pelvic anatomy, choose a proper surgical technique, and constantly be prudent to avoid injury to the urinary tract.3 Early detection and treatment in the case of ureteral injury can prevent the decline of renal function and bring a satisfactory prognosis.1,3 But, in iatrogenic ureteral injuries with delayed diagnosis, the recommended first-line method is non-surgical treatment.1,3

We conducted our study to recognize urologic complications resulting from obstetric and gynecologic procedures in Sanglah General Hospital.

METHODS

From January 2014 to August 2017, 41 patients with genitourinary injuries during or following obstetric and gynecologic procedures were treated in the Division of Urology, Department of Surgery, Sanglah General Hospital, Bali.

Urological complications were defined as genitourinary tract laceration, transsection, rupture, or ligation found during surgery. In addition, the complications found after surgery include hydronephrosis or leakage of contrast media out of the urinary tract.

The patients were followed-up in the outpatient clinic at 2 weeks, 1 month, 3 months, and 6 months, with the taking of a detailed history and thorough

1 Correspondence to: Kadek Budi Santosa, Pande Made Wisnu Tirtayasa, Anak Agung Gede Oka busanbsa@gmail.com

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physical examination. In the case of bladder repair, urethral catheters were removed only after the absence of extravasation was confirmed by cystography. Serum creatinine, urine culture, and ultrasound examination were done at 1 and 3 months follow-up.

RESULTS

The mean age was 38 years old. A total of 51.2% of the patients had delayed complications such as kidney obstructions and fistula. Based on the type of injuries, a bladder injury occurred in 73.17% of the patients (n=30), ureter injury 19.51% (n=8), and both bladder and ureter 7.32% (n=3). A total of 53.33% (n=16) of the bladder-injured patients had a VVF.

Our data showed bladder complications were mostly caused by obstetric procedures. From a total of 30 patients with bladder injury, 14 occurred in a Caesarean section, 4 in an obstructed labor, 11 in a hysterectomy, and 1 following a radiation procedure. The ureteral injury occurred in 10 patients with radical and total hysterectomy, and 1 patient following a colpopexy surgery (Table 1).

Fourteen patients with iatrogenic bladder injury recognized during the surgery underwent primary suturing without complications. From a total of 16 VVF cases, 2 underwent laparoscopic transabdominal repair, 2 cases underwent open transabdominal cystography, and 12 cases underwent transvaginal repair with Martius flap. The overall success rate of the VVF repair was 75% at the primary repair (Table 2). Four cases, which failed at the first surgery, were later successfully managed using a transvaginal approach. The indwelling urethral catheter had been left for at least 14 days postoperatively in all of the patients. The urethral catheter was removed only after a cystogram confirmed the absence of extravasation.

Out of 6 patients with ureteral injury which were recognized intraoperatively, 2 had ureteral laceration and 4 had ureteral transection. The ureteral lacerations were managed by primary suturing. The ureteral transection underwent an end-to-end ureteral anastomosis. All of the ureteral transection were found with segmental tissue lost at the high level of the ureter which had to be repaired using Boari flap technique. From a total of 5 cases with a delayed-recognized ureteral injury, 3 were with kidney obstruction due to ureteral stricture, and 2 were found with ureterovaginal fistula. Three cases were managed using open Boari flap technique and 2 patients were repaired using laparoscopic ureteroneocystostomy. In all cases of ureteral injuries, pre-operative retrograde pyelography and retrograde double J (DJ) stenting were attempted first. Surgery was undertaken right away if the endourological procedure failed. The DJ stent was maintained for 2 months. At 6 months follow-up, no morbidities were found.

DISCUSSION

Urinary tract injury is the most common complication of pelvic surgery. The incidence was reported ranging from 0.5% to 1.5% and the bladder was the most common organ being injured.3-6 We had 41 patients with urological complications observed following obstetrics and gynaecological procedures over a four-year period. Joong et al. found 97 cases in 5 years and Diip Kumar et al. recorded 37 cases in 4 years.3,4 However, the number reported in our study is only a small fraction of the total number of patients affected. Our hospital is a tertiary care referral center for East Indonesia. Therefore, only complex urological cases which other hospitals have difficulty in treating are being referred to us. Some of these patients might have been suffering from their problem for years due to the lack of health workers in their region to consult with, the low level of education in the communities, or difficulties in transportation to health facilities. In

| Obstetric/Gynecologic Procedures | Bladder Injury | Ureter Injury | Bladder and Ureter Injury |
|----------------------------------|----------------|---------------|--------------------------|
| Hysterectomy                     |                |               |                          |
| Radical hysterectomy             | 1              | 3             | 1                        |
| Total abdominal hysterectomy      | 10             | 4             | 2                        |
| Obstetric                        |                |               |                          |
| Caesarian section                | 14             |               |                          |
| Obstructed labor                 | 4              |               |                          |
| Colpopexy                       |                | 1             |                          |
| Radiation                        | 1              |               |                          |
| Total (%)                        | 30 (73.2%)     | 8 (19.5%)     | 3 (7.3%)                 |
addition, some of the complications may be asymptomatic. For example, a unilateral ureteral obstruction is asymptomatic when the contralateral kidney retains its normal function. The true incidence is difficult to determine because most of the studies reviewed patients who were symptomatic and required urologic intervention.\textsuperscript{3,4,7}

The most common organ being injured in our study was the urinary bladder (80.5%). Bladder injury mostly followed obstetric procedures (60%). There were 14 bladder injuries with iatrogenic bladder injury recognized during surgery which had undergone primary suturing without further complication. Bladder injury in a Caesarean section may occur because the bladder failed to be emptied pre-operatively.\textsuperscript{8} Moreover, inadequate bladder flap reflection or extension of the incision into the vagina may also cause bladder injury in this procedure.\textsuperscript{9} The alteration of urine color in the urine bag is a significant sign in identifying bladder injury.\textsuperscript{9}

Radical abdominal hysterectomy and total abdominal hysterectomy were the two most common surgeries where ureteral injury may be recognized at the time of the procedures.\textsuperscript{5} Ureteral injury is least common in laparoscopic-assisted vaginal hysterectomy.\textsuperscript{6} Our study recorded 4 cases of ureteral injury resulting from a radical hysterectomy and 6 cases from a total hysterectomy. Ureteral injuries were found less commonly than bladder injuries but were far more troublesome. In our study, 6 patients with ureteral injury were

\begin{table}
\centering
\caption{Route of repair in VVF and the success rate}
\begin{tabular}{|l|c|c|c|}
\hline
Repair Route & Number of Patients & Number of Successful Closures & (%) \\
\hline
Transvaginal & 12 & 9 & 75% \\
Transabdominal (open) & 2 & 2 & 100% \\
Transabdominal (laparoscopy) & 2 & 1 & 50% \\
Total & 16 & 12 & 75% \\
\hline
\end{tabular}
\end{table}

\begin{table}
\centering
\caption{Primary management of urinary tract injuries}
\begin{tabular}{|l|c|}
\hline
Type of repair & Number of cases \\
\hline
Bladder & \\
Primary suturing & 14 \\
Ureter & \\
Immediate & Primary suturing & 2 \\
End-to-end anastomosis & 2 \\
Boari flap technique & 2 \\
Delayed & Laparoscopic ureteroneocystostomy & 1 \\
Open Boari flap technique & \\
Vesicovaginal fistula & Open transabdominal & 2 \\
Transvaginal & 5 \\
Transvaginal with flap & 7 \\
Laparoscopic transabdominal & 2 \\
Ureterovaginal fistula & Open Boari flap technique & 2 \\
\hline
\end{tabular}
\end{table}

\textbf{Figure 1} Vesicovaginal Fistula
recognized during surgery, while 5 cases were with delayed diagnosis accompanied by renal insufficiency. Five cases of ureteral transection were found with segmental tissue lost at the high level of the ureter which had to be repaired using Boari flap technique. This technique affords a means of transversing extensive ureteral defects close to the lower pole of the kidney. Ureteral injuries usually involve the pelvic ureter.\textsuperscript{10} Patients with altered anatomy, fibrosis or direct extension of the disease process are at high risk of iatrogenic ureteral injuries.\textsuperscript{11,12}

In all of our cases of ureteral injury, DJ stents were maintained for 2-3 months. At 6 months follow-up after surgery, we found no morbidities.

Three cases with concomitant urinary bladder and ureteral injury were detected intraoperatively during total abdominal hysterectomy. In all of the cases, primary bladder and ureteral repair with an end-to-end anastomosis and Boari flap technique were done. All cases were successfully treated.

From a total of 16 VVF cases, only one case was found following an obstructed labor. In many developing countries, obstetrical VVF remains a major medical problem.\textsuperscript{13} Good antenatal and obstetric care may reduce the risk of developing VVF in obstructed labors.

Our VVF fistula cases were found from 3 months to 6 years after the primary surgery. There is no consensus about the timing or surgical technique for fistula repair.\textsuperscript{14} The classical approach is to delay the repair from 3 months to 6 years after the primary surgery. There is no consensus about the timing or surgical technique of fistula repair. From 7 cases of VVF, 4 cases were with extensive fibrotic tissue and had undergone a previous repair by another surgeon, and 3 cases had VVF 3 cm in diameter. Two patients were treated with laparoscopic VVF repair. One of them failed but was successfully treated later using a transvaginal approach with Martius flap. The labial fat in Martius flap may ease the surgical dilemmas of poor quality tissue and overlapping suture lines. In tissue where there may not be layers to close, the flap creates a layered closure. It also encourages neo-vascularity so that it improves healing and cure rate.\textsuperscript{15} The advantages of laparoscopic surgery include decreased convalescence, shorter hospitalization, and decreased pain medication requirements. The main drawback is the steep learning curve associated with laparoscopy.\textsuperscript{16} VVF treatment remains challenging for a surgeon. The choice of technique used depends on the severity of the case and individual surgeon preference.
CONCLUSION

Bladder injury was the most common urological injury during obstetric and gynecologic surgery, followed by ureteral injury. VVF is one of the complications that may arise from labor or a urogenital surgery and the treatment is challenging. It is important to analyze the postoperative complications to help a surgeon to understand why things went wrong and to plan the management to avoid such complications in the future.

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