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Case Report

Management of Iatrogenic Ureteral Trauma Post Caesarean Section

Tatalaksana Trauma Ureter Iatrogenik Pasca Sectio Caesarea

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ABSTRACT

Trauma in the ureter occurs in 1-2.5% of all urogenital trauma, and the most common causes of iatrogenic ureteral trauma come from the Obstetrics Gynecology field (59%). One of the causes of delayed diagnosis of ureteral trauma is the lack of operator awareness. This case report described a 29-year-old woman suspected of ureteral trauma after urine-like fluid was found during a caesarean section operation. After 12 days, a clear-yellowish fluid was obtained from the abdominal drain, so the patient was referred to urologists. The abdominal drain produced fluid approximately 250-300cc/24 hours, clear yellow color. IVP and left RPG inferred left distal ureter laceration AAST grade III. Re-exploration, ureteroneocystostomy using Boari Flap technique, and DJ-Stent insertion were done. On the second day postoperative, the abdominal drain production was < 25cc/24 hours in red color. Ureteral trauma is rare, often unnoticed, and often diagnosed late due to a lack of operator alertness.

Keywords: *Boari Flap, caesarean section, iatrogenic, psoas hitch, ureteral trauma*

ABSTRAK

Trauma pada ureter terjadi pada 1-2,5% dari seluruh trauma urogenitalia dan penyebab trauma ureter iatrogenik terbanyak berasal dari bidang obstetri ginekologi (59%). Salah satu penyebab tertundanya diagnosis trauma ureter adalah kurangnya kewaspadaan operator, sehingga dapat meningkatkan resiko komplikasi. Laporan kasus memaparkan seorang perempuan berusia 29 tahun yang dicurigai mengalami trauma ureter setelah didapatkan rembesan cairan kuning jernih di lapangan operasi *sectio caesarea*. Setelah 12 hari, dari *drain* abdomen didapatkan cairan kuning jernih, sehingga pasien dirujuk ke urologi. *Drain* abdomen berproduksi cairan kurang lebih 250-300cc/24 jam, warna kuning jernih. Dari *IVP* dan *left RPG* disimpulkan laserasi ureter distal kiri AAST derajat III. Dilakukan re-eksplorasi, ureteroneosistostomi dengan teknik *Boari Flap*, dan insersi *DJ-Stent.* Hari kedua pasca operasi, produksi *drain* abdomen < 25cc/24 jam berwarna merah. Trauma ureter merupakan kasus yang jarang, sering tidak disadari, dan sering terlambat didiagnosis karena kurangnya kewaspadaan operator.

Kata Kunci: *Boari Flap, iatrogenik, psoas hitch, sectio caesarea, trauma ureter*

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INTRODUCTION

Trauma in the ureter is rare, with an incidence rate of 1-2.5% of all cases of urogenital trauma (1,2) due to its mobility, the size of the ureter, and the closeness to the vertebrae, pelvic bones, and muscles (3). Based on location, ureteral trauma mostly occurs in the total-right ureter (51.8%), total-left ureter (48.1%), left-distal ureter (40.7%), right-distal ureter (33.3%), and right-middle ureter (7.4%) (4).

This study showed that ureteral trauma is mainly caused by surgeries in the field of obstetrics gynecology (59%), followed by general surgery (24%), urology (15%), and orthopedics (2%) (4). Iatrogenic trauma can occur in open, laparoscopy, or endoscopic surgeries. Indications for surgery, such as pregnancy, tumors, cancer, previous surgical history, irradiation, congenital-anatomical abnormalities, or infectious processes (3), can cause anatomical malposition of the ureter so that the ureters are difficult to be identified and make the operator unaware if trauma has occurred. Causes of iatrogenic can be ligation, bending, sutures, crush injury due to clamps, lacerations, thermal injury, and ischemia due to devascularization (3).

CASE REPORT

This study reported a twenty-nine-year-old woman with a chief complaint of urine-like fluid discharged from the abdominal-evaluation drain for 12 days after caesarean section surgery. During the cesarean section surgery, there was a suspicion of urine seepage in the operating field, so an evaluation drain was placed on the abdomen.

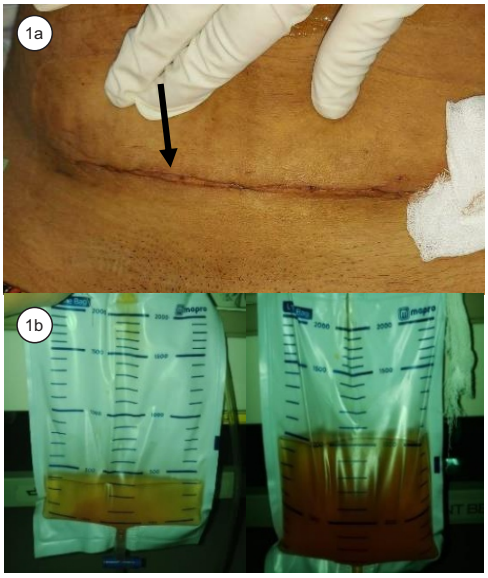

Figure 1. a) Postoperative caesarean section wound, a 20-cm Pfannenstiel cut, wet, b) Abdomen-evaluation drain (left) and urinary catheter (right) production, both shares similar macroscopic appearances

From the physical examination, the hemodynamics were within normal limits. On the abdomen was a sign of a Pfannenstiel incision wound of approximately 20 cm, wet, wrapped in sterile gauze (Figure 1a). From the abdominal-evaluation drain, urine-like fluid was obtained at about 250-300cc/24 hours. In the genitalia, a 2-way urine catheter 16Fr was attached with a production of 400cc/8 hours of clear yellow color urine (Figure 1b).

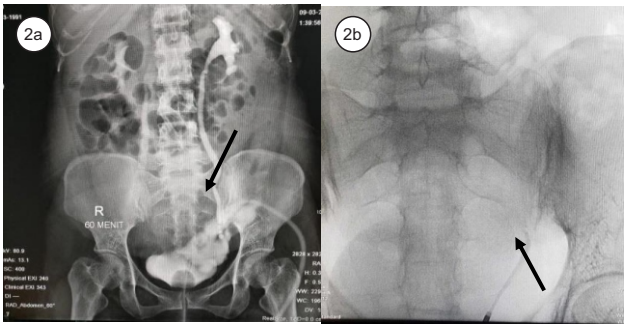

Figure 2. a) IVP at the 60th minute. IVP shows contrast extravasation on the left distal ureter, b) Left-RPG shows contrast rising to the left distal ureter

From complete blood counts, urinalysis, kidney function, blood sugar levels, and Anti-SARS Cov-2, the results were within normal limits. The Intravenous Pyelography (IVP) (Figure 2a) revealed a laceration in the left-distal ureter. The left-retrograde pyelography (RPG) (Figure 2b) found that contrast rose to the left-distal ureter.

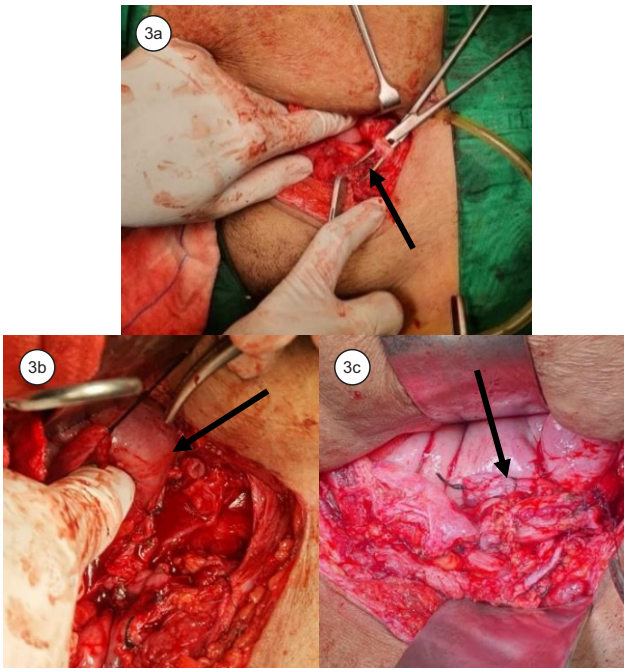

Figure 3. a) Fibrosis process b) Ureter identification c) Post ureteroneocystostomy with Boari Flap technique

The patient was positioned from lithotomy to supination, and an incision was made following the previous Pfannenstiel cut of the caesarean section surgery. During the identification, adhesion and fibrotic process of the uterus were found, suture marks on the ureter and uterine arteries, and adhesion of the proximal and distal ureter (Figure 3a, Figure 3b). The ureter was released in a proximal direction as far as 3 cm bluntly. A ureteral incision

was then performed, and the distance of the ureter to the bladder was measured. The approximate distance obtained was 15 cm. A reconstructive incision measuring 3x4 cm in the bladder was made, followed by spatulation of the ureter and retrograde installation of Double J-Stent (DJ-Stent), and ureteroneocystostomy was performed using Boari Flap Technique (Figure 3c).

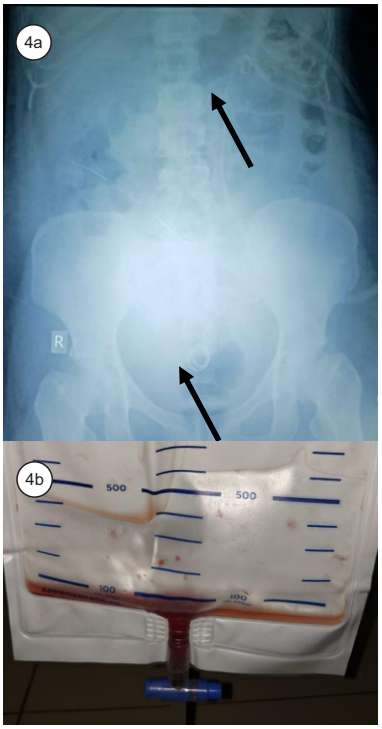

Figure 4. a) KUB photo shows DJ stent b) Postoperative drain's production

Two-layer bladder sutures, evaluation of bleeding, installation of drain, and closing of the peritoneum, muscles, fascia, and skin were performed. After the surgery, a plain photo of the Kidney Ureter Bladder (KUB) was taken, and DJ-Stent in situ was found (Figure 4a). On the second postoperative day, the drain production was less than 25 cc in 24 hours in red color (Figure 4b). The patient was then discharged.

DISCUSSION

This study reported a patient suspected of ureteral trauma with a complaint of yellowish urine-like fluid from the abdominal drain for the last 12 days after caesarean section surgery. The symptoms of ureteral trauma include fever, flank pain, abdominal pain, nausea, and vomiting. Signs that appear can be hydronephrosis (e.g., in the ureter ligation), extravasation of urine into the peritoneal cavity (becomes ascites) into the vagina, or the leakage of urine through the wound in the body (5). One of the causes of delayed diagnosis of ureteric trauma is a lack of operator alertness which reaches 50% of the total incidents (4).

Suspicion of iatrogenic ureteral trauma can also be based on the presence of the bluish color on the operating field during the primary procedure after the patient is intravenously injected with indigo carmine. From the urinalysis, microscopic hematuria can be obtained. On radiology examination, Computed Tomography-Urography (CT-Urography) can be performed to see contrast extravasation, Anterograde/Retrograde Urography to determine the location of obstruction or extravasation, Ultrasonography to see the signs of hydronephrosis, hydroureter, and urinoma, and Radionuclide Scanning to see delayed excretion at the point of ureter trauma of postoperative correction (2,5,6).

The differential diagnoses of ureteral trauma are postoperative intestinal obstruction, deep wound infection, or acute pyelonephritis (6). Diagnosis of ureteral trauma can be delayed due to several causes, such as malignancy, adhesion, pelvic cavity organ prolapse, and lack of operator awareness (7). Complications that can occur are ureteric strictures, hydronephrosis, urinoma, pyelonephritis, urinary tract infection, and decreased renal function, which can lead to nephrectomy (4). A study stated that if iatrogenic ureteral trauma diagnosis is delayed within three days, it will lead to difficulty in installing a stent that leads to more severe complications (4). To reduce the risk of iatrogenic ureteral trauma, visual identification can be made carefully (2), and installation of ureteral stents can facilitate visualization and palpation of the ureter (3).

In this patient, the cause of iatrogenic trauma was surgery in the area of obstetrics-gynecology, namely caesarean section. The patient was previously suspected of ureteral trauma after a urine-like fluid was found in the operating field but was not consulted to urologists, and an evaluation drain was installed in the abdominal cavity. After 12 days, the abdominal-evaluation drain still produced urine-like fluid of approximately 250-300 cc in 24 hours, so the patient was referred to urologists. After IVP and RPG examinations, there was contrast extravasation, and the location of the laceration was in the left distal ureter and categorized as AAST grade III ureteral trauma (Table 1).

Table 1. American Association for the surgery of trauma organ injury severity scale for the ureter (2,8)

Degree	Type	Description
I	Hematoma	Contusion or hematoma without devascularization
II	Laceration	Transection <50%
III	Laceration	Transection ≥50%
IV	Laceration	Complete transection with devascularization <2cm
V	Laceration	Avulsion with devascularization >2cm

The management of ureteral trauma should be done immediately since the diagnosis is established. If the diagnosis of ureteral trauma cannot be established within 7-10 days and there are no signs of infection and complications, it is necessary to re-explore and repair immediately (6). Because the diagnosis of ureteral trauma was established on the 12th day, the suitable treatment for this patient was performing re-exploration and repair carried out with psoas hitch that could be done using the Boari Flap technique (2,6,9,10). However, this technique cannot be used in patients with contracted bladders and a history of radiation to the pelvic area because it will

complicate bladder mobilization and compromised blood supply (11). After the reconstruction, a left-ureter stent was installed to optimize the healing process.

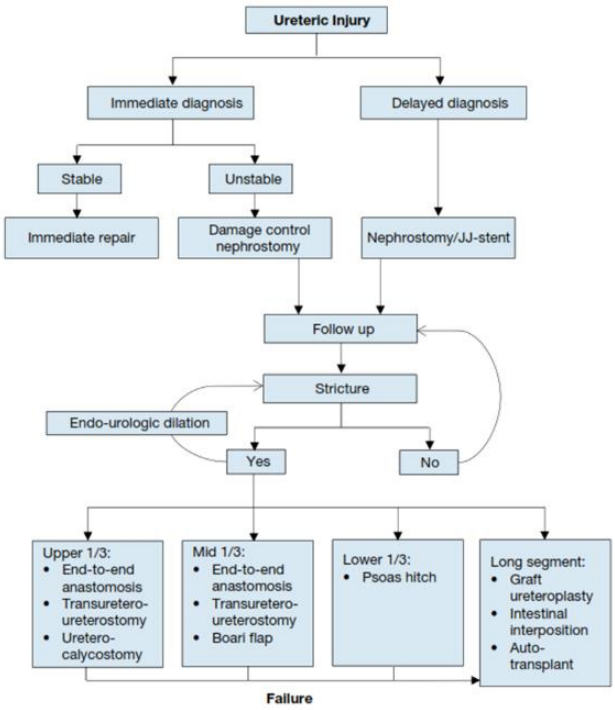

Figure 5 Ureteral trauma management flow (6)

The principle of urethral trauma management should include debridement of necrotic tissue, spatulation of the end of the ureter, watertight intramucosal anastomoses using absorbable sutures, internal stenting, external drainage, and isolation of the injury with the peritoneum or omentum (3). Management of ureteral trauma depends on the timing of diagnosis, causal factors, severity, and location of trauma (7). The management of ureteral trauma can be summarized through the flow chart in Figure 5 (3,9).

In the final stages of treatment, percutaneous nephrostomy or stenting may be performed. One preferred technique is the installation of internal silicone stents before closing the operating field. J-shape memory curve at each end of the stent will help to prevent the stent from switching positions. The stent can be endoscopically removed after 3-4 weeks postoperative from the bladder. The stent will help keep the ureter straight, maintain the diameter of the ureter, and prevent the extravasation of urine (6,12).

Iatrogenic ureteral trauma is unnoticed because of the operator's lack of awareness. Appropriate investigations, such as IVP and RPG, have an important role in proving the presence of ureteral trauma, its degree, location, and predicting possible complications. Ureteroneocystostomy with Boari Flap technique followed by insertion of DJ-Stent is an effective treatment option for late-diagnosed iatrogenic ureteral trauma.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study has already been approved by the Saiful Anwar General Hospital's ethical committee with letter number 400/008/CR/302/2021

CONSENT FOR PUBLICATION

This study has received the patient's consent for publication

AVAILABILITY OF DATA AND MATERIALS

We don't have data and materials published on the journal

COMPETING INTEREST

There is no competing of interest

FUNDING

There is no funding associated with our study.

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