

IATROGENIC URINARY TRACT TRAUMA IN OBSTETRICS AND GYNECOLOGIC SURGERIES AT H. ADAM MALIK GENERAL HOSPITAL MEDAN

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ABSTRACT

Objective: Urinary tract iatrogenic trauma in abdominal or pelvic surgery may cause morbidity, mortality, or even medico-legal problems. The close embryonic, as well as anatomical relationship between urinary tract and genital organs, may be a predisposition for urinary tract trauma, especially ureter and bladder, in obstetrics and gynecology surgeries. This research aimed to evaluate the incidence of iatrogenic urinary tract trauma in obstetrics and gynecology surgeries. **Material & Methods:** This was a descriptive retrospective research. This research was conducted at Urology Division of Department of Surgery at H. Adam Malik General Hospital, Medan, from February to June 2016. Total sampling method was used. Data were collected from medical records of patients who had iatrogenic urinary tract trauma due to obstetrics and gynecology surgeries at H. Adam Malik General Hospital from January 2011 to December 2015. Parameters that were evaluated included patient characteristics, the type of obstetrics and gynecology procedure that was conducted, the type of urinary tract trauma, and the type of urologic procedure conducted. Data were registered and analyzed using statistical software SPSS version 22. **Results:** There were 25 patients with 28 incidences of iatrogenic urinary tract trauma, which consisted of 12 iatrogenic ureteral trauma and 16 iatrogenic bladder trauma, out of all patients who underwent obstetrics and gynecologic surgeries at H. Adam Malik General Hospital, Medan, from January 2011 to December 2016. The youngest patient was 19 years old, while the oldest patient was 78 years old. Mean age of patients was 46.48 years ($SD \pm 11.6$). The age group with the most iatrogenic urinary tract trauma was between 26-45 years old, which consisted of 12 patients (48%). Gynecologic patients had the most iatrogenic urinary tract trauma, which was experienced by 23 patients (92%). The most common diagnosis was ovarian cancer. Hysterectomy was the most common procedure to cause iatrogenic urinary tract trauma, as was found in 23 patients (92%). All patients who were found with iatrogenic bladder trauma (15 patients; 60%) underwent bladder repair. **Conclusion:** Gynecologic procedure, especially hysterectomy, was the most common cause of iatrogenic urinary tract trauma. Bladder repair procedure was the most common procedure performed on patients who were found with iatrogenic urinary tract trauma.

Keywords: Gynecology, iatrogenic trauma, obstetrics, urinary tract.

ABSTRAK

Tujuan: Trauma traktus urinarius iatrogenik pada operasi abdomen atau pelvis dapat menyebabkan morbiditas, mortalitas, atau masalah medikolegal. Asal embriologis yang berdekatan serta hubungan secara anatomis antara traktus urinarius, terutama ureter dan buli, dan organ genitalia menjadi predisposisi terjadinya trauma traktus urinarius pada operasi obstetri dan ginekologis. Penelitian ini bertujuan untuk mengevaluasi insidensi dari trauma traktus urinarius iatrogenik pada operasi obstetri dan ginekologis. **Bahan & Cara:** Penelitian ini merupakan studi deskriptif retrospektif. Penelitian ini dilakukan di Divisi Urologi, Departemen Bedah di RSUP H. Adam Malik Medan, dari Februari sampai Juni 2016. Metode total sampling digunakan dalam penelitian ini. Data diperoleh dari rekam medis pasien yang menderita trauma traktus urinarius iatrogenik akibat operasi obstetri dan ginekologis di RSUP H. Adam Malik Medan dari Januari 2011 sampai Desember 2015. Parameter yang dievaluasi meliputi karakteristik pasien, jenis prosedur obstetri dan ginekologis yang dilakukan, jenis trauma traktus urinarius, dan jenis prosedur urologis yang dilakukan. Data dicatat dan dianalisis dengan perangkat lunak statistik SPSS versi 22. **Hasil:** Terdapat 25 pasien dengan 28 insidensi dari trauma traktus urinarius iatrogenik yang terdiri dari 12 trauma ureter iatrogenik dan 16 trauma buli iatrogenik, dari seluruh pasien yang mengalami tindakan operasi obstetri dan ginekologis di RSUP H. Adam Malik Medan dari Januari 2011 sampai Desember 2016. Pasien usia termuda adalah 19 tahun, sedangkan usia tertua adalah 78 tahun. Rerata usia pasien adalah 46.48 tahun ($SD \pm 11.6$). Kelompok usia dengan insidensi terbanyak terdapat pada rentang usia 26-45 tahun, meliputi 12 pasien (48%). Pasien ginekologis mengalami kejadian trauma traktus urinarius iatrogenik lebih banyak,

dialami oleh 23 pasien (92%). Diagnosis terbanyak adalah kanker ovarium. Histerektomi merupakan tindakan yang paling sering menyebabkan trauma traktus urinarius iatrogenik, yang dijumpai pada 23 pasien (92%). Seluruh pasien yang menderita trauma buli iatrogenik (15 pasien; 60%) dilakukan repair buli. **Simpulan:** Prosedur ginekologis, terutama histerektomi, merupakan penyebab tersering dari trauma traktus urinarius iatrogenik. Prosedur repair buli merupakan prosedur yang paling sering dilakukan pada pasien yang mengalami trauma traktus urinarius iatrogenik.

Kata kunci: Ginekologis, trauma iatrogenik, obstetrik, traktus urinarius.

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INTRODUCTION

Despite its rarity, it is important for urologists to understand iatrogenic trauma. Urinary tract iatrogenic trauma in abdominal or pelvic surgery may cause morbidity, mortality, or even medico-legal aspects.¹ Occurring morbidities include increased length of hospital stay, increased needs for additional intervention, increased duration of surgery, decreased renal function, and decreased patients' quality of life.² Trauma investigation and management, both in acute and delayed condition, are important to decrease the effects of possible complications.^{1,2}

Urinary tract iatrogenic trauma may be caused by various procedures, such as urological procedures, colorectal surgeries, as well as obstetrics and gynecology surgeries.³ The close embryonic, as well as anatomical relationship between urinary tract and genital organs, may be a predisposition for urinary tract trauma in obstetrics and gynecology surgeries.⁴

The incidence of iatrogenic trauma in obstetrics and gynecologic surgeries vary in each country. A study by Nawazh and Odzemir determined that the incidence of iatrogenic trauma of urinary tract was around 0.74-0.79%.^{5,6} The most common urinary tract trauma in obstetrics and gynecologic surgeries is ureteral and bladder trauma. In the study by Visco AG et al., it was found that the incidence of ureteral trauma in gynecologic surgeries was around 0.02-6%.⁷ The incidence of iatrogenic trauma in obstetrics and gynecologic surgeries in Indonesia, especially North Sumatra, has not been reported. Thus, the author was interested in conducting this research.

OBJECTIVE

This research aimed to evaluate the incidence of iatrogenic urinary tract trauma in

obstetrics and gynecology surgeries. More specifically, this research aimed to evaluate the number of iatrogenic urinary tract trauma incidences, the characteristics of obstetrics and gynecology procedures which may cause iatrogenic urinary tract trauma, as well as the characteristics of urology procedures in patients with iatrogenic urinary tract trauma due to obstetrics and gynaecology surgeries.

MATERIAL & METHODS

This was a descriptive retrospective research. This research was conducted at Urology Division of Department of Surgery at H. Adam Malik General Hospital, Medan, from February to June 2016. Research population were all patients diagnosed with iatrogenic urinary tract trauma due to obstetrics and gynecology surgeries intraoperatively at H. Adam Malik General Hospital. Total sampling method was used. The inclusion criteria for research participants were patients who had iatrogenic urinary tract trauma due to obstetrics and gynecology surgeries intraoperatively at H. Adam Malik General Hospital. The exclusion criteria were patients who did not undergo obstetrics and gynecology surgeries at H. Adam Malik General Hospital.

Data were collected from medical records of patients who had iatrogenic urinary tract trauma due to obstetrics and gynecology surgeries intraoperatively at H. Adam Malik General Hospital from January 2011 to December 2015. Parameters that were evaluated included patient characteristics, the type of obstetrics and gynecology procedure that was conducted, the type of urinary tract trauma, and the type of urologic procedure conducted.

Data were then registered and analyzed using statistical software SPSS version 22. Data were then presented in tables and tabulations.

RESULTS

In this research, there were 28 incidents of iatrogenic urinary tract trauma from all patients who underwent obstetrics and gynecology surgeries from January 2011 to December 2015. There were 25 patients included in this research; three patients were excluded as they had iatrogenic trauma while undergoing obstetrics and gynecology surgeries outside of H. Adam Malik General Hospital, Medan. In this research, out of 25 patients who had iatrogenic urinary tract trauma, there were three patients who had more than one iatrogenic urinary tract trauma. Therefore, in this research, there were in total 28 iatrogenic urinary tract trauma which was experienced by patients who had undergone obstetrics and gynecology surgeries at H. Adam Malik General Hospital, Medan, from January 2011 to December 2016, which consisted of 12 iatrogenic ureteral trauma and 16 iatrogenic bladder trauma.

In this research, we found that the youngest patient was 19 years old, while the oldest patient was 78 years old. Mean age of patients was 46.48 years (SD ± 11.6). The age group with the most iatrogenic urinary tract trauma was between 26-45 years old,

which consisted of 12 patients (48%). The age group with the most iatrogenic ureteral trauma was between 46-65 years old, which consisted of 6 patients (50%). Meanwhile, the age group with the most iatrogenic bladder trauma was between 26-65 years old, which consisted of 14 patients (87.5%).

In this research, we found that gynecologic patients had the most iatrogenic urinary tract trauma, which account for 25 cases in both ureteral and bladder injury, compared to obstetric patients with 3 cases. Ovarian cancer was the most common gynecological abnormalities which cause both iatrogenic ureteral trauma in six patients (50%) and iatrogenic bladder trauma in five patients (31.5%) of total 9 cases (36%). In this research, we also found iatrogenic ureteral and bladder trauma in one patient diagnosed with uterine atony and iatrogenic bladder trauma in one patient diagnosed with severe preeclampsia.

In this research, we found that hysterectomy was the most common procedure to cause iatrogenic urinary tract trauma, as was found in total of 26 cases. We also found cesarean section as the procedure to cause iatrogenic bladder trauma in 2 cases.

Table 1. Patients' characteristics based on age.

Age Group	Total Cases of Urinary Tract Trauma (%)	Injury in Ureter (%)	Injury in Bladder (%)
12-25	1 (4)	1 (8.3)	-
26-45	12 (48)	5 (41.67)	7 (43.75)
46-65	10 (40)	6 (50)	7 (43.75)
>65	2 (8)	-	2 (12.5)
Total	25 (100)	12 (100)	16 (100)

Table 2. Patients' characteristics based on obstetrics and gynecology diagnosis.

Obstetrics and Gynecology Diagnosis	Cases of injury in Ureter (%)	Cases of injury in Bladder (%)
Gynecologic		
Ovarian cancer	6 (50)	5 (31.25)
Uterine myoma	3 (25)	3 (18.75)
Cervical cancer	1 (8.3)	3 (18.75)
Endometriosis	1 (8.3)	2 (12.5)
Uterine prolapse	-	1(6.25)
Obstetric		
Preeclampsia	-	1 (6.25)
Uterine atony	1 (8.3)	1(6.25)
Total	12 (100)	16 (100)

Table 3. Patients' characteristics based on obstetrics and gynecology procedures.

Procedures	Cases of injury in Ureter (%)	Cases of injury in Bladder (%)
Hysterectomy	12 (100)	14 (87.5)
Cesarean section	-	2 (12.5)
Total	12 (100)	16 (100)

Table 4. Patients' characteristics based on iatrogenic urinary tract trauma.

Diagnosis	Cases of injury in Ureter (%)	Cases of injury in Bladder (%)
Intraperitoneal bladder rupture	-	15 (100)
Ureteral transection (R)	4 (28.6)	-
Ureteral transection (L)	6 (42.85)	-
Ureteral stenosis (R)	3 (21.4)	-
Ureteral stenosis (L)	1 (7.15)	-
Total	14 (100)	15 (100)

Table 5. Patients' characteristics based on urological procedures.

Urological procedures	Cases of injury in Ureter (%)	Cases of injury in Bladder (%)
Bladder repair	0 (0)	15 (100)
Ureterocutaneostomy	9 (75)	-
Ureter ligation + DJ stent insertion	1 (12.5)	-
Inoperable	1 (12.5)	-
Total	11 (100)	15 (100)

In this research, the most common type of iatrogenic trauma was bladder rupture, which was found in 15 patients account for all bladder injury, where intraperitoneal rupture contributed in all 15 cases. While in ureteral injury, we found ureteral transection as the most common injury with total of 10 cases, 4 in the right, and 6 in the left ureter.

In this research, we found that in patients with iatrogenic ureteral trauma, the side of ureter injured was identical between the left and the right side, and there were three patients discovered with bilateral iatrogenic trauma.

In this research, we found that all patients who were found with iatrogenic bladder trauma (15 patients) underwent bladder repair. We also found in this research that there were two patients who passed away during hospital stay. However, one of the patients who were deceased came under a condition in which it was no longer possible to perform a surgery.

In this research, we also found that nine cases which had iatrogenic ureteral trauma underwent ureterocutaneostomy. In one patient who had ureteral trauma, anastomosis was not able to be made, therefore, ureteral ligation and nephrostomy were conducted since there was wide dissection on the injured ureter.

DISCUSSION

The incidence of iatrogenic trauma in various studies differed; however, almost all studies reported that gynecological abnormalities were the most common cause of iatrogenic trauma, especially iatrogenic bladder trauma. Similar results were also found by Liapis et al., which reported that gynecologic procedures were the main cause of iatrogenic ureteral trauma, which was 85%, with the incidence of ureteral trauma due to gynecological procedures reaching 0.35%.⁸ Mo et al., also

discovered that the risk for ureteral trauma incidence in gynecology surgeries was five times higher when compared to endoscopic surgeries.⁹

In this research, we also found that ovarian cancer was the most common gynecological abnormalities which cause iatrogenic ureteral trauma in nine patients (36%) and iatrogenic bladder trauma in five patients (31.5%). This result is similar to the study result by Mo et al., which mentioned that ovarian cancer surgery was the most common gynecology surgery to cause iatrogenic trauma (33.3%).⁹ The high number of iatrogenic trauma incidences was caused as ureter position changed during ovarian cancer surgery, especially when the size of cancer was larger than 4 cm. Moreover, ovarian malignancies also cause adhesion on the ureter and bladder, which made it difficult for the operators to identify the ureter and bladder during the surgical procedure.

In this research, we also found iatrogenic ureteral and bladder trauma in one patient diagnosed with uterine atony and iatrogenic bladder trauma in one patient (4%) diagnosed with severe preeclampsia. A study by Afzal et al., showed that the incidence of iatrogenic trauma in patients undergoing obstetrics surgeries was 0.69%, with bladder trauma as the most common injury (88.67%).¹⁰ The study by Afzal and Syaundra et al., also reported that the possibility of iatrogenic bladder trauma increased in patients undergoing emergency obstetric procedures.¹⁰ This condition as the patients' condition was generally not optimum, forcing the operators to make wide incision in order to perform the procedure better and rapidly, as in procedures such as hysterectomy and cesarean section.

In the study by Chinakwana et al., it was found that transabdominal hysterectomy was the most common cause of iatrogenic urinary tract trauma (85%).¹¹ This was because anatomically, ureter is positioned diagonally with uterine blood vessels on infundibulopelvic ligament.¹¹ Iatrogenic trauma, especially ureteral trauma did not only happen during ligation or tissue dissection but may also occur due to thermal injury caused by improper use of diathermy.¹² Therefore, the number of iatrogenic trauma incidences will increase even more if there were massive, uncontrolled bleeding during surgery or if there were found adhesions to surrounding tissues.

In this research, the most common type of iatrogenic trauma was bladder rupture, which was

found in 15 patients (60%). This result was similar to the results of various studies which found that iatrogenic bladder trauma was more commonly found in patients undergoing obstetrics and gynecology surgeries. This trauma usually occurred during releasing the bladder caudally in the ureterovesical space, as there was usually fibrosis between the base of bladder and pubovesical fascia.¹³

However, it is necessary to notice the difficulty in determining the real number of iatrogenic trauma incidences in obstetrics and gynecology surgeries, as various researches reported different results. Some researches reported that the incidence of iatrogenic ureteral and bladder trauma was around 0.43-1.23%, while other researches reported that the number might have reached 0.5-0.11%.^{14,15} Another study by Mo et al., concluded that the number of iatrogenic trauma incidences in gynecologic surgeries was 4.84%, with most injuries affecting the ureter.⁹ A study by Visco AG et al., also found high numbers of iatrogenic ureteral trauma in gynecologic surgeries, which was 6%.⁷

In a few researches, it was also mentioned that the low number of iatrogenic ureteral trauma incidences was because of only a third of all iatrogenic ureteral trauma that was identified and reported. This was so as most iatrogenic ureteral trauma was asymptomatic or did not cause any sign or symptom until there was decreased renal function.¹⁶ The high possibility of iatrogenic ureteral trauma may be caused by the proximity of ureter anatomical position with uterine blood vessel, and that ureter may be positioned anywhere in the retroperitoneal area and upper pelvis.^{16,17} Other factors are the difficulty in identifying the ureter due to its position or congenital abnormalities such as ureter duplication.¹⁷

In this research, we found that in patients with iatrogenic ureteral trauma, the side of ureter injured was identical between the left and the right side, and there were three patients discovered with bilateral iatrogenic trauma. This finding contrasted with the results of some researches, which showed mentioned that most patients suffered iatrogenic trauma on the left ureter, as anatomically, the left ureter was closer to the uterus.¹⁸

In this research, we found that all patients who were found with iatrogenic bladder trauma (15 patients; 60%) underwent bladder repair. This management approach corresponded to EAU recommendations, which stated that all patients with repaired.¹⁹ We also found in this research that there

were two patients (8%) who passed away during hospital stay. This finding was not much different from the result in the study by Philliatrogenic bladder trauma, either intraperitoneal or extraperitoneal, should have it Ipo et al., who found that the mortality rate of patients with iatrogenic urinary tract trauma was 7.3%.²⁰ However, one of the patients who were deceased came under a condition in which it was no longer possible to perform a surgery.

In the same research, it was also mentioned that there were a few factors causing mortality in patients who had iatrogenic trauma, including late-onset symptoms, decreased renal function, infected surgery wounds, and unidentified iatrogenic trauma.²⁰ These factors needed special attention as iatrogenic trauma is a condition which may lead to medico-legal problems.

In this research, we also found that eight patients (32%) who had iatrogenic ureteral trauma underwent ureterocutaneostomy. In one patient (4%) who had ureteral trauma, anastomosis was not able to be made, therefore, ureteral ligation and nephrostomy were conducted since there was wide dissection on the injured ureter.

CONCLUSION

In this research, there were 25 patients with 28 incidences of iatrogenic urinary tract trauma, which consisted of 12 iatrogenic ureteral trauma and 16 iatrogenic bladder trauma, out of all patients who underwent obstetrics and gynecologic surgeries at H. Adam Malik General Hospital, Medan, from January 2011 to December 2016. Gynecologic procedure, especially hysterectomy, was the most common cause of iatrogenic urinary tract trauma. Bladder repair procedure was the most common procedure performed on patients who were found with iatrogenic urinary tract trauma.

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