Abstract. – BACKGROUND: The double-J stent (DJS) is a commonly used ureteral stent in urological surgeries, which provides support and drainage. However, the DJS may result in various complications such as infection, hematuria, stone formation, stent occlusion, and migration. Normally, one end of the DJS is located in the renal pelvis, and the other end in the bladder. In this case report, we describe the rare occurrence of a misplaced DJS during laparoscopic pyeloplasty, which was unintentionally placed in the contralateral renal pelvis.

CASE REPORT: A 4-month-old male infant was diagnosed with left hydronephrosis. After confirmation of the diagnosis, laparoscopic left pyeloplasty was performed with the placement of a DJS. The patient did not experience any discomfort, such as nausea, vomiting, refusal to feed, crying and restlessness, or fever, after the operation, and was discharged on postoperative day 4. The patient returned to the hospital for DJS removal 6 weeks after the operation. However, the kidneys, ureters, and bladder (KUB) X-ray examination showed that the DJS was unintentionally placed in the contralateral ureter and renal pelvis. The stent was confirmed and removed under cystoscopy. Postoperative examination of the DJS showed that there was a hole in the side of the middle of the stent for urine drainage, with no obstruction or contralateral hydronephrosis.

CONCLUSIONS: Misplacement of a DJS in the contralateral renal pelvis during laparoscopic pyeloplasty is a rare but potentially serious complication. Surgeons should be cautious when placing the stent and confirm its placement with imaging studies. Patients should be closely monitored for postoperative complications and prompt intervention should be taken if necessary.

Key Words: Pyeloplasty, Double-J stent, Children, Misplacement, Complications.

Introduction

Ureteropelvic junction obstruction (UPJO) is a congenital disease where obstruction of the ureteropelvic junction results in poor urine flow and dilation of the collecting system, which is a common cause of pediatric hydronephrosis. It has been reported that the incidence of UPJO in newborn babies ranges from 1:500 to 1:1250, and often a surgical intervention is required to relieve the obstruction and preserve renal function. There are several treatment options available for UPJO, and traditional open pyeloplasty has been considered the gold standard. Since the first pediatric laparoscopic pyeloplasty was reported in 1993, it has been continuously developing and improving. In recent years, robot-assisted laparoscopic pyeloplasty has achieved good results due to its minimally invasive, flexible, and fast postoperative recovery characteristics.

Regardless of the type of pyeloplasty, a double-J stent (DJS) must be placed in the ureter during surgery to provide support to the ureter and drain the urine. The DJS that we normally use is bent at both ends, forming a “J” shape, with one end positioned in the renal pelvis and the other end in the bladder. There are multiple small holes around the side of the stent to facilitate urine drainage. It can effectively reduce swelling at the ureteropelvic junction, decrease the risk of anastomotic leak, and promote healing. However, leaving the DJS in the ureter is also challenging. Armas-Phan et al. reported a case of unintended placement of the DJS into the inferior vena cava and right atrium during the ureteral repair. Vascular involvement by ureteral stents has considerable risks and often requires further surgery. In addition, leaving the DJS in the ureter can also lead to urinary tract infection, hematuria, stone formation, blockage...
of the official cavity, and displacement so we removed the DJS 6 weeks postoperatively.

**Case Presentation**

The patient was a male infant, 4 months old, with a weight of 6.2 kg and a height of 62 cm. He was admitted for left hydronephrosis, and the preoperative diagnosis was left UPJO. A diethyleneetriaminepentaacetic acid scan showed that the left kidney had a split function of 38.6%, indicating obstructive changes. After confirming the diagnosis, the patient underwent laparoscopic left pyeloplasty. Before the surgery, a urinary catheter was placed and clamped to maintain a moderately filled bladder. Under laparoscopic visualization, a DJS was placed through the anastomosis to the left ureter. Currently, various techniques are used to place the DJS through the anastomosis site into the bladder; we used a guide wire and a push rod to place the stent through a 3 mm suction catheter, which was inserted into the abdominal cavity via a 3 mm trocar. The direction of the stent was adjusted using the push rod before placement into the bladder. Methylene blue was then injected into the bladder through the urinary catheter to confirm the correct stent placement. Our team had previously placed the DJS as described above, and there had never been any unintended placement of the DJS into the contralateral renal pelvis. Therefore, intraoperative urological ultrasound and kidneys, ureters, and bladder (KUB) X-ray were not performed to clarify the position of the DJS. As blue urine was visible at the pelvic end of the DJS, it was considered that the DJS had entered the bladder, and it was difficult to detect and correct the DJS misplacement intraoperatively.

The surgery was successful, and the urinary catheter was opened after the surgery. The patient did not experience symptoms, such as vomiting, refusal to feed, or fever, after the surgery, and the urine output changes. After sufficient. The patient was discharged on postoperative day 4 and received oral antibiotics to prevent infection. No febrile urinary tract infection occurred after discharge. The DJS was removed 6 weeks after the surgery. Ultrasonography showed mild dilation of the left renal pelvis and no dilation of the right renal pelvis. Echoes of the DJS were observed in the bilateral renal pelvis, ureter, and bladder KUB X-ray indicated that the DJS was visible in the bladder and bilateral urinary tract (Figure 1). Based on the imaging findings, it was considered that the DJS had accidentally been placed in the right renal pelvis during the surgery. This was confirmed during a cystoscopy (Figure 2), and the stent was removed. A hole was found in the side of the middle part of the DJS (Figure 3).

**Discussion**

In this case, a DJS was inserted from the left renal pelvis and passed through the bladder directly into the contralateral ureter opening to the right renal pelvis. The occurrence of this situation is extremely rare, and there is currently no literature reporting such cases. Pediatric hydronephrosis is one of the most common urological diseases, which is mainly caused by UPJO; pyeloplasty is the preferred treatment method. The use of a DJS is crucial for ensuring the quality of the pyeloplasty anastomosis, as it provides support to the ureter and facilitates urine drainage, thereby reducing symptoms such as anastomotic swelling and urinary obstruction and decreasing the incidence of anastomotic leakage.

Unintended entry of DJS into the contralateral renal pelvis during laparoscopic pyeloplasty is poorly reported in the literature. The possible cause was due to the inappropriate length of the DJS chosen for laparoscopic pyeloplasty. Usually, there are no specific quantitative indicators, and the selection of the DJS is mostly based on the surgeon’s experience. The literature includes attempts to directly measure the length of the ureter using guide wires or ureteral catheters during surgery, or to measure the distance from the renal pelvis-ureter junction to the bladder-ureter

![Figure 1](image1.png) KUB X-ray show that the DJS was visible in the bladder and bilateral urinary tract.
junction using intravenous pyelography; however, there are limitations, such as calculation errors and measurement difficulties, in determining the ureter length using any of these methods\textsuperscript{11}. Therefore, in our clinical work, we often estimate the length of the ureter based on the patient’s height and weight using the formula length = 2.76 + 0.14 (height in cm) + 0.02 (weight in kg) - 2.44\textsuperscript{12}. Furthermore, to ensure the stent entry into the bladder and avoid difficulties in removing the stent later due to it being trapped in the ureter, we often follow the principle of “better to be longer than shorter”, resulting in the selection of a longer DJS. Secondly, the DJS used by us have fixed sizes, with the shortest being 12 cm, which is much longer than the ureter for infants and young children. Thirdly, in this case, the patient was young, and the ureter opening on both sides was close together. After the DJS entered the bladder through the left ureter opening, there may be a delayed withdrawal of the stiff guide wire in the DJS, and the lower end of the DJS has not yet formed a soft enough curl, which resulted in the stent accidentally entered the right ureter opening. In this case, there were holes for urine drainage in the side at both ends and in the middle of the DJS, and the middle side hole was located in the bladder; therefore, when the blue liquid refluxed up during the laparoscopic pyeloplasty procedure, this mistakenly led us to believe that the lower end of the DJS had entered the bladder. The patient had sufficient urine drainage after surgery and did not exhibit symptoms of ureteral obstruction, such as nausea, vomiting, crying, or refusal to feed, and without imaging assistance, such complications could not be discovered in a timely manner, only being identified when the DJS was removed 6 weeks after surgery through imaging examination and cystoscopy. If the DJS used had only side holes at both ends, the patient may have exhibited symptoms of ureteral obstruction and poor urine drainage early after surgery, and the clinician should have considered the possibility of the DJS entering the contralateral renal pelvis.

How to avoid the unintended placement of the DJS in the contralateral renal pelvis during pyeloplasty is worth exploring for pediatric surgeons. From an anatomical perspective, the bilateral ureteral orifices and the urethral meatus form a triangular funnel-shaped configuration. It is common for the distal end of the DJS to enter the urethral meatus and even protrude outside, especially in female pediatric patients. However, the occurrence of unintended placement in the contralateral renal pelvis is rare. To avoid abnormal positioning of the DJS after pyeloplasty, Kuo et al\textsuperscript{13} discussed different methods to determine the length of the ureter and choose an appropriate length DJS, including a calculation based on the patient’s height and weight, computed tomography examination, and venous pyelography. Chandrasekharan\textsuperscript{14} believed that using the retrograde placement method can better avoid the occurrence of abnormal positioning of the distal end of the DJS;
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however, the surgical time is significantly longer than that of the antegrade placement method. When the position of the distal end of the DJS is uncertain during surgery, using radiography to determine the position is simple and efficient. The technique of antegrade placement of the DJS is relatively easy, and the surgeon often relies on experience to judge whether the DJS is in the bladder. Currently, our experience is to judge whether the DJS has entered the bladder mainly by observing the reflux of fluid in the bladder and by seeing blue fluid flowing out from the DJS after pressing the bladder area, but we cannot sure whether it has entered the contralateral renal pelvis. At the same time, attention needs to be paid to the position of the side holes of the DJS. Even if the distal end of the DJS enters the contralateral renal pelvis, if there are holes in the side of the middle of the DJS, blue fluid will still reflux, leading to an incorrect judgment. However, this condition does not affect the urine drainage. When there are no side holes in the middle of the DJS, if the end of the DJS is not located in the bladder, there will be no blue urine reflux. When the end of the DJS is suspected to be in an abnormal position, an intraoperative KUB X-ray or cystoscopy is recommended to clarify the position of the DJS.

Conclusions

Misplacement of a DJS in the contralateral renal pelvis during laparoscopic pyeloplasty is a rare but potentially serious complication. Surgeons should be cautious when placing the stent and confirm its placement with imaging studies. Patients should be closely monitored for postoperative complications, and prompt intervention should be taken if necessary.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Informed Consent

Written informed consent for publication was obtained from the patient’s guardians.

Authors’ Contribution

CKM, QFD, and XLZ wrote the paper. HC, BP, XL, and XY carried out the operation. CPT, CY, and TZ prepared the figures. YSC reviewed the paper. All authors critically revised the manuscript. All authors have read and agreed to the published version of the manuscript. All authors read and approved the final manuscript.

Ethics Approval

The study was approved by the Ethics Committee of Anhui Provincial Children’s Hospital (Approval number: 2022-02-2807).

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