

A case of refractory urinary fistula after partial nephrectomy treated with additional partial nephrectomy for suspected isolated calix

Akiyoshi Katagiri

ABSTRACT

Introduction: Urinary fistula is the major complication after partial nephrectomy and is occasionally refractory to conservative treatments.

Case Report: A 66-year-old man with renal cell carcinoma was treated with partial nephrectomy. Diagnosis of urinary fistula was triggered by drainage of perirenal abscess after surgery. Being refractory to ureteral stenting, a dilated ventral upper calix was detected in the subsequent fistulography, whereas the calix or its connection with the renal pelvis was not demonstrated in excretion phase of enhanced computed tomography. Considering the possibility of isolated calix due to infundibular injury besides the fistula communicating with the renal pelvis, we performed additional partial nephrectomy for the upper pole kidney and immediately closed the collecting system. The drain could be removed thereafter.

Conclusion: We report the first case of refractory urinary fistula after partial nephrectomy treated with additional partial nephrectomy.

Keywords: Additional partial nephrectomy, Isolated calix, Partial nephrectomy, Urinary fistula

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INTRODUCTION

Partial nephrectomy is the standard treatment for small renal cell carcinoma and its indication is extending to larger tumors for alleviation of the risk of chronic kidney disease, resulting in prolonged overall survival. Urinary fistula is one of the complications after partial nephrectomy, and in most cases it resolves conservatively or with minor interventions, including ureteral stenting and/or drainage of urinoma [1]. However, it occasionally persists and impairs quality of life with long hospitalization. We report a case of refractory urinary fistula after partial nephrectomy for renal cell carcinoma, in which we could manage ultimately with additional partial nephrectomy.

CASE REPORT

A 66-year-old male was diagnosed with left renal cell carcinoma of cT1aN0M0. The completely buried tumor was 3.5 cm in diameter and located at the lateral mid-portion of the left kidney with a RENAL nephrometry score of nine (Figure 1). He was treated with open partial nephrectomy. Intraoperatively, collecting system injuries were recognized and closed with confirmation by

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instillation of indigo carmine via ureteral stent. The renal cortex was closed with mattress sutures in one layer. After removal of the drain with decreased output, increased C-reactive protein persisted and computed tomography (CT) revealed a perirenal abscess without hydronephrosis or stone migration. Drainage of the abscess was performed without definite findings of urinary fistula in fistulography at that time. When the drain output increased transiently, an increased level of creatinine in the drained fluid was observed and the subsequent fistulography demonstrated a urinary fistula communicating with the left renal pelvis. In spite of ureteral stenting and urethral catheterization, the urinary fistula persisted for more than a month. At re-evaluation of the fistulographies, we could recognize a slightly dilated ventral upper calix, whereas the calix or its connection with the renal pelvis were not demonstrated in excretion phase of enhanced CT, which suggested infundibular lesion of the upper calix (Figure 2). Considering the possibility of isolated upper calix and co-existing urinary fistula toward the renal pelvis, we

performed direct closure of the collecting system with additional partial nephrectomy for the upper pole kidney including scar tissue and adjacent renal stones to remove the upper calyceal function and reduce the possibility of infection. Eventually, we could remove the drain 92 days after the first surgery.

DISCUSSION

In the review of Guliev, frequency of urinary fistula after partial nephrectomy was reported to be 0.25–17% [1]. He also reported that urinary fistula occurred less often in endoscopic surgery especially with robot assistance than in open surgery, of which he speculated attribution of patient selection, better visualization, and secure suture in robot surgery [1]. Most cases of urinary fistula are diagnosed by prolonged drainage and in minor cases the diagnosis is made after removal of perisurgical drainage [2, 3].

Multiple related factors for urinary fistula after partial nephrectomy have been raised previously, including tumor size, endophyticity, proximity to the collecting system or sinus, intrarenal pelvis, RENAL nephrometry score, renorrhaphy, repair of the collecting system, blood loss, warm ischemic time, surgical time, severity of chronic kidney disease, surgeon's experience, and so on [1–6]. In the present case, the tumor was completely endophytic and large at 35 mm in diameter with a higher RENAL nephrometry score of nine, suggesting a higher risk of urinary fistula.

Regarding duration of urinary fistula, Meeks et al. reported the median duration of urine leakage was 20 days (5–240) in 21 cases of open and laparoscopic surgery [2], and Kundu et al. reported 63 days (29–96) as the median time to resolution in 52 cases of the same surgical setting [3]. Potretzke et al. reported of robot-assisted partial nephrectomy and the median time of presentation was 13 days (3–32) after surgery in 14 cases of urine leakage and the median time of removal of the drain was eight days (4–13) in eight drained cases [4].

Many cases of urinary fistula will cure spontaneously, and primary interventions including drainage of urinoma, percutaneous nephrostomy, and ureteral stenting have been reported in 31–64% of the cases [1–4]. Although ureteral stent is frequently used to decrease the renal pelvic pressure, it is possible to worsen the urinary fistula by reflux at voiding or obstruction of the urethral catheter [3]. Also in the present case, output of the drainage increased after removal of urethral catheter at the patient's wishes in the course of the treatment.

In cases of persistent urinary fistula, various approaches have been reported, including double stenting, primary closure of the fistula (fibrin adhesive, *N*-butylcyanoacrylate and fulguration), reconstructive surgery including calyceal infundibular dilation, cryoablation, transarterial embolization (TAE), and nephrectomy [1–3, 7–11]. Meeks et al. reported that 5 of 21 cases of urinary

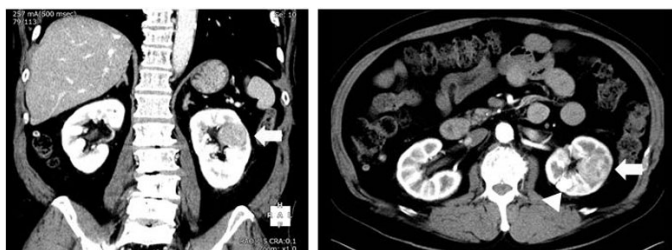


Figure 1: The renal tumor was located at the lateral mid-portion of the left kidney and was completely endophytic (arrow, arrow head: renal stones).

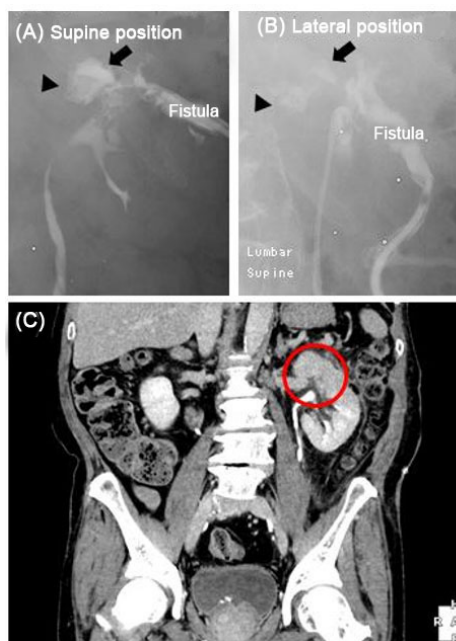


Figure 2: (A, B) Fistulography revealed a slightly dilated upper calix (arrow) ventral to the renal stones (arrow head). (C) Enhanced computed tomography in excretory phase could not demonstrate the upper calix or its communication with the renal pelvis (circled area).

fistula after partial nephrectomy presented anatomical causes, including two cases of infundibular stenosis of calix with a duration of the fistula of more than five months [2]. It is considered to be difficult to recognize intraoperatively infundibular lesions especially due to suturing, and the isolated calix probably results in refractory urinary fistula. In the present case, the upper calix demonstrated in fistulography without definite connection with the renal pelvis in excretion phase of enhanced CT suggested that the isolated calix contributed to the refractory urinary fistula. It was presumed that a minor urine leakage at the infundibular lesion has caused a perirenal abscess, and the inflammation might have accelerated or provoked the fistula toward the renal pelvis probably at the injured calyceal infundibular region. In 24 cases previously reported as isolated calix or infundibular stenosis, 17 cases were treated with reconstruction via a percutaneous or transurethral approach and seven cases were treated with selective TAE which eliminates the function of the calix responsible for the fistula [2, 7–10]. Ward et al. performed cryoablation for the same purpose in a case of urine leakage after partial nephrectomy for a duplicated collecting system [11]. In the present case, it is considered that treatment only for the infundibular lesion with reconstruction or parenchymal ablation including cryosurgery or TAE could not have healed the fistula toward the renal pelvis immediately. Therefore, partial nephrectomy for the upper calyceal region with direct closure of the collecting system was considered to be the best choice for cure. As far as we know, this is the first case of refractory urinary fistula after partial nephrectomy treated with additional partial nephrectomy for suspected isolated calix.

CONCLUSION

Urinary fistula after partial nephrectomy often recovers conservatively with or without minor interventions. However in refractory case, the possibility of isolated calix due to infundibular injury should be considered, and additional partial nephrectomy may be taken into account as one of the ablative treatments.

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Author Contributions

Akiyoshi Katagiri – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Guarantor of Submission

The corresponding author is the guarantor of submission.

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Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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