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Case Report

Ureteral obstruction by sloughed tumor complicating cryoablation of a renal oncocytoma

*Hiro Okawa**, *Hideo Gobara, MD, Yusuke Matsui, MD, Toshihiro Iguchi, MD, Takao Hiraki, MD, Susumu Kanazawa, MD*

Department of Radiology, Okayama University Hospital, 2-5-1 Shikata-cho, Kita-ku, Okayama, Japan 700-8558

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ABSTRACT

Percutaneous cryoablation for renal tumors may be associated with rare complications such as injury to the ureter. A 65-year-old woman underwent percutaneous cryoablation after a transcatheter arterial embolization using lipiodol and ethanol for left renal oncocytoma. Two months after the percutaneous cryoablation, computed tomography images showed left hydronephrosis caused by high-density debris, which was assumed to be sloughed tumor with lipiodol accumulation in the left ureter. A stent was placed in the left ureter to enhance the drainage of urine and the necrotic cell debris. Three months later, the ureteral stent was removed, and she remained asymptomatic during the follow-up period of 4 months. We should consider the possibility of urinary tract obstruction by sloughed tumor when hydronephrosis occurs after percutaneous cryoablation of a renal tumor.

Introduction

Percutaneous cryoablation (PCA) is a minimally invasive treatment for renal tumors, with a low frequency of serious complications [1]. Although hemorrhage is the most common complication of renal PCA rare complications such as, injury to the adjacent organs including the bowel or the ureter, abscess formation requiring intervention, and pneumothorax could occur. We report a case of hydronephrosis, which was caused by the obstruction of the urinary tract by sloughed tumor cells after PCA of a renal tumor.

Case report

A 65-year-old woman with a history of myasthenia gravis was referred to our hospital. Computed tomography (CT) images revealed a 4-cm, solid, endophytic tumor in her left kidney

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* Corresponding author.
E-mail addresses: h-okawa06@hotmail.co.jp, hiokawa17@gmail.com (H. Okawa).

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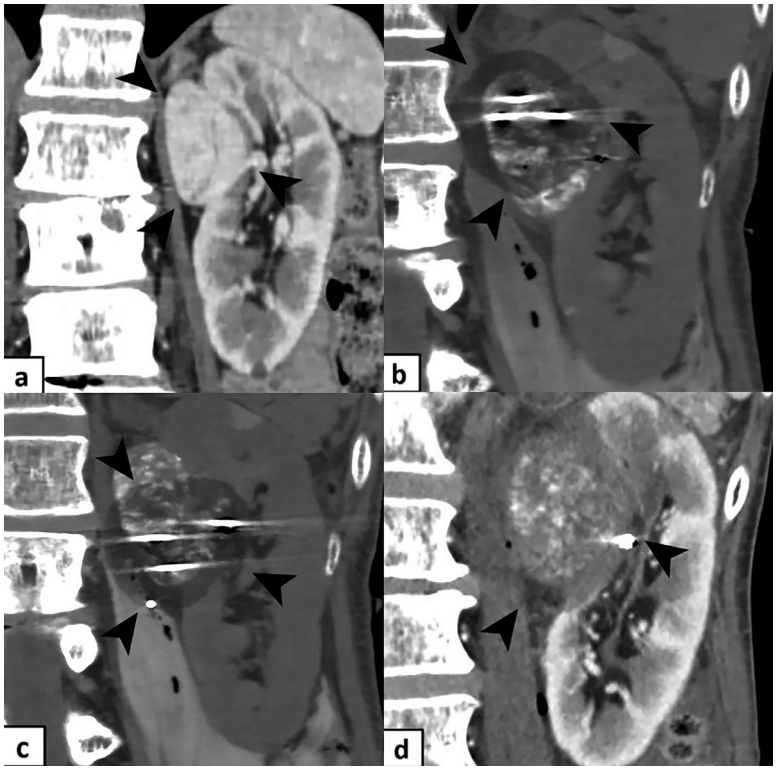

Fig. 1 – (a) Pretreatment contrast-enhanced computed tomography (CT) demonstrates a left renal tumor close to the renal pelvis; CT during cryoablation demonstrates a low-density area (i.e. ice ball) with 3 cryoprobes in the upper (b) and lower (c) parts of the tumor; (d) CT image 2 days after the cryoablation shows an ablation zone with an adequate treatment margin.

(Fig. 1A) as well as another small tumor in her right kidney. Percutaneous biopsy of the left renal tumor suggested the diagnosis of oncocytoma. We decided to treat the left renal tumor by PCA for addressing the concern regarding the existence of a hybrid tumor with features of oncocytoma and renal cell carcinoma [2]. Prior to the PCA, we performed a transcatheter arterial embolization (TAE) to enhance the therapeutic effect and to reduce the risk of bleeding. The embolization was selectively performed using a mixture of ethanol and ethiodized oil (Lipiodol, Guerbet, Villepinte, France) at a ratio of 7:3. Two days later, PCA of the left renal tumor was performed using an argon-based cryoablation system (CryoHit, Galil Medical, Yokneam, Israel). First, three 17-gauge cryoprobes (IceRod, Galil Medical, Yokneam, Israel) were inserted to the upper part of the tumor. The cryoprobes were inserted sequentially in a triangle configuration, under CT fluoroscopy guidance. After the placement of the three cryoprobes, PCA was performed in two 15-minute freeze cycles separated by 2 minutes of thawing (Fig. 1B). Then, the same treatment was carried out in the lower part of the tumor (Fig. 1C). During freezing, the low-density area (i.e., ice-ball) involved the entire tumor and calices of the upper medial part of the left kidney.

The CT images obtained 2 days after the PCA demonstrated the ablation zone, which included the tumor with an adequate ablation margin (Fig. 1D), without any evidence of complication after the treatment. However, 2 months after the PCA, the patient visited our institution with complaints of high fever and left-sided back pain. Laboratory tests revealed an increased inflammatory response (leukocyte count: 9.88×10^9/L, C-reactive protein: 154 nmol/L). CT images demonstrated a left perirenal abscess and left hydronephrosis with high-density debris in the lower part of the left ureter (Figs. 2A and B). We supposed that this high-density debris consisted of sloughed tumor with ethiodized oil accumulation and was the cause of the urinary tract obstruction. A single-J stent was placed in the left ureter for allowing the drainage of urine and the necrotic tumor debris. The back pain disappeared immediately after the stent placement, whereas the fever and laboratory findings improved gradually. CT images obtained 2 days after the stent placement demonstrated improvement in hydronephrosis and drainage of necrotic tumor into the tract of the urinary fistula (Fig. 2C). On the CT images obtained 5 days after the stent placement, the necrotic tumor debris was not observed and the hydronephrosis appeared to have improved. The patient was discharged after replacing the single-J stent with a double-J stent. Three months later, the double-J stent was removed, and she remained asymptomatic during the follow-up period of 4 months.

Discussion

The frequency of severe complications after PCA of renal tumors was reported to be about 2%-6%, and therefore, this treatment is recognized as a minimally invasive treatment

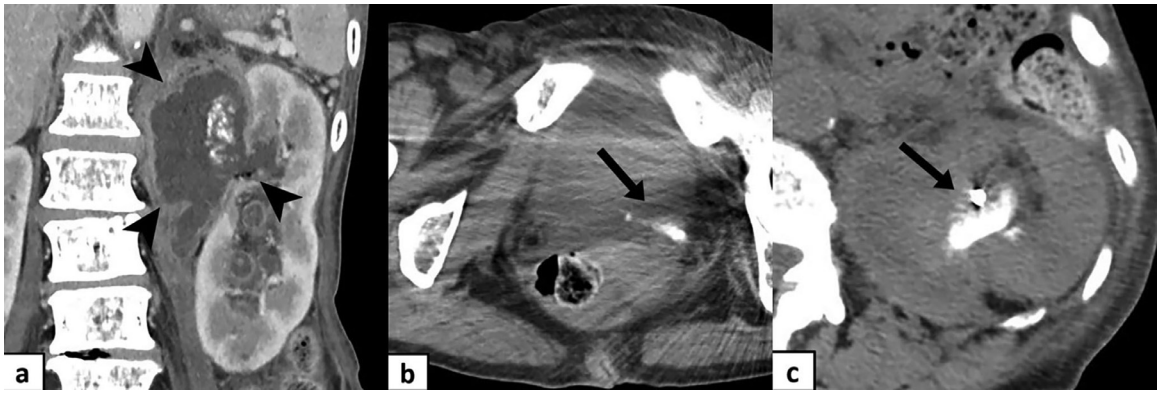

Fig. 2 – (a) Computed tomography (CT) image 2 months after the cryoablation shows hydronephrosis with perirenal abscess on the left side and (b) high-density debris in the lower part of the left ureter; (c) CT images 2 days after the stent placement shows that the necrotic tumor has moved into the tract of urinary fistula.

for renal tumor [1,3,4]. In case of pelvicalyceal or ureteral injury after PCA, ureteral stenosis requiring ureteral stent placement may occur; however, such a complication is less common with PCA than with radiofrequency ablation [5]. Breen et al. reported only 3 cases of pelvicalyceal injury among 153 procedures [6]. These 3 patients complained of debris colic, which required temporary ureteral stent placement. Although these cases might appear similar to the current case, further details were not available for assessing the similarities.

The urinary tract obstruction in our patient probably occurred by the sloughing of the necrotic tumor cells into the pelvicalyx through defects on the injured pelvicalyceal wall. However, previous studies have shown that the pelvicalyceal injury was unlikely to occur due to PCA. Rosenberg et al. reported no evidence of injury, such as urinoma or fistula, to the collecting system in 67 cases of PCA performed with renal sinus involvement by ice-ball [7]. Sung et al. reported no evident urine extravasation after intentional cryoinjury of the renal collecting system in the animals studied [8]. However, the pelvicalyces could be occasionally injured, especially when the tumor adjacent to or invading the pelvicalyces is completely ablated. In our case, the preablative TAE might have contributed to the event as it might have caused ischemia of the tumor and surrounding renal tissue including the pelvicalyceal wall. Ethanol used for the TAE could produce a more intense effect than the other embolizing materials such as the gelatin sponge particle or microsphere. Renal oncocytoma is a benign tumor of the kidney, accounting for 3%-7% of all solid renal neoplasms [9]. Jacob et al. observed that only 4% of cases of oncocytoma showed a complete pseudocapsule compared with 80% of cases of clear cell renal cell carcinoma [10]. The lack of the pseudocapsule might allow the necrotic tissue to slough down to the urinary tract. A combination of the above-mentioned factors might be the cause of the urinary tract obstruction in the present case. Further, an elevated urinary pressure accelerated the development of the urinary fistula and caused the perirenal abscess.

In summary, the present case shows that PCA of renal tumor can rarely cause urinary tract obstruction by sloughed tumor cells, resulting in hydronephrosis and perirenal abscess. In all cases of perirenal abscess, we should rule out similar causes for urinary obstruction. In the present case, we could detect the necrotic tissue causing urinary obstruction on CT and provide appropriate treatment.

Informed consent

The patient has provided informed consent for publishing this case report.

Ethical approval

The study design was exempted from ethics review board approval.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2018.08.014.

REFERENCES

[1] Atwell TD, Carter RE, Schmit GD, Carr CM, Boorjian SA, Curry TB, et al. Complications following 573 percutaneous renal radiofrequency and cryoablation procedures. J Vasc Interv Radiol 2012;23(1):48–54. https://doi.org/10.1016/j.jvir.2011.09.008.

[2] Humphrey PA. Oncocytoma of the kidney. J Urol 2012;187(5):1854–5. https://doi.org/10.1016/j.juro.2012.02.007.

[3] Georgiades CS, Rodriguez R. Efficacy and safety of percutaneous cryoablation for stage 1A/B renal cell carcinoma: results of a prospective, single-arm, 5-year study. Cardiovasc Intervent Radiol 2014;37(6):1494–9. https://doi.org/10.1007/s00270-013-0831-8.

[4] Schmit GD, Schenck LA, Thompson RH, Boorjian SA, Kurup AN, Weisbrod AJ, et al. Predicting renal cryoablation complications: new risk score based on tumor size and location and patient history. Radiology 2014;272(3):903–10. https://doi.org/10.1148/radiol.14132548.
[5] Kim KR, Thomas S. Complication of image-guided thermal ablation of liver and kidney neoplasms. Semin Intervent Radiol 2014;31(2):138–48. https://dx.doi.org/10.1055%2Fs-0034-1373789.
[6] Breen DJ, Bryant TJ, Abbas A, Shepherd B, McGill N, Anderson JA, et al. Percutaneous cryoablation of renal tumors: outcomes from 171 tumors in 147 patients. BJU Int 2013;112(6):758–65. https://doi.org/10.1111/bju.12122.
[7] Rosenberg MD, Kim CY, Tsivian M, Suberlak MN, Sopko DR, Polascik TJ, et al. Percutaneous cryoablation of renal lesions with radiographic ice ball involvement of the renal sinus: analysis of hemorrhagic and collecting system complications. AJR Am J Roentgenol 2011;196(4):935–9. https://doi.org/10.2214/AJR.10.5182.
[8] Sung GT, Gill IS, Hsu TH, Meraney AM, Skacel M, Brainard JA, et al. Effect of intentional cryo-injury to the renal collecting system. J Urol 2003;170(2):619–22. https://doi.org/10.1097/01.ju.0000068722.22186.66.
[9] Jayaratna I, Munver R, Disick G, Han MW, Sawczuk I. Paraneoplastic hypertension associated with renal oncocytoma: management with cryoablation. Urology 2009;73(1):9–11. https://doi.org/10.1016/j.urology.2008.02.011.
[10] Jacob JM, Williamson SR, Gondim DD, Leese JA, Terry C, Grignon DJ, et al. Characteristics of the peritumoral pseudocapsule vary predictably with histologic subtype of T1 renal neoplasms. Urology 2015;86(5):956–61. https://doi.org/10.1016/j.urology.2015.06.015.