Radiology Case Reports 14 (2019) 1432–1437

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journal homepage: www.elsevier.com/locate/radcr

Case Report

Acute gouty arthritis following percutaneous cryoablation of renal cell carcinoma

Ahmed-Zayn Mohamed, JD[a,*], William J. Wallach, BS[a], Sen Lu, MD[a,b], Bruce Zwiebel, MD[a,b], Glenn Hoots, MD[a,b]

[a] University of South Florida, Morsani College of Medicine, 12901 Bruce B Downs Blvd, Tampa, FL 33612, USA
[b] Tampa General Hospital, University of South Florida, Morsani College of Medicine, Tampa, FL 33606, USA

ARTICLE INFO

Article history:
Received 5 August 2019
Revised 2 September 2019
Accepted 2 September 2019
Available online 26 September 2019

Keywords:
Gout
Arthritis
Gouty Arthritis
Ablation
Cryoablation
Renal Cell Carcinoma

ABSTRACT

We report a case of acute gouty monoarthritis of the left ankle in a 58-year-old female with chronic renal insufficiency after cryoablation of a 3.8 cm left renal cell carcinoma. The patient's symptoms resolved after intravenous Solumedrol and did not recur at her 1-month follow-up visit. To the best of our knowledge, this is the first reported case of acute gouty monoarthritis after cryoablation of a renal cell carcinoma lesion in a patient with underlying chronic renal insufficiency. Clinicians should be vigilant of the potential for this complication in at-risk patient populations.

Introduction

Percutaneous cryoablation of renal cell carcinoma (RCC) is an increasingly popular method for treating lesions in patients needing nephron-sparing treatment with complication rates of less than 7% [1,2]. According to the European Association of Urology, RCC represents 2%-3% of all cancers, and has been annually increasing at a 2% incidence rate worldwide, possibly due to increased use of abdominal imaging [3,4]. RCC has also historically had a high prevalence rate, with an estimated 304,000 new cases reported worldwide in 2012 [5]. With most RCCs being asymptomatic, many are diagnosed incidentally by radiologic imaging [6]. Although overall mortality rates from RCC have stabilized since the 1990s, RCC remains a morbid disease, depending upon key established risk factors in anatomic, histologic, and clinical features (eg, size, microvascular invasion, and cachexia). Other established risk factors include obesity, hypertension, and smoking [7].

Percutaneous cryoablation is a common technique for RCC treatment, especially for patients who are not suitable for surgery due to comorbid diseases or other factors. Percutaneous ablation is especially appropriate for patients with impaired renal function or patients with only 1 kidney, as this procedure results in significantly less nephron loss than a partial nephrectomy. Recent data shows that

Declaration of Competing Interests: None.

* Corresponding author.
E-mail address: Ahmohamed@health.usf.edu (A.-Z. Mohamed).

https://doi.org/10.1016/j.radcr.2019.09.003

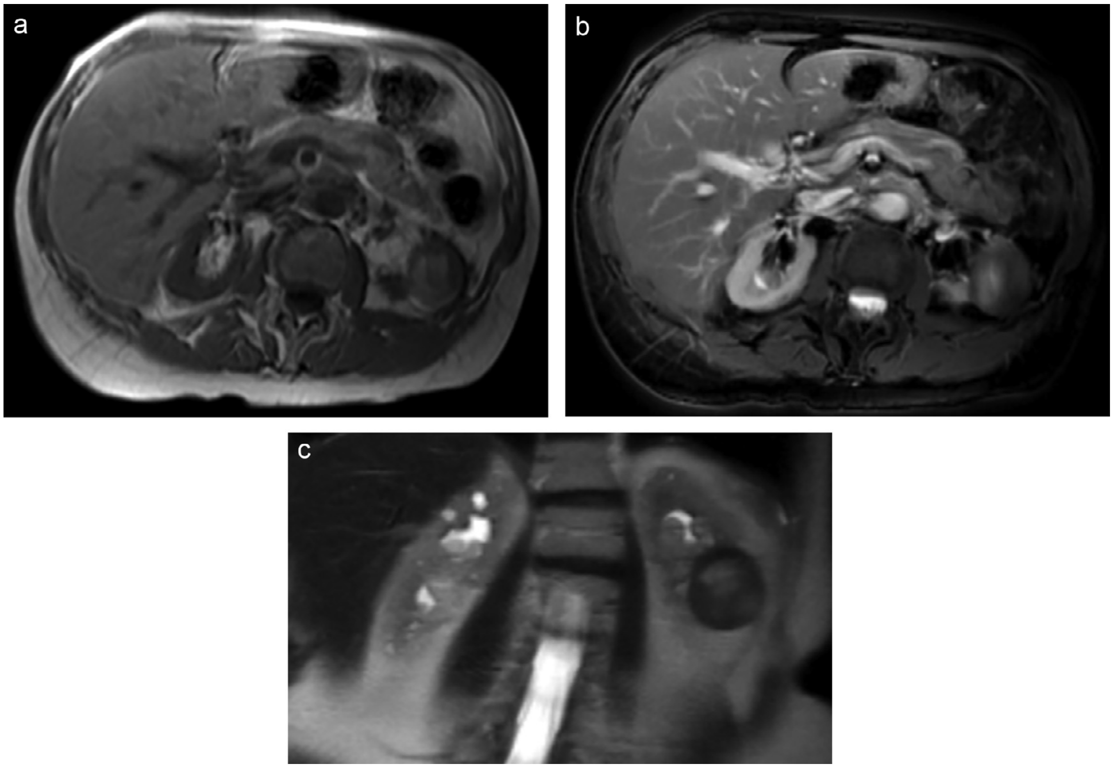

Fig. 1 – Preprocedural axial T1 (a), axial T2 (b), and coronal T2 (c) MRI images obtained on a 1.5 T magnet without contrast demonstrating an enlarging 3.8 cm solid left renal mass with irregular internal signal intensity. Contrast enhanced imaging was not performed due to the patient's significant renal impairment. The lesion was considered highly suspicious for RCC.

cryoablation has an 88%-100% technical success rate with only a 1%-7% complication rate, and long-term data reveals 88%-99% disease-free survival rates 5 years postprocedure. Potential complications for cryoablation include hematuria (20%), chyluria (18%), perirenal hematoma (9%), temporary intercostal, or genitofemoral nerve injury (7%), pneumoperitoneum (<1%), urinary retention due to an occluding blood clot (<1%), and loss of renal function (0.5%) [2].

Overall, the risk of any major complications occurring postcryoablation is 0%-9% [8]. Nevertheless, for proper postprocedural treatment, it is important to know all possible complications. Laparoscopic cryoablation may result in ileus, hypoxemia, urinary retention, acute renal failure, retroperitoneal hematoma, pneumothorax, hemothorax, or hemorrhage [9]. Percutaneous cryoablation complications include hemorrhage, perirenal hematoma, pelvicalyceal injuries, pneumothorax, flank paraesthesia, urinary retention, and urinary sepsis [10]. There is also the possibility of recurrent RCC after primary cryoablation, in which case a salvage percutaneous cryoablation is a treatment option [11].

No prior cases of acute gouty arthritis have been reported following percutaneous cryoablation of renal cell carcinoma, although 1 case was reported following percutaneous radiofrequency ablation of a hepatocellular carcinoma [12]. We describe a case of acute gouty arthritis following percutaneous cryoablation of a 3.8 cm left renal cell carcinoma.

Case report

A 58-year-old female with a complicated history of rheumatoid arthritis previously treated with chronic nonsteroidal anti-inflammatory drugs and methotrexate now treated with chronic Prednisone 10 mg daily, monoclonal gammopathy of unknown significance, hypertension, ovarian clear cell carcinoma in remission after surgery and chemotherapy, osteoporosis, and chronic kidney disease (CKD) presented to the interventional radiology clinic with an enlarging 3.8 cm left renal lesion suspicious for renal cell carcinoma (Fig. 1). The patient was not a candidate for partial or radical nephrectomy given the size of the mass, baseline renal impairment, and likelihood of dialysis dependence. She was thus referred to interventional radiology for biopsy and cryoablation of the left renal lesion.

Baseline laboratory data prior to cryoablation demonstrated renal insufficiency with elevated creatinine (2.4 mg/dL) and blood urea nitrogen (52 mg/dL) levels and normal hemoglobin (Hgb) (12.8 g/dL), potassium (3.8 mmol/L), and calcium (9.5 mg/dL) levels. Computed tomography (CT)-guided cryoablation and biopsy of the left renal mass were performed. Three 14-gauge cryoablation probes (Ice Force, Galil Medical) were placed in the mass, a single core biopsy was obtained with a 20-gauge biopsy device (Biopence, Argon Medical), and an 18-gauge blunt Hawkins needle (Argon Med-

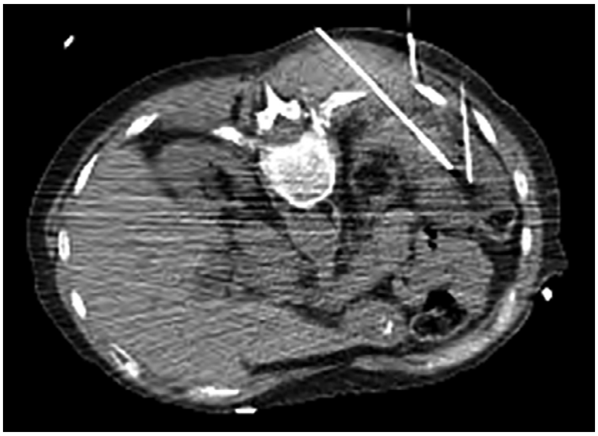

Fig. 2 – Intraprocedural axial CT image showing placement of three 14-gauge probes into the left kidney for cryoablation (only 2 visualized) and one 18-gauge Hawkins needle for hydrodissection of the descending colon.

Fig. 4 – Postprocedural axial CT image showing small perinephric (balck arrow) and intramuscular (white arrow) hematomas.

Fig. 3 – Intraprocedural axial CT image of the ice ball at eight minutes into the first freeze cycle indicating adequate coverage of the lesion and no extension of the iceball to the adjacent colon.

ical) was used to hydrodissect a portion of the descending colon that was proximal to the mass (Fig. 2). After repeat precryoablation CT showed satisfactory displacement of the colon, freeze-thaw-freeze cycles were initiated as directed by the manufacturer and intrapocedural CTs confirmed sufficient mass of the ice ball (Fig. 3). A final CT demonstrated no evidence of pneumothorax, but small perinephric and intramuscular hematomas were noted (Fig. 4).

The cryoablation and biopsy were successful, complicated only by a left perinephric hematoma with a slight drop in Hgb not requiring transfusion (lowest 8.2 g/dL). The patient was admitted for pain control and overnight observation. On postprocedure day 2, the patient had residual left flank pain, which was well controlled with per os (PO) Percocet 10-325 mg. She was discharged on postprocedure day 2 with PO analgesics, antiemetics, stool softeners, and prophylactic antibiotics for a urinary tract infection.

On postprocedure day 5, the patient presented with acute monoarthritis of the left ankle with dolor, calor, and tumor, in addition to bilateral leg swelling that was greater in the left extremity. Deep venous thrombosis was excluded with a lower extremity venous Doppler ultrasound. The patient was then admitted for pain control and further testing. A urinalysis showed 50-500 red blood cells per high power field (normal 0-2 RBCs/hpf), high urine Hgb, proteinuria, and trace leukocytes.

Orthopedic, nephrology, and rheumatology consults were obtained. Radiographs of the ankle showed an old traumatic injury and circumferential soft tissue swelling (Fig. 5). The orthopedic surgeon evaluated the patient for joint aspiration, but conservative therapy was recommended because there was a low concern for infectious monoarthritis. The patient was started on 60 mg intravenous (IV) Solumedrol and showed great improvement in range-of-motion and pain. The nephrology consult and additional lab tests showed elevated uric acid (8.6 mg/dL) and C-reactive protein (13.30 mg/dL) levels. The patient's creatinine had increased to 2.8 mg/dL. Rheumatology consult found no evidence of active synovitis and no significant effusion in the left ankle, ruling out a rheumatoid arthritis flare. IV Solumedrol 40 mg was continued every 6 hours with continued improvement in activity and weight bearing status. The patient also received a single dose of IV Venofer for anemia and decreased Hgb (8.1 g/dL). Rheumatology recommended a steroid taper at discharge of 40 mg prednisone tapering 10 mg every 2-3 days until 10 mg oral daily at baseline.

The patient was discharged on postprocedure day 6 in stable condition with antibiotic and steroid tapers, PO analgesics for breakthrough pain, and a secondary diagnosis of iron deficiency anemia (Hgb remained at 8.1 g/dL). At her 1-month postprocedure follow-up, the patient's ablation cavity appeared normal (Fig. 6). She had residual asymmetrical left lower extremity edema, but her acute gouty arthritis symptoms had resolved. Our suspicion was that her gouty episode

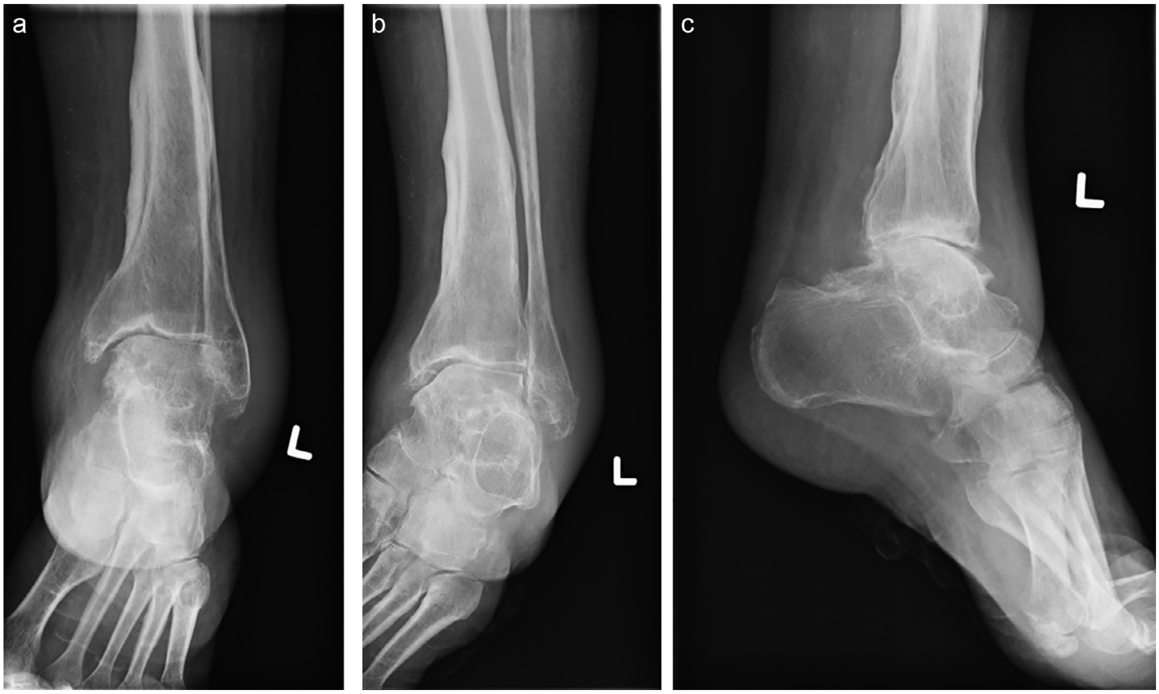

Fig. 5 – Postprocedure day 5 anterior-posterior (a), oblique (b), and lateral (c) radiographs of the left ankle performed when the patient returned with ankle pain and swelling. Images demonstrate periosteal reaction with new bone formation along the cortex of the distal tibial diaphyseal metaphyseal region, which was thought to be related to an old traumatic injury. Minimal soft tissue swelling is present at the level of the ankle. The osseous structures are diffusely demineralized, likely from long-term steroids.

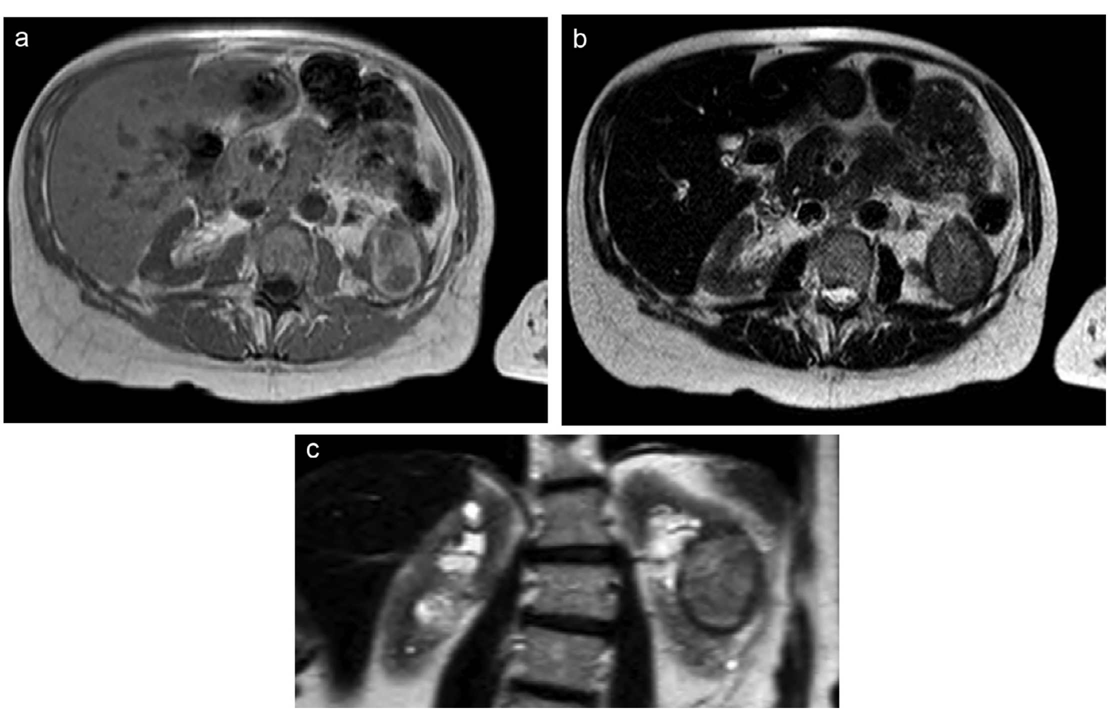

Fig. 6 – One-month postprocedure axial T1 (a), axial T2 (b), and coronal T2 (c) MRI images obtained on a 1.5 T magnet without contrast demonstrating postcryoablation changes in the left kidney with normal ablation cavity consistent with successful cryoablation.

arose in the setting of acute renal insufficiency in CKD (stage G3a/A1, GFR 45-59, and albumin-creatinine ratio <30 mg/g).

Discussion

Tumor Lysis Syndrome (TLS) is the condition of metabolic abnormalities caused by a high rate of cell lysis in the body. TLS may occur spontaneously or it may be induced when large tumors are treated with radiotherapy, chemotherapy, or embolization [13]. Laboratory TLS is a less severe form of TLS than clinical TLS. The former is characterized by irregular lab results such as hyperuricemia, hyperphosphatemia, hypocalcemia, hyperkalemia, and metabolic acidosis. The latter is characterized by irregular lab results as well as clinical symptoms of cardiac arrhythmias, seizures, and/or acute kidney injuries (AKI) [14].

Patients receiving treatment for lymphoproliferative malignancies are at risk for TLS. Patients who also have chronic renal insufficiency are at an increased risk of kidney failure. Large amounts of nucleic acids released from lysed cells can cause hyperuricemia and AKI from uric acid or calcium phosphate complex deposits in the renal tubules [12,15]. Normally, treatment of TLS includes proper hydration to prevent AKI, and clinical measures to restore normal serum levels of potassium, calcium, and uric acid [16].

There have been reports of TLS as a post-treatment complication in cases of colon cancer [17,18], lung cancer [19], breast cancer [20], and pancreatic cancer [21]. Notably, Patel et al described a case of spontaneous TLS leading to AKI in a patient with non-Hodgkin's lymphoma [22]. AKI in the event of spontaneous TLS shows a poor prognosis since most preventative measures are not possible at this time [19]. Patel et al stressed that vigilance and readiness to provide hemodialysis or other necessary treatments in the event of TLS are very important [23]. We advise a similar vigilance toward the possibility of acute gouty arthritis.

The recent report of gouty arthritis after radiofrequency ablation of a 3.5 cm hepatocellular carcinoma lesion in a patient with chronic renal insufficiency demonstrates the high likelihood of a similar pathogenesis of the acute gouty monoarthritis experienced by our patient [12]. In both cases, the afflicted patients had undergone a procedure that acutely destroyed a large tumor (3.8 cm in our patient). They subsequently developed acute gouty symptoms a few days after the ablation.

Our case is unique because we are reporting gouty arthritis as a postprocedure complication in the cryoablation of an RCC. There is no indication that this case of gouty arthritis was secondary to medications or other causes. The patient in our case was taking several chronic medications, and from among them the only medication that has been reported to possibly cause gout was escitalopram oxalate. Escitalopram oxalate has only been reported to rarely cause gout [24]. The patient was taking 10 mg tablet nightly chronically. Due to the timing of this episode of gout, it is more likely that it was related to the cryoablation, and not the chronic medications. We believe this case of gouty arthritis was the result of TLS following the treatment of the patient's RCC in the setting of chronic renal insufficiency. Because CKD can be caused by RCC, it is not uncommon for patients with RCC to have underlying renal insufficiency prior to intervention. One study found that the prevalence of preoperative CKD stage 3 or greater was 15.8% in a cohort of 543 RCC patients [25]. Due to this high prevalence of CKD, we stress the importance of vigilance and readiness to treat possible postprocedure complications, including the possibility of acute gouty arthritis as a result of TLS.

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