



Inflammation and infection

## Recurrent heterotopic ossification following open radical nephrectomy

Jordan R. Richards<sup>a,\*</sup>, Ian M. McElree<sup>b</sup>, Joanna Orzel<sup>a</sup>, Mark C. Smith<sup>a</sup>, Vignesh T. Packiam<sup>a</sup>

<sup>a</sup> University of Iowa Hospitals and Clinics, Department of Urology, USA

<sup>b</sup> University of Iowa Carver College of Medicine, USA

### ABSTRACT

A 46-year-old male presented with a localized left renal mass and underwent an open radical nephrectomy via a midline incision. He recovered uneventfully and was discharged. After one month he reported persistent incisional pain; CT demonstrated heterotopic bone formation under the fascial closure. He underwent resection of calcified preperitoneal fat. Final pathology revealed benign bone tissue. He received a course of celecoxib. The patient developed recurrence of a smaller calcification. He underwent a second resection and was treated with adjuvant radiation. The patient had improvement of pain and no ossification visualized on CT imaging at 1-year follow up.

### 1. Introduction

Heterotopic ossification is a well-documented complication of orthopedic surgeries, high impact trauma, and burns.<sup>1</sup> However, it is rarely occurs after abdominal incisions, with few cases reported in the literature.<sup>2</sup> Herein, we report a case of recurrent post-operative heterotopic ossification following radical nephrectomy.

### 2. Case presentation

A 46-year-old male with gross hematuria underwent a CT urogram and was found to have an 11 cm left renal mass. There was no lymphadenopathy or metastases. He was admitted for persistent gross hematuria with clot retention and was placed on continuous bladder irrigation. A staging CT chest was negative for metastatic disease. Due to ongoing bleeding, an open left radical nephrectomy was recommended and the patient consented to proceed.

The patient was prepped in the usual sterile fashion and the surgery was performed through a midline abdominal incision that extended from 1 cm inferior to the xiphoid process to 1 cm below the umbilicus. Final pathology demonstrated pT3aN0 Fuhrman Grade 3 clear cell renal cell carcinoma with negative margins.

The patient's hospital course was uncomplicated and he was discharged on post-operative day 4. After one month, he reported persistent abdominal incisional pain. A CT scan was obtained which demonstrated heterotopic bone formation under the fascia at the superior extent of the incision (Fig. 1). He was taken to the operating room one month later where he underwent resection of 8 cm of calcified preperitoneal fat.

Final pathology revealed bone and associated striated muscle and adipose tissue. Aiming to prevent recurrence, the patient received a 3-week course of once daily 200 mg celecoxib. The patient did well initially but had recurrent incisional pain four months after the initial resection. A subsequent CT scan revealed a similar but smaller calcification (Fig. 2). Due to ongoing pain, a second resection was completed with pathology demonstrating benign heterotopic ossification components including marrow. He was then treated with adjuvant radiation on post-operative day 1 with a regimen of 7 Gy in 1 fraction. At nearly one year following the second resection, the patient has had resolution of most of his pain with no further ossification visualized on CT imaging.

### 3. Discussion

Radical nephrectomy is the primary recommendation for large clinically localized renal masses. While various surgical approaches are available, an open approach is often favored in the setting of very large renal masses, tumor thrombi, or need for urgent surgery. Incisional heterotopic ossification is extremely rare for abdominal incisions with few reports in the literature.<sup>3,4</sup> This report describes the feasibility of multimodal management for recurrent symptomatic ossification.

There are several described strategies for the prophylaxis and management of heterotopic ossification including physical therapy, NSAIDs, corticosteroids, radiation, and surgical resection. The timing and efficacy of each of these treatments have not reached consensus.<sup>1</sup> Physical therapy may be used to mitigate the development or progression of heterotopic ossification, but data mostly derived from burns and neurologic injury is conflicting.<sup>5</sup> NSAIDs are the most commonly used

\* Corresponding author.

E-mail address: [jordan-r-richards@uiowa.edu](mailto:jordan-r-richards@uiowa.edu) (J.R. Richards).

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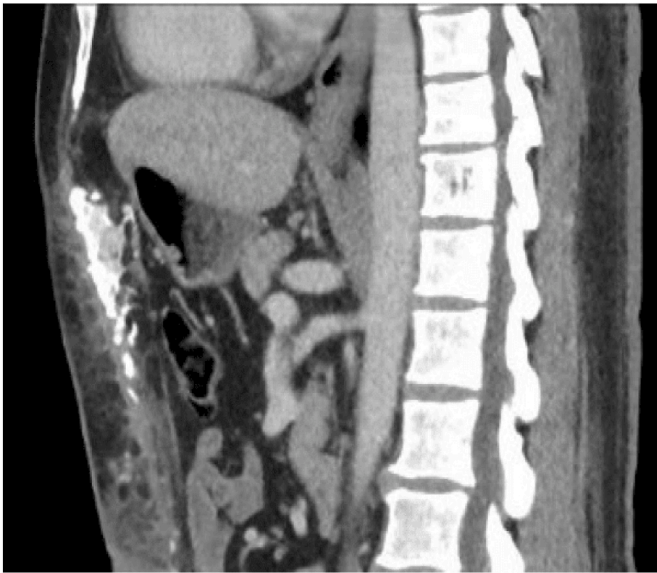


Fig. 1. Initial incisional heterotopic ossification.



Fig. 2. Recurrence of incisional heterotopic ossification.

modality of prophylaxis, with indomethacin being the historical gold

standard. Selective COX-2 inhibitors are now more commonly used as there is no difference in efficacy but reduced side effect profile.<sup>1</sup> Radiation has been used in prophylaxis of high-risk patients and in those who have undergone surgical resection to prevent recurrence. Most studies of radiation prophylaxis involved heterotopic ossification after surgery around the hip, none of which included soft tissue heterotopic ossification.<sup>1</sup> Rarely, heterotopic ossification of the soft tissue can occur. Early incorporation of adjuvant radiation of the resection site may contribute to a more complete response with reduced rates of recurrence.

Corticosteroid injections have been used primarily in the prophylaxis of genetic heterotopic ossification as flare-ups can be more readily noticed and treated. Bisphosphonates have failed to demonstrate appreciable prevention of heterotopic ossification when used for prophylaxis.<sup>1</sup> Surgical resection is recommended in non-genetic heterotopic ossification cases once the ossification process has finished maturation, typically 6 months after the heterotopic ossification process begins.<sup>1</sup>

#### 4. Conclusion

We report a case of multimodal management for recurrent incisional heterotopic ossification in a patient who underwent open radical nephrectomy. While the optimal protocol for this rare condition remains to be defined, the risk of recurrence may be reduced with earlier incorporation of adjuvant radiation therapy.

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