Case Report

MRI diagnosis of rubber band constriction syndrome✩✩✩

David Sosnouski, MDa, Russell W. Chapin, MDb, Paul G. Thacker, MD,MHA∗,∗, Zeke J. Walton, MDb, James F. Mooney, MDe

aDepartment of Radiology, McFarland Clinic, Ames, IA, USA
bDepartment of Radiology and Radiological Science, Medical University of South Carolina, Charleston, SC, USA
cMayo Clinic, Department of Radiology, 200 First Street SW, Rochester, MN 55905, USA
dDepartment of Orthopedics and Physical Medicine, Medical University of South Carolina, Charleston, SC, USA
eShriners Hospitals for Children, Springfield, MA, USA

ABSTRACT

Rubber band syndrome is caused by constriction of the wrist from elastic bracelets worn for decorative purposes. Overtime, the fixed or elastic band burrows into the skin and becomes invisible. We present the case of a 2.5-year-old female child presenting to our institution with signs of circumferential swelling and inflammatory changes about the right wrist. MRI of the wrist demonstrated a subcutaneous circular foreign body, which was confirmed at surgery to be a rubber band. Although this disease entity is rare, radiologists can be instrumental in suggesting this diagnosis based on the location involved, ie, wrist, and the imaging findings.

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Introduction

Rubber band syndrome is a rare disorder caused by constriction of the wrist from elastic bracelets worn for decorative purposes. If the bracelet is left on the child unnoticed, it can burrow through the skin and become invisible at physical exam. Over time, the constriction progressively worsens and eventually can result in neurovascular compromise. When the bracelet is not recalled, imaging can provide a definitive unexpected diagnosis. Recognition of this disease is important to prevent progressive infection and neurovascular compromise.

Case

A 2.5-year-old female presented with a 3 month history of ery-thema and circumferential swelling about her right wrist by family report. One month prior to presentation to our facility,
her parents report that they had removed a woven bracelet that had become tight around her wrist. The patient had received several courses of both IV and oral antibiotics but continued to have intermittent erythema, swelling, and occasional drainage. The patient had an elevated white blood cell count despite antibiotic treatment but had not been febrile according to her parents. At presentation, the parents reported a worsening of the wrist swelling that progressed to involve the entire hand.

Physical examination revealed a circumferential erythematous swelling of the right wrist. There was also swelling on the dorsum of the hand and fusiform swelling of her digits. She had a palpable radial pulse with brisk capillary refill of all of her digits with no color changes noted. She denied any paresthesias. Her motor exam was normal. There was a small 5 × 5 mm area along the volar portion of wrist swelling with a granular base that drained purulent, malodorous material. Cultures obtained prior to consultation were all negative.

Radiographs demonstrated circumferential soft tissue swelling of the right wrist at the level of the distal metaphysis of the right radius and ulna (Fig. 1). There was no underlying osseous pathology or evidence of a radiopaque foreign body.

MRI was subsequently performed which demonstrated a circular foreign body in the soft tissues of the distal forearm just proximal to Lister’s tubercle (Fig. 2). This was located superficial to the extensor and flexor tendons as well as the radial, ulnar, anterior intersosseus, and dorsal intersosseous arteries. The foreign body itself was hypointense on T1 and T2 weighted imaging and there was increased T2 signal and enhancement of the superficial soft tissues. A sinus tract was seen volar and slightly radial which corresponded to the location of expressed purulent drainage on physical exam. Flow voids persisted in the radial and ulnar arteries at the level of constriction consistent with patency.

The patient was taken to the operating room. The volar opening was extended transversely along the epithelialized scar. Dissection was carried down bluntly where a rubber band was identified immediately superficial to the palmaris longus tendon. The rubber band was cut and traction was applied to one end. The rubber band slid out of the tract in continuity. The wound was copiously irrigated with normal saline and a dressing applied. There were no immediate complications.

**Discussion**

“Rubber band syndrome” is a term that was coined by Aggarwal et al., to describe a rare condition which develops when infants or toddlers have a constricting band placed around the wrist which eventually burrows through the skin such that it is no longer visible and goes unrecognized by parents until symptoms develop [1]. Classic symptoms include diffuse swelling of the hand with or without neurovascular compromise. In severe cases the patient may develop gangrene or compartment syndrome.

A review of the literature reveals only a small number of prior described cases, most from India [1–7]. This disease en-
tity has been linked to a cultural ceremony in India involving a “sacred” thread [6]; however, cases outside of India have been reported [7]. Clinical history is very useful. However, the patients and caregivers may not recall the bracelet. In fact, upon reviewing the prior case reports, the presence of a rubber band or bracelet was unknown by the parents in multiple instances at the time of clinical presentation. In 1 previously reported case, and in our case, the parents believed they had removed the bracelet, but it was only partially removed [5]. Physical exam findings of a circumferential wound with seropurulent discharge were consistent findings seen in patients. Radiographs were performed in several cases and all were positive for soft tissue abnormality. An indentation of bone known as the “constriction sign” [6] was present in 2 patients.

Identification of rubber band syndrome of the wrist is critical. Commonly, the parents are aware of bracelet, which simplifies the diagnosis. However, even in the absence of good clinical history, the physical exam and radiographic findings are highly sensitive and specific. As with this case, treatment is surgical resection with most having good outcomes. Knowledge of this disease entity is important as a misdiagnosis could lead to significant negative outcomes such as tendon involvement or neurovascular compromise.

### Roles played

The co-author was involved in development and revision of the manuscript.

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