

## What Is Your Diagnosis?

In collaboration with the American College of Veterinary Radiology

### History

A 9-year-old 3.8-kg castrated male Maltese mixed-breed dog was referred for evaluation of acute lameness in the right forelimb after falling down a flight of stairs 3 days earlier. The dog had non-weight-bearing lameness in the right forelimb when taken to the referring veterinarian, who then identified signs of pain in the right elbow joint and prescribed carprofen (3.3 mg/kg, PO, q 24 h).

On referral examination, the dog had non-weight-bearing lameness in the right forelimb and mild soft tissue swelling over the right elbow joint and midantebrachium. Manipulation of the right elbow joint elicited signs of discomfort. Two orthogonal radiographic views were obtained of the right elbow joint (**Figure 1**).

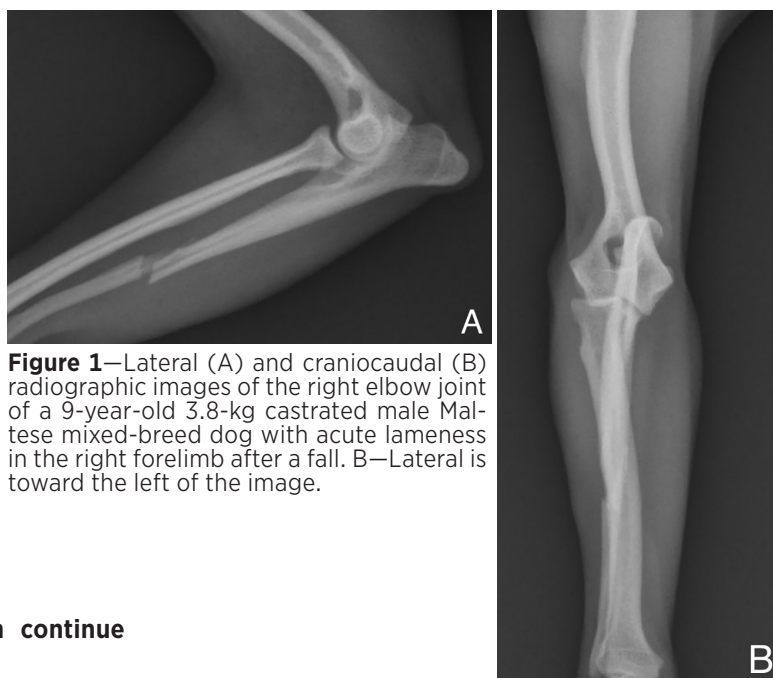
**Formulate differential diagnoses, then continue reading.**

### Radiographic Findings and Interpretation

Radiographic examination of the right forelimb revealed a mid-diaphyseal, short, oblique ulnar fracture with craniolateral displacement of the distal segment and lateral luxation of the radial head (**Figure 2**). Together, these injuries were consistent with a type III Monteggia fracture of the right forelimb.

### Treatment and Outcome

Surgical stabilization was performed by the placement of a 1.5-mm screw in a caudal-to-cranial trajectory through the proximal ulnar segment into the radial head. Due to the small size of the ulna in this patient, further stabilization of the ulnar frac-



**Figure 1**—Lateral (A) and craniocaudal (B) radiographic images of the right elbow joint of a 9-year-old 3.8-kg castrated male Maltese mixed-breed dog with acute lameness in the right forelimb after a fall. B—Lateral is toward the left of the image.

ture was not performed. At 8 days after surgery, recheck radiographic examination revealed that the screw implant had migrated laterally and led to relaxation of the radial head laterally. The patient underwent surgical revision, which involved removal of the implant and replacement with a 1.5-mm lag screw. A spica bandage was placed for 3 weeks. At recheck examination 4 weeks later, the patient was moderately lame and had decreased range of motion of the elbow joint in the affected limb.

### Comments

Monteggia fractures are characterized by luxation of the radial head combined with proximal ulnar fractures that are most frequently due to trauma and uncommon in small animal patients. These fractures are classified as types I through IV on the basis of the direction of radial head luxation.<sup>1</sup> In small animal patients, type I is most common<sup>2,3</sup> and defined as cranial luxation of the radial head. The dog of the present report had a type III Monteggia fracture, which is rarely seen in people<sup>4</sup> or veterinary patients. In fact, children are most commonly affected by type

Mikaela N. Gondolfe, MAg, DVM<sup>1,2\*</sup>

<sup>1</sup>Dallas Veterinary Surgical Center, Dallas, TX

<sup>2</sup>BluePearl Pet Hospital, Southfield, MI

\*Corresponding author: Dr. Gondolfe (mgondolfe@gmail.com)

<https://doi.org/10.2460/javma.21.05.0254>

III Monteggia fracture secondary to traumatic varus force while the elbow joint is extended.<sup>4</sup>

Imaging is pivotal not only for the diagnosis and appropriate specification of the type of Monteggia fracture but also the development of a patient-spe-



**Figure 2**—Same images as in Figure 1. There is a mid-diaphyseal, short, oblique fracture of the ulna with craniolateral displacement (black arrows); widening of the humeroradial joint space (white solid arrow); and lateral luxation of the radial head (dotted white arrow).

cific therapeutic plan. Orthopedic examination can facilitate diagnosis of radial head luxation via palpation. However, in the dog of the present report, radial head luxation was not palpable on examination, which could have been because of the extent of soft tissue swelling present at 3 days after the injury occurred and further supported the importance of diagnostic imaging.

For veterinary patients, ulnar fractures usually require radiographic diagnosis because abnormal lateral movement may be attributed only to the radial head luxation on examination.<sup>5</sup> Orthogonal radiographic views are essential for appropriate diagnosis, and an appropriate diagnosis is crucial for planning surgical treatment and minimizing complications. A single screw placement rather than a combination of radial head screw and ulnar bone plate was chosen due to the small size of the dog and the more distal location of the ulnar fracture. Despite a successful repair for the dog of the present report, it was discussed with the owner that potential removal of the screw may be indicated in the future due to migration or failure from shearing forces. Between the radius and ulna, sliding motion occurs during ambulation that increases shear forces on implants.<sup>2</sup> Findings for the dog of the present report further supported the importance of diagnostic imaging and provided additional information on surgical decisions, which are limited in the literature regarding Monteggia fractures.

## References

1. Schwarz PD, Schrader SC. Ulnar fracture and dislocation of the proximal radial epiphysis (Monteggia lesion) in the dog and cat: a review of 28 cases. *J Am Vet Med Assoc.* 1984;185(2):190-194.
2. Fox DB. Radius and ulna. In: Tobias KM, Johnson SA, eds. *Veterinary Surgery: Small Animal.* 2nd ed. Elsevier; 2018:918-920.
3. Piermattei D, Flo G, DeCamp C. Fractures of the radius and ulna. In: *Handbook of Small Animal Orthopedics and Fracture Repair.* 4th ed. Elsevier; 2006:365-371.
4. Johnson NP, Silberman M. Monteggia fractures. Accessed Oct 7, 2021. <https://www.ncbi.nlm.nih.gov/books/NBK470575/>.
5. Leclerc A, Greunz EM, Daude-Lagrave A. Surgical treatment of a type III Monteggia fracture in a ring-tailed lemur (*Lemur catta*). *Rev Med Vet.* 2014;165(11-12):313-317.