

ARTHROSCOPY AND PRE-OPERATIVE RADIOGRAPHY / COMPUTED TOMOGRAPHY FINDINGS IN 224 CANINE ELBOWS

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INTRODUCTION:

The elbow joint is a common location for orthopedic disease in dogs, frequently manifesting as clinical lameness.^{1,2} Large breed dogs are more commonly affected, though elbow disease has been documented in nearly all breeds. Arthroscopy is a minimally invasive procedure that allows both visual inspection of the elbow joint and surgical treatment for many common elbow pathologies.

OBJECTIVES:

The purpose of this study is to describe the predictive value of radiography and computed tomography (CT) as imaging modalities for surgical planning and arthroscopic findings for elbow disease.

MATERIALS AND METHODS:

Medical records from 2006-2012 were retrospectively reviewed for information on signalment, date of arthroscopy, date and form of preoperative imaging (radiographs and/or CT), imaging findings, and arthroscopic findings. Radiograph and CT reviews were performed by board-certified radiologists (ACVR) and surgical procedures were performed by board-certified surgeons (ACVS). Radiographs were obtained with a digital machine and CT images were acquired with 0.5mm slices and 0.2mm slice intervals. Arthroscopic findings from 224 elbow procedures (134 canine patients) were compared to radiographic and/or CT reports preoperatively. Of the 224 arthroscopic procedures, 158 had both radiographs and CT performed, 39 had only CT performed, and 27 had only radiographs performed.

RESULTS:

Thirty-four breeds were represented, with Labrador Retrievers being the most common breed undergoing arthroscopy (38/134). Average age of patients undergoing arthroscopy was 5.6 years (range of 9 months to 17 years). Pathologies noted on arthroscopic evaluation included fragmented medial coronoid process/coronoid injury (154), osteochondrosis dissecans (29), joint incongruity (3), degenerative joint disease/synovitis (195), ununited anconeal process (7), fractures (4), and subchondral bone cyst (1). Of the patients who had preoperative radiographs, radiographic findings were consistent with the arthroscopic findings in 143/185 of cases. Of the patients who had preoperative CT, CT findings were consistent with the arthroscopic findings in 146/197 of cases. Of the patients confirmed with a fragmented medial coronoid process (FMCP) on arthroscopy, 105/127 of radiograph findings and 109/138 of CT findings were predictive. Of the patients diagnosed with OCD on arthroscopy, 14/21 of radiograph findings and 21/27 of CT findings were predictive. Incongruity was noted arthroscopically in 3/9 cases where it was documented by radiographs, and in 3/12 cases where it was documented by CT. Of the patients diagnosed with UAP, 5/5 of radiographic findings and 7/7 of CT findings were diagnostic. Of the patients diagnosed with fractures, 4/4 of radiograph and CT findings were diagnostic. There was one patient diagnosed with radiohumeral and radioulnar subluxation on arthroscopy that also was documented on its radiographs and CT scan. One patient was diagnosed with a subchondral bone cyst on arthroscopy that was documented on CT scan but not radiographs.

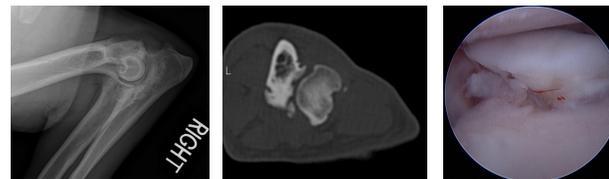


Fig 1: Fragmented medial coronoid process



Fig 2: Osteochondrosis dissecans lesion

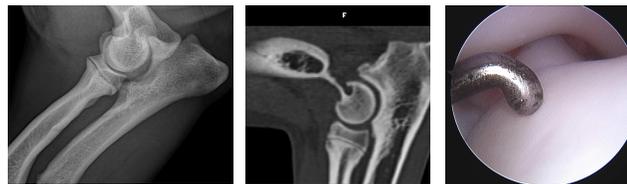


Fig 3: Joint incongruity



Fig 4: Ununited anconeal process

DISCUSSION/CONCLUSION:

Radiographic and CT imaging overall had good diagnostic value for arthroscopic procedures.² Radiographs and CT alone were both predictive for UAP (Fig 4), fractures, and subluxation, and there were no other pathologies noted on arthroscopy for those patients that were not documented by imaging. However, diagnostic value was variable for medial coronoid injury (Fig 1), OCD (Fig 2), joint incongruity (Fig 3), and subchondral bone cyst that were detected on arthroscopic exploration. In the cases of medial coronoid disease diagnosed arthroscopically, radiographs were slightly more predictive than CT. In the cases of OCD diagnosed arthroscopically, CT was more predictive than radiographs. In the cases of incongruity diagnosed arthroscopically, radiographs were more predictive than CT. The subchondral bone cyst diagnosed by arthroscopy was only predicted by the more sensitive imaging modality (CT). Non-articular findings such as panosteitis, enthesiophytes, and angular limb deformity were only identified on imaging. Limitations of arthroscopy should be considered such as inability to fully assess joint congruency and intramedullary changes such as panosteitis which can be seen on CT scans. Similarly, more subtle superficial changes found upon arthroscopic inspection such as synovitis and cartilage damage often cannot be picked up even on advanced imaging. Though arthroscopy is the gold standard diagnostic for elbow joint assessment, advanced imaging is important to gain the most information about joint congruency and pathology.^{2,3} Radiographs and CT should be used as complementary imaging modalities, as each contributes a different quality of information that is valuable in surgical planning.

REFERENCES:

1. Fitzpatrick N, Smith TJ, Evans RB, Yeaton R. 2009. Radiographic and arthroscopic findings in the elbow joints of 263 dogs with medial coronoid disease. *Vet Surg* 38:213-223.
2. Punke JP, Hulse DA, Kerwin SC, et al. 2009. Arthroscopic documentation of elbow cartilage pathology in dogs with clinical lameness without changes on standard radiographic projections. *Vet Surg* 28:209-212.
3. Cook CR, Cook JK. 2009. Diagnostic imaging of canine elbow dysplasia: a review. *Vet Surg* 38:144-153.