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TREATMENT OF ULNAR FRACTURE WITH DISLOCATION OF CAPUT RADII (MONTEGGIA LESION) IN 2 DOGS AND 3 CATS*

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İki köpek ve üç kedide kaput radii dislokasyonu ile ulna kırığının (Monteggia lezyonu) sağaltımı

Özet: *Bu çalışmada klinik ve radyolojik muayeneler sonucunda Monteggia lezyonu olduğu belirlenen 2 köpek ve 3 kedi konu edildi.*

Olguların 2 köpek ve 1 kedi'de tip I, 1 kedi'de tip II, 1 kedi'de ise tip III Monteggia lezyonu saptandı.

Genel anestezi altında ulna'daki kırıkların redüksiyonu ve fikzasyonu 1 köpek'te Steinman pin, 3 kedi'de Kirschner tellerinin intramedüller uygulanması ile, 1 köpek'te ise, dinamik kompresyon plağı kullanılması ile sağlandı. Kaput radii'nin redüksiyonu 3 olgu'da ulna ile birlikte semiserklaj, 1 olguda vida ile, 1 olgu da ise ligamentum annulare radii'ye sentetik bir iplik ile dikiş uygulanması ile sağlandı.

Postoperatif 3 hafta süreyle olgulara destekli bandaj uygulandı. Olguların postoperatif 60-90. günler arasında ön ekstremitelerini çok rahat kullandıkları izlendi. Olgularda ulna'da yetersiz kallus, kaput radii'nin relükzasyonu, periartiküler ossifikasyon, osteoartritis, cubiti ekleminin hareket aralığının daralması, radius ulna arasında sinostozis oluşumu gibi komplikasyonlarla karşılaşılmadı.

Sonuç olarak, kedi ve köpeklerde rastlanılan 5 olguya ait bilgilerin sunulduğu bu çalışmada, Monteggia lezyonu hakkında meslektaşlarımıza detaylı bilgi sunularak, bu alandaki sınırlı sayıdaki literatüre katkı sağlanmaya çalışılmıştır.

Anahtar kelimeler: *Caput radii lukzasyonu, kedi, köpek, Monteggia lezyonu, sağaltım, ulnar kırık.*

Summary: *Two dogs and three cats with Monteggia lesions were diagnosed due to clinical and radiological examinations which were subjected in this study.*

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Type I, type II and type III Monteggia lesions were diagnosed in two dogs and three cats.

Reduction and fixation of ulnar fractures were performed under general anesthesia using Steinman pin in one dog, intramedullar Kirschner wires in three cats and DCP in one dog. The reduction of the radial head was maintained by synthetic substitution of the annular ligament in one case by transfixation of ulna with a screw in one case and with semi cerclage in three cases. Coaptation bandages were used post operatively for three weeks. It is observed that cases began to use their legs properly between 60 and 90 days post operatively.

Complications such as incomplete callus formation, recurrent subluxation of radial head, periarticular ossification, osteoarthritis, poor function of art. cubiti and synostosis between radius and ulna were not developed.

As a conclusion, this study presents detailed knowledge on Monteggia lesions, in which there are limited studies on this subject.

Key words: *Caput radii luxation, cat, dog, Monteggia lesion, treatment, ulnar fracture.*

Introduction

The luxation of caput radii and fracture of ulna and also named as "Monteggia fracture-dislocation" is not a common lesion (1,3,5,6, 13).

Monteggia lesion was first described by Giovanni Battista Monteggia in 1814 and represents about 0.7% of elbow fractures and dislocations and 7% of fractures of the radius and ulna in human (9,14,15).

Four types of Monteggia lesions have been described in human by Bado (1962), according to the dislocation direction of caput radii and the level of ulnar fracture according to the classification made (11,14).

Type I: Cranial dislocation of caput radii with caudal angulation and ulnar diaphyseal fracture. It is the most common type seen in cats and dogs.

Type II: Caudal dislocation of caput radii and ulnar diaphyseal fracture.

Type III: Craniolateral and lateral dislocation of caput radii and ulnar diaphyseal fracture.

Type IV: Cranial dislocation of caput radii with proximal 1/3 fracture of radius and ulnar diaphyseal fracture.

Close reduction and external fixation can be used in cases with slight dislocation, but this technique is not successful enough for treatment of lesions (2,14). Open reduction and immobilization is reported to be the best operative technique in Monteggia lesions (2,4,6,8,14). Reduction of the caput radii and immobilization of the ulnar fracture must be made by using intramedullary pins, bone screws and plates. Reduction of the radial head can be maintained by repairing of lig. annulare radii or ulnar transfixation of the ligament using screws, pins or cerclage wires (4,5,7,12,14).

Monteggia lesion is not a common problem in veterinary surgery and there are limited studies concerning the subject (1,2,6,14). In a study concerning 28 cases; type I, type II and type III Monteggia lesions were described in 24, 1 and 3 cases respectively (14).

In the present clinical study, it was aimed to determine the treatments and prognosis of Monteggia lesions diagnosed in 2 dogs and 3 cats.

Materials and Methods

The study performed on 2 dogs and 3 cats with different breed, age and sex which were brought to Orthopaedics and Traumatology

Clinics of Veterinary Faculty of Ankara University.

Cases were brought with the etiology because of traffic accidents in 2 cases (Case 1 and 4) and falling down windows in 3 cases (Case 2, 3 and 5). Deformation and pain in art. cubiti and crepitation in ulna was noticed in their clinical examination.

According to the radiographic examinations, in 2 dogs (Case 1 and 4) and one cat (Case 3) Type I, in one cat (Case 2) Type II and in one cat (Case 5) Type III Monteggia lesions were diagnosed (Fig. 1,2,5,6,7,10).

After the cases were premedicated by xylazine hydrochlorid (Rompun, Bayer, Türkiye, 23,32 mg/ml, 0,1 mg/kg IM), anesthesia was performed by ketamine hydrochlorure (Ketalar, Eczacibasi, Türkiye, 50 mg/ml, 10 mg/kg IM). All cases were prepared in lateral recumbency and operation site was prepared.

The skin incision is started from the lateral humeral epicondyle followed the joint and centered between ulna and radius to the mid points of these two bones. After the skin incision subcutaneous fat tissue and fascia was elevated and muscles were exposed. After the incision of aponeurosis, musculus extensor digitalis communis and musculus extensor digitalis lateralis were reached from the septum intermuscularis.

Fracture line on ulna was exposed with the elevation of these two muscles. The reduction and fixation of the ulnar fracture has been accomplished by using Steinmann pin in 1 dog (Case 1) (Fig. 3,4) and Kirschner wires in 3 cases (Case 2, 3 and 5) intramedullary with retrograd method. Fixation of ulnar fracture was accomplished by dynamic compression plate (DCP) and screw system in one dog (Case 4) (Fig. 8).

Proximal part of the incision was prolonged including the art. cubiti. Musculus extensor digitalis communis and musculus extensor digitalis lateralis were elevated to the sides and reached to the joint with a myotomie under the humeral condyle (7,10) within these directions. Attention was paid to protect the radial nerve. The reduction of cranially, caudally or laterally dislocated radius was accomplished manually. In 3 cases (Case 1, 3 and 5) semicerclages, in one case (Case 4) a screw was used in fixation of caput radii and in one case (Case 2) repair of join annular ligament was performed with a 3/0 propilen suture material (Ethicon,UK, polyglicolic asid) with sutures myotomied m. supinator had it's original anatomical condition.

Post operatively the fixation of the joint in it's physiological angle was performed by bandages which is supported with plastic coaptation material, in dogs and bandages supported with cartoon in cats.

Between postoperative 7^{th} and 10^{th} days, skin sutures, and after 3 weeks bandages were removed.

Results

Because of the post operatively applied padded bandages it is observed that function loose of front limbs decreased by removing of these bandages.

After observing enough callus formation and healing of ulna in radiographs taken in 45-60^{th} days, in one cat (Case 2) intramedullar pin was been left in ulna because of the 6 months age of the case.

In the other 3 cases (Case 1, 3 and 5) in which intramedullar pins were used and in 1 case (Case 4) in which DCP was used, fixation materials were removed with a second operation on 6^{th} months (Fig. 9).

The cerclage wire which was used in repairment of annular ligament was left in cases (Case (1, 3 and 5) and no complications about this was observed.

In clinical examinations which were done in postoperative 60-90^{th} days, it was observed that cases were using their front limbs easily and comfortably. Detailed knowledge about cases are presented in table I.

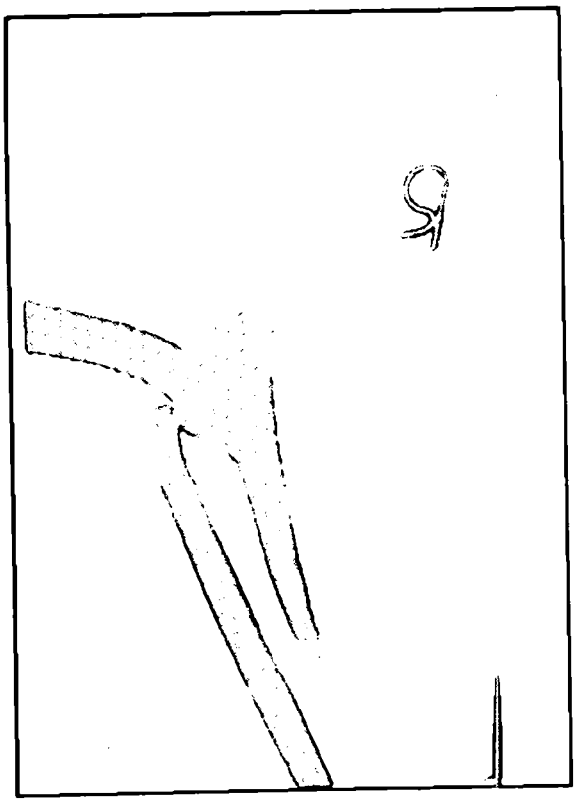

Figure 1. The preoperative mediolateral radiographic view of case one (Type I).
Şekil 1. Olgu 1'in preoperatif mediolateral radyografik görünümü (Tip I).

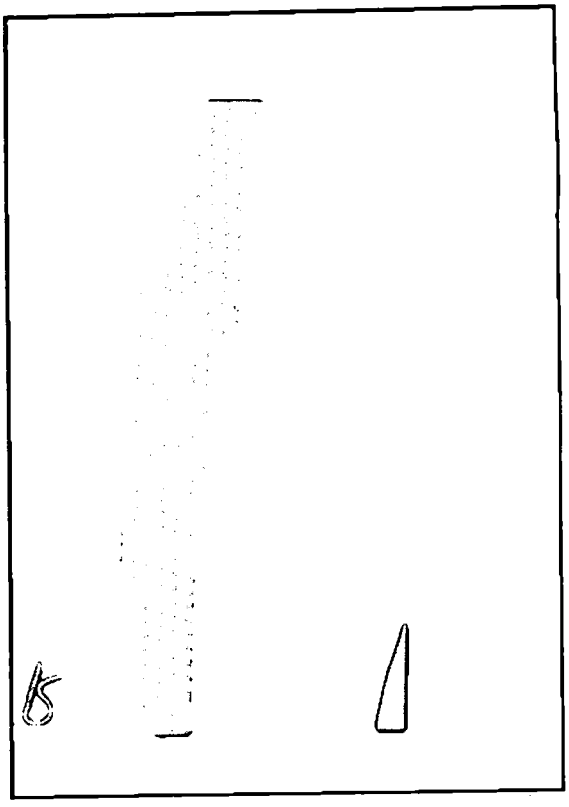

Figure 2. The preoperative anteroposterior radiographic view of case one.
Şekil 2. Olgu 1'in preoperatif anteroposterior radyografik görünümü.

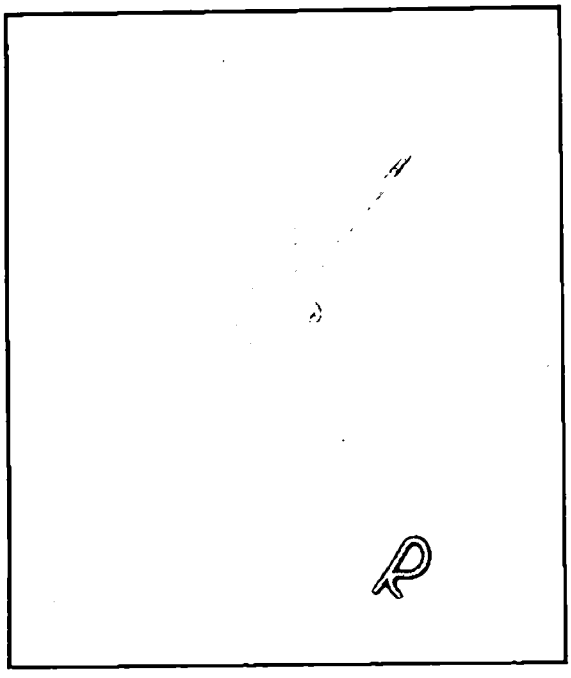

Figure 3. The postoperative mediolateral radiographic view of case one.
Şekil 3. Olgu 1'in postoperatif mediolateral radyografik görünümü.

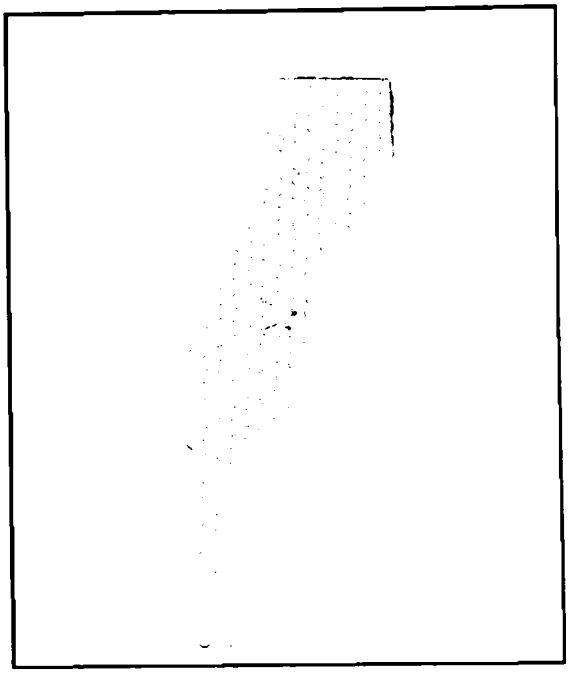

Figure 4. The postoperative anteroposterior radiographic view of case one.
Şekil 4. Olgu 1'in posteperatif anteroposterior radyografik görünümü

Figure 5. The preoperative anteroposterior andmediolateral radiographic views of case 2 (Type II).
Şekil 5. Olgu 2'nin preoperatif anteroposterior ve mediolateral radyografik görünümleri (Tip II)

Figure 6. The preoperative mediolateral radiographic view of case 3 (Type I).
Şekil 6. Olgu 3'ün preoperatif mediolateral radyografik görünümü (Tip I).

Figure 7. The preoperatif anteroposterior ve mediolateral radiographic views of case 4 (Type I).
Şekil 7. Olgu 4'ün preoperatif anteroposterior ve mediolateral radyografik görünümleri (Tip I).

Figure 8. The postoperative anteroposterior and mediolateral radiographic views of case 4.
Şekil 8. Olgu 4'ün postoperatif anteroposterior ve mediolateral radyografik görünümleri.

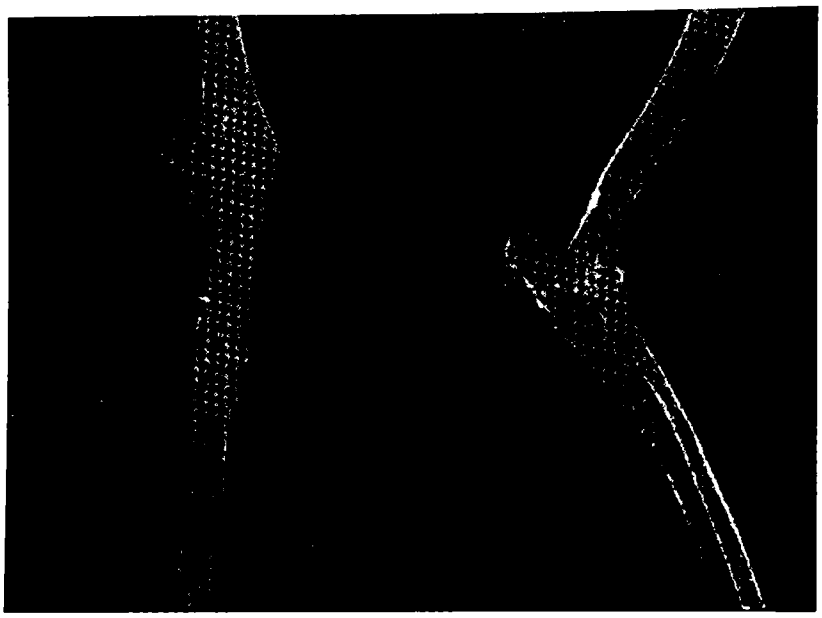

Figure 9. The anteroposterior and mediolateral radiographic views of case 4 when plate and screws removed on 6th months.
Şekil 9. Olgu 4'ün postoperatif 6. ayda plak ve vidalarının uzaklaştırılmasından sonraki anteroposterior ve mediolateral radyografik görünümleri.

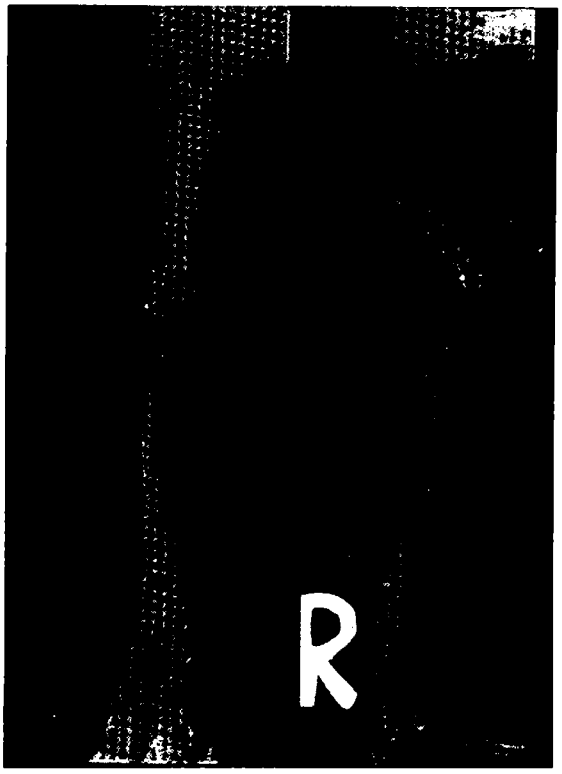

Figure 10. The preoperative anteroposterior and mediolateral radiographic views of case 5 (Type III)
Şekil 10. Olgu 5'in preoperatif anteroposterior ve mediolateral radyografik görünümleri (Tip III)

Discussion

The dispersion of Monteggia lesions in total veterinary cases, are limited according to the reports. The most common Monteggia lesion is Type I. In 3 cases Type I, in one case Type II and in one case Type III lesions were observed in this study. Second type of Monteggia lesion was recorded in one dog but not in any cat (4,11,12,14).

Definitive diagnosis can be made only by radiographic examination. It has been reported that closed reduction and external fixation may be considered in cases without displacement but the chance of this method is so weak in cases with displacements (2,14).

Definitive diagnosis about the type of the lesions was made by double sided radiographs. Operative treatment must be undertaken for the correction of the displacements.

In operative treatment while some surgeons are recommending the fixation of the ulnar fracture with a intramedullar pin firstly and than the immobilization of radius with cerclage

Table 1. Data of cases.
Tablo 1. Olgulara ait veriler.

Case No	Species, breed, age, sex	Etiology, localisation and time of lesion	Type lesion	Operative method
1	Dog, Setter, 7 years, male	Traffic accident 2 days ago Right	Type I	Intramedullary pin into ulna and semicerclage for caput radii
2	Cat, mix breed, 6 months, male	Folling down 3 days ago Left	Type II	Intramedullary pin into ulna and manual reduction for caput radii and sutured tolig. annulare
3	Cat, mix breed, 1,5 years, male	Folling down 2 days ago Left	Type I	Intramedullary pin into ulna and semicerclage for caput radii
4	Dog, Pitt-Bull Terrier 1.5 years, male	Traffic accident 1 day ago	Type I	DCP Into ulna and reduction with 3rd screws on the DCP plate for caput radii
5	Cat, mix breed, 1 year, male	Folling down 2 days ago Right	Type III	Intramedullary pin into ulna and semicerclage for caput radii

wires turn around ulna and radius (6), some other surgeons recommends the use of a long screw to the proximal fracture of the olecranon (2) or a plate to the ulna and different methods and materials are also been recommended (4,5,7,12,14). In chronic cases, some recommend the excision of caput radii (2,8).

In our study case, the fixation of ulna was performed by a Steinman pin 1 case, by a Kirschner wire in 3 cases and by DCP in 1 case and no functional problem occurred about the 3/0 propilen which was used in repairment of lig. annulare and fixation of the dislocated caput radii to the ulna with a semicerclage. According to the literature knowledge; complete callus formation on ulna, redislocation of caput radii, traumatic periarticuler ossification, osteoarthritis, restricted range of motion elbow, osteomyelitis and synosthosis between the radius and ulna are the most common complications (2,8).

In cases between postoperative 60-90th days a complete functional healing was observed and complications, like nonunion, malunion, joint lesion, redislocation, ankylosis were observed.

As a result of this study in which knowledge about 5 cases, we worked was presented, detailed knowledge about Monteggia lesion was presented. It is aimed to help to the few literature about this subject.

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