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CLINICAL CASE

Use of string-of-pearls locking implants for the stabilisation of acetabular and supra-acatebular fractures in three dogs☆

Utilisation des implants vérrouillés « string-of-pearls » pour la stabilisation de fractures acétabulaires et supra-acétabulaires chez trois chiens

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KEYWORDS
SOP plate;
Acetabular fracture;
Supra-acetabular fracture;
Dog

Summary
Aims of the study. — To describe the use of string-of-pearls (SOP) plates for the stabilisation of acetabular and supra-acetabular fractures in three dogs.
Material and methods. — Clinical cases with acetabular ($n=1$) or supra-acetabular ($n=2$) fractures that were repaired with SOP plates were retrospectively reviewed. Fracture type, concurrent injuries, fracture management, radiographic outcome and clinical recovery were documented.
Results. — Fracture reduction on immediate postoperative radiographs was considered excellent in all of the three dogs. No postoperative complications were reported in any dogs. Complete bone healing was achieved in all cases at eight weeks postoperatively with no loss of fracture reduction. There were no problems related to the implants. Excellent limb function was reported in all three cases.
Conclusions. — Dorsal plating of the acetabulum may be challenging. The use of SOP plates for stabilisation of acetabular and supra-acetabular fractures in dogs allows adequate reduction and excellent fixation with no postoperative complications.

☆ La lecture de cet article ouvre droit à 0,05 CFC. La déclaration de lecture, individuelle et volontaire, est à effectuer auprès du CNVFCC (cf. sommaire).

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MOTS CLÉS
Plaque SOP ;
Fracture acétabulaire ;
Fracture supra-acétabulaire ;
Chien

Résumé
Objectifs. — Rapporter l'utilisation des implants verrouillés « string-of-pearls » (SOP) pour la stabilisation de fractures acétabulaires et supra-acétabulaires chez le chien.
Matériels et méthodes. — Les dossiers médicaux des chiens opérés pour une fracture acétabulaire ($n = 1$) ou supra-acétabulaire ($n = 2$) au moyen d'implants verrouillés SOP sont analysés rétrospectivement. Le type de fracture, les lésions concomitantes, les implants utilisés, le suivi radiographique et clinique sont documentés.
Résultats. — La qualité de la réduction de la fracture en postopératoire immédiat est considérée comme excellente pour les trois chiens. Aucune complication postopératoire n'est rapportée. Une consolidation osseuse est objectivée pour les trois cas dans les huit semaines suivant la chirurgie sans perte de réduction. Aucune migration ou casse d'implants n'est rapportée. Une récupération fonctionnelle excellente est obtenue pour tous les chiens.
Conclusions. — L'application d'une plaque vissée sur l'acétabulum est techniquement difficile. L'utilisation des implants SOP pour la stabilisation de fractures acétabulaires et supra-acétabulaires chez le chien permet une réduction adéquate et une excellente stabilisation sans complication postopératoire rapportée.

Introduction

Fractures of the pelvis comprise 20 to 30% of all fractures in dogs, of which 18 to 46% are ilial fractures and 12% are acetabular fractures [1,2]. Surgery is recommended for fractures of the ilium and acetabulum, luxations of the sacroiliac joint, fractures resulting in narrowing of the pelvic canal, fractures in breeding females and for animals with multiple limb fractures [1]. Adequate reduction and rigid internal fixation are generally advocated to provide a rapid return to function in dogs [1—4].

Acetabular fractures require perfect anatomical alignment and are usually stabilised by application of appropriately contoured plates and screws. Various types of plates have been employed for the stabilisation of acetabular fractures, including veterinary acetabular plates [5,6], dynamic compression plates [7,8], reconstruction plates with or without plate luting [9—11] and miniplates [4]. None of those fixation methods attempt to circumvent the difficulties associated with the loss of primary reduction that can occur after plate application if adequate (i.e., perfect) plate contouring to the irregular dorsal surface of the acetabulum is not achieved [6,12,13]. Although satisfactory clinical outcomes have been reported in most retrospective studies of canine acetabular fractures, complications such as, implant failure, secondary arthritic hip changes and post-surgical muscular atrophy have been reported following plate and screws stabilisation [4,6,9,10,14].

Fractures of the ilial body often occur concurrently with pubic and ischial fractures [15]. Ilial body fractures are usually long oblique fractures with some varieties extending from the ventral aspect of the ilium cranially, to the level of, or caudal to the acetabulum dorsally [1,2]. In this study, for convenience, the author will use the term 'supra-acetabular' fractures in order to define this type of ilial fracture with a caudal fracture line located on the dorsal surface of the acetabulum without entering the hip joint. This is an extrapolation from 'supracondylar' humeral and femoral fractures. Previously described technique for the stabilisation of supra-acetabular fractures in dogs used reconstruction plates overlapping the acetabulum [1,2]. As for acetabular fractures, plate contouring may be challenging with the potential for fixation failure over time because of the limited screw purchase caudal to the fracture site [4,6,9,10,14]. To our knowledge, the use of string-of-pearls (SOP) plates (Orthomed UK Ltd, Halifax, UK) for the management of acetabular and supra-acetabular fractures in canine patients has not been described. The author reports the use of SOP plates in three dogs with acetabular and supra-acetabular fractures.

Material and methods

Medical records of all dogs that had stabilisation of acetabular and supra-acetabular fractures performed by one surgeon at the University College Dublin Veterinary Teaching Hospital between September 2012 and August 2013 were retrospectively reviewed. Inclusion criteria included: occurrence of acetabular and supra-acetabular fractures repaired by open reduction and internal fixation using a SOP plate and complete clinical and radiographic records. The history, body weight, signalment, initiating trauma, configuration of the acetabular and supra-acetabular fractures, other concomitant fractures, surgical approach, type of implants used to stabilise the fractures, postoperative complications and time to radiographic healing were recorded. Dogs were anaesthetised for surgery, however differences in individual anaesthetic protocols were not described for the purposes of this study. Potentiated amoxicillin (Augmentin injectable: GlaxoSmithKline, Dublin, Ireland) (12.5 mg/kg) was administered intravenously 20 minutes prior to skin incision and every 90 min thereafter throughout the surgery. All procedures were performed by a boarded-certified veterinary surgeon. All patients were positioned in lateral recumbency and the pelvis was aseptically prepared with the use of an incision surgical drape. Fracture repairs were performed through a standard lateral approach to the ilium