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Scapulohumeral Joint Luxation in a Thoroughbred Racehorse during Recovery from General Anesthesia

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Abstract

Scapulohumeral joint luxation in horses is rare. This report describes the case of a 3-year-old thoroughbred racehorse with scapulohumeral luxation that occurred during recovery from general anesthesia. Closed reduction using a hoist under general anesthesia was performed soon after the injury had occurred, and successful reduction was achieved; however, radiographic evidence of bony injury was observed. A conservative postoperative treatment was chosen, and a long-term successful outcome was achieved. Prompt reduction can hasten postoperative healing in the present case and can be imperative in dealing with scapulohumeral joint luxation.

Key Words: Closed reduction, Horse, Scapulohumeral joint luxation

Scapulohumeral joint luxation in horses appears to be rare whether or not it is associated with general anesthesia^{1,4,6-10,12,13}. Trauma is suspected in the etiology of the scapulohumeral joint luxation, and considerable force is required for it to occur; therefore, humeral or scapular fractures may occur concomitantly^{1,4,7}. Some reports have shown that closed reduction techniques, using a calving jack or hoist, provide successful reduction of the luxation^{6,9,12,13}; however, these reports, with different extent of the bone and soft tissue damage and different duration of the scapulohumeral joint luxation, had various outcomes. Although it has been suggested that the luxation should be corrected as soon as possible to make the reduction

easier^{1,7,12} and to attain successful outcomes^{4,13}, the damage to the bone and soft tissue of the joint or the duration of the luxation is assumed to contribute to the outcome^{2-4,7,9-11,13}. One possibility has been suggested that the outcome improves with a combination of closed reduction and scapulohumeral arthroscopy⁹; however, it is unclear why the outcome varied among the previous reports, although a similar approach for the closed reduction was performed.

The present report describes an anesthesia-associated scapulohumeral joint luxation with a concurrent bony fragment in a thoroughbred racehorse and a long-term sound outcome following prompt closed reduction. We emphasize the possibility that prompt reduction is key to

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deal with scapulohumeral joint luxation.

A 3-year-old thoroughbred filly weighing 456 kg was admitted to the Equine Medical Center of HIDAHA Horse Breeders Association for arthroscopic surgery of osteochondral fractures of the left carpal bones. The horse developed the fractures during racing 10 days prior to admission.

No abnormalities were noticed on clinical examination, and the horse was premedicated with medetomidine [$5 \mu\text{g/kg}$ body weight (bwt)]. A radiographic series of both carpi revealed osteochondral fragments of the proximal aspect of the right intermediate carpal bone and the distomedial aspect of the left radius. For surgery, an intravenous catheter was placed in the left jugular vein. Anesthesia was induced with guaifenesin (100 mg/kg bwt) and ketamine (2 mg/kg bwt). The horse was intubated, and a hoist was used to move the horse to the surgical table. During surgery, the horse was placed in the dorsal recumbent position. Anesthesia with isoflurane in oxygen was maintained for 79 min, and the arterial blood pressure was maintained above a mean value of 70 mmHg.

Following uneventful surgery, the horse was shifted to an induction/recovery box, which had a rough surface rubber mat on the floor, and placed in the right lateral recumbent position on the padded mattress. The horse was insufflated with a high flow of oxygen by a demand valve. Once the swallowing reflex had returned, the horse was extubated. Xylazine (0.22 mg/kg bwt) was administered intravenously to enable a smooth recovery from anesthesia. The time from the termination of isoflurane anesthesia to the onset of the swallowing reflex was 20 min. Head and tail rope-assisted recovery was used as a usual procedure at this clinic.

The horse required several attempts to stand. The first unsuccessful attempt was made 18 min after extubation. The horse showed uncoordinated movement and attempted to stand immediately after she attained a sternal recumbent position. She placed her front legs forward and attempted to stand; however, her

forelimbs slipped caudally. This rendered the forelimbs to be trapped under the horse's belly, with the shoulder joints in the flexed position. Immediately, the second unsuccessful attempt to stand was made with higher effort. The horse was able to protract her right forelimb forward, but not the left forelimb, during standing; thus, she fell down with the left shoulder joint in the flexed position and rolled to the left lateral recumbent position. Afterwards, the horse stood up successfully. The time from extubation to standing was 27 min.

Following recovery, the horse showed non-weight-bearing lameness of the left forelimb, with mild swelling and asymmetry around the left scapulohumeral joint. The greater tubercle of the left humerus was easily discernible and palpated laterally and cranioproximally. No signs of pain were elicited on palpation of the limb; however, the horse resented protracting the limb. Radiography of the left scapulohumeral joint revealed cranioproximal dislocation of the humerus (Fig. 1), and lateral luxation of the scapulohumeral joint was diagnosed.

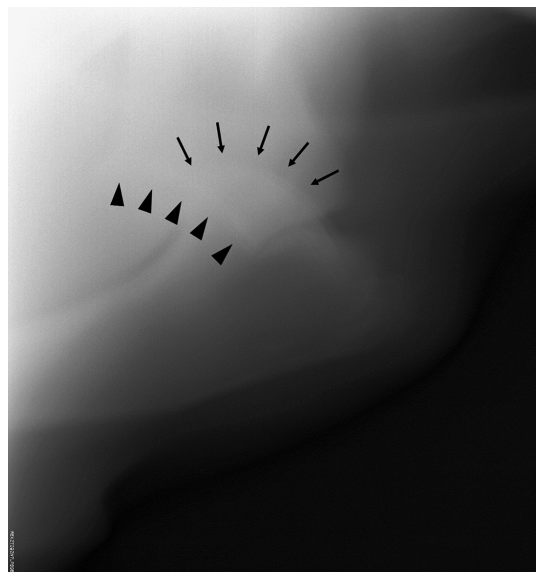


Fig. 1. Mediolateral radiographic view of the left scapulohumeral joint immediately after rough recovery from anesthesia. Cranioproximal dislocation of the humeral head can be observed. Arrows and arrowheads delineate the humeral head and glenoid cavity, respectively.

To reduce the luxation, the horse was administered 5 µg/kg bwt of medetomidine, and anesthesia was induced and maintained as previously mentioned. The horse was positioned in the dorsal recumbent position on the padded mattress, and a hobble was placed on the left front pastern region and attached to a hoist. Only the affected limb was hoisted vertically until the weight of the horse was suspended by the limb, and external pressure was exerted manually on the greater tubercle of the left humerus toward the medio-caudal direction. Following continuous suspension of the limb and a constant exertion of the pressure for a while, repositioning of the luxation was experienced with a sudden click. Radiography revealed congruity of the shoulder joint and a large bony fragment, which had not been seen on the initial radiographs (Fig. 2). The time from the occurrence of to the reduction of the injury was 58 min. Although the filly was a horse in training, the owners declined further treatment for the bony fragment and decided the filly to be retired for breeding purposes. Recovery from anesthesia

was assisted with an Anderson Sling (Care for Disabled Animals; Potter Valley, CA). The time to standing was 94 min, and the recovery quality was graded as uneventful. Immediately after recovery, a repeated radiography was taken, and the anatomically correct position of the left humerus in addition to a large bony fragment was confirmed. Repeated lameness evaluation revealed that the lameness was markedly improved after reduction.

During the first 2 weeks postoperatively, the horse presented only slight lameness with no detectable muscle atrophy or shoulder instability while walking. The horse showed no signs of lameness and pastured without any abnormalities thereafter. The horse was bred and conceived approximately 4 months after surgery and delivered a foal in the subsequent breeding season without any clinical abnormality. A radiographic follow-up performed after over 2 years postoperatively showed osteophyte formation at the cranial margin of the glenoid cavity with no evidence of joint space narrowing (Fig. 3). To date, the horse has shown no lameness.

Scapulohumeral joint luxation with concurrent bony injury of 2-week duration reported by Madison *et al.*⁹⁾ showed the possibility that

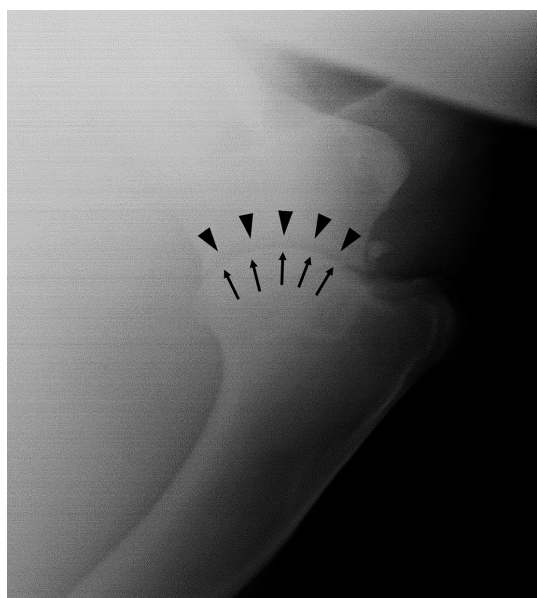


Fig. 2. Mediolateral radiographic view of the left scapulohumeral joint following closed reduction. Congruity between the humeral head (arrows) and the glenoid cavity (arrowheads) and a large bony fragment in the cranial aspect of the joint can be observed.

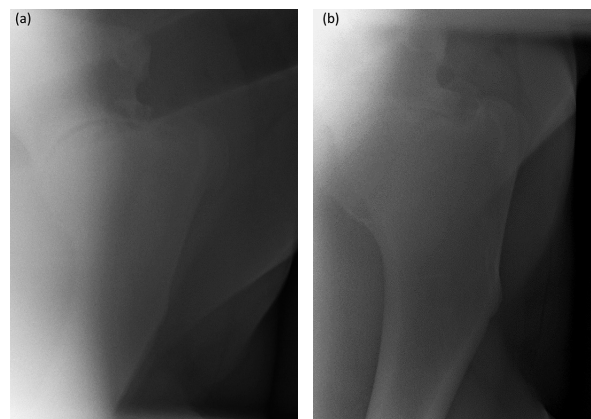


Fig. 3. Mediolateral (a) and craniomedial-caudolateral oblique (b) radiographic view of the left scapulohumeral joint after over 2 years postoperatively. Note a radiographic evidence of osteophyte formation at the cranial margin of the glenoid cavity.

arthroscopic exploration combined with closed reduction leads to a more preferable outcome. They considered that the arthroscopic assessment and debridement of bony and soft tissue debris within the joint accelerated postoperative repair by reducing excessive damage to the joint surface. On the other hand, Zilberstein *et al.*¹³⁾ described a closed reduction technique without arthroscopic examination in a horse with an 8-hour duration of scapulohumeral joint luxation. Successful reduction was achieved, but a fracture of the lesser tubercle of the humerus and a possible fracture of the lateral margin of the glenoid cavity were detected the following day. Although the luxation was reduced in a relatively short time, persistent lameness remained 6 months later. Whether the lack of arthroscopic examination following closed reduction contributed to the persistent lameness in that case is undetermined; however, damage to the bone and soft tissue of the joint appeared to negatively affect the soundness. Furthermore, one report in which a horse with subluxation of the humerus for a 6-week duration was euthanatized due to chronic lameness¹⁰⁾ suggested that the long-lasting injury had evoked exaggerated damage to the bone and soft tissue of the joint, which negatively affected the outcome.

In the present case, closed reduction was performed within 1 hour after the scapulohumeral joint luxation had occurred, and a sling recovery system was used in recovery from general anesthesia. At first, as in previous reports^{3,4,7,11)}, we suspected a guarded prognosis in light of the bony fragment, for which no arthroscopic debridement was performed. However, the horse returned to soundness and achieved complete recovery for use as a broodmare 4 months after reduction. The reasons for this successful outcome are unknown; however, we believe that the prompt reduction following the occurrence of scapulohumeral luxation and the use of a sling recovery system after closed reduction contributed to keeping damage to the bone and soft tissue of the joint to a minimum, which provided the joint

with sufficient stability to allow healing of the injuries during the postoperative convalescence period. Radiographic changes seen in Fig. 3 also provide a comprehensive view of the joint stability. The inflammatory and subsequent restorative periarticular reactions following the soft tissue injuries possibly offered this joint stability because of the restricted joint movement and function³⁾. This is supported by the fact that the scapulohumeral joint is stabilized by the muscles and tendons surrounding the joint instead of lacking the ligamentous support¹⁰⁾, and heavy damage to the surrounding soft tissue can result in delayed healing or guarded outcomes²⁾. Furthermore, we speculate that the anatomically abnormal position of the humerus can cause pressure-induced vascular compromise to the surrounding soft tissue. Although the resultant ischemic-related muscle and nerve damages can be reversible if the conditions are corrected as soon as possible, irreversible damages begin after 5 to 6 hours of ischemia⁵⁾. We believe that the promptly reduced scapulohumeral joint luxation in the present case ensured adequate blood supply and strength of the surrounding soft tissue, which are imperative to the healing process. Therefore, although the bony fragment, if present, should be removed arthroscopically to expect the better outcomes, emphasis should be put on promptly reducing scapulohumeral joint luxation to minimize time-dependent exaggeration of damage to the bone and soft tissue of the joint when encountering the luxation.

In conclusion, once scapulohumeral luxation occurs, treatment should be attempted as soon as possible in order to keep the damage to the bone and soft tissue of the joint to a minimum. Closed reduction, which is a widely accepted treatment technique, requires general anesthesia but no specialized equipments or skills. Although the sling recovery system is considered useful following successful reduction, it is not essential. Therefore, the closed reduction technique can be easily used in a clinical setting, and prompt reduction should be attempted in any case of

scapulohumeral joint luxation.

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