Trochleoplasty in Lateral Patellar Luxation in Two Calves

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ABSTRACT. Two Holstein Friesian calves were referred to the Animal Medical Center of Chonbuk National University with severe lameness on the hind limb(s), flexed stifle joint and an inability to walk since birth. Based on the clinical history, clinical findings and radiography of the stifle joint, the cases were diagnosed as grade III lateral patellar luxation (LPL). Trochleoplasty along with medial retinacular reinforcement and lateral release were performed in both calves. The calves recovered 3 to 4 weeks after surgery. Trochleoplasty along with medial retinacular reinforcement and lateral release can be an effective technique for the treatment of LPL in calves.

KEY WORDS: calf, lateral patellar luxation, trochleoplasty.

Lateral patellar luxation (LPL) in cattle is uncommon and in most of the cases it is genetic in nature. Patellar luxation can affect either one or both legs [2, 5, 15, 16]. LPL is often accompanied by malformation of the femur and/or tibia. In LPL the lateral condyle of the femur is misshapen because its growth plate has been subjected to excess pressure and growth has been altered. The trochanteric ridge is lower and the trochlear groove is shallower [10]. Therefore, the patella does not have a good, deep, secure groove to ride in and easily pulled out. When this groove is too shallow or when the leg is slightly bowed, the patellar ligaments can be damaged. Lateral luxation of the patella can also begin with a hypoplastic muscle called the vastus medialis. If it is not working properly, it does not balance the force of the vastus lateralis, which then exerts too much pull toward the outside. This abnormal displacement of the patella results in pain, cartilage damage, and arthritis. Many of the malformations in the bones and joint occur over time and can be prevented with an early correction [1, 9, 14, 15].

Two Holstein Friesian calves with LPL were referred to the Animal Medical Center of Chonbuk National University. Case 1 was a 3-month-old male calf, weighing 75 kg and presented with the clinical history of severe lameness on right hind limb which was present since birth, an inability to fully extend the stifle. Case 2 was a 1-month-old female calf, weighing 30 kg that presented with severe lameness on both hind limbs since birth. Both the stifles were flexed, the calf was unable to stand and when assisted adopted a crouching position.

In both cases physical, hematological and radiological examinations were performed. The pulse, respiration, temperature and hematological parameters were normal. During palpation, the patella was found displaced laterally and there was atrophy of the muscles. In both cases, the patella was permanently luxated along with tibial torsion and misalignment of the tibial tuberosity with the patellar groove and the patella could not be manually reduced. The radiographs of the stifle joint revealed lateral displacement of the patella involving the right hind limb in case 1 and both hind limbs in case 2. The radiographs also showed a flattened and shallow trochlear groove in both the cases (Fig. 1). These findings were consistent with grade III patellar luxation in dog [11] and also with the previous reports of congenital lateral patellar luxation in calves [5, 7, 15].

The diagnosis was made based on the history, physical findings, characteristic clinical signs and radiographs of the affected stifle joint. Both cases were diagnosed as grade III LPL. Case 1 was diagnosed as unilateral LPL, involving the right hind limb and case 2 was diagnosed as bilateral LPL, involving both the hind limbs.

In both cases surgical corrections of the deformities were performed following the technique of trochleoplasty and imbrication of the medial retinaculum through a synthetic suture fascia lata transposition. The calves were anesthetized with atropine sulphate (0.04 mg/kg, subcutaneously) and xylazine (0.06 mg/kg, intravenously). The area of the stifle joint was surgically prepared, a parapatellar incision was made through the fascia lata and the joint was entered. The trochlear groove was exposed and a rectangular piece of cartilage flap was made, 1–2 mm of subchondral bone was

Fig. 1. Skyline radiographic projection of the left (L) and right (R) femoropatellar joint in case 1. a: Lateral displacement of the patellar, b: Shallow trochlear groove, c: Normal position of the patellar, d: Normal trochlear groove.
removed beneath the flap and the flap was then placed in position. This resulted in the deepening of the trochlear groove that the patellar ligament rides in. The medial retinaculum was then reinforced by synthetic suture fascia lata transposition (Fig. 2). In addition, a release incision on the joint capsule was made on the side of the luxation in order to loosen it. Postoperative treatment involved intramuscular administration of amoxicillin 11 mg/kg and dexamethasone 0.15 mg/kg for 1 week. Postoperatively a support bandage was placed around the leg.

In case 1, from postoperative day 7, the calf began to touch the ground with the toes of the affected foot and tried to bear weight on it. It began to bear weight on the affected foot from the postoperative day 14 and was able to walk almost normal from the postoperative day 21. In case 2, from postoperative day 14 it could stand from postoperative day 21 the calf began to walk but there was little lameness. However, after postoperative day 28 the calf walked almost normally. The muscle atrophy also gradually disappeared 4 weeks after surgery. Radiographic examination 1 and 2 weeks after surgery showed a normal position of the patella and the healing stage of the articular cartilage (Fig. 3 and Fig. 4). The radiograph taken at 3 and 4 weeks after surgery showed a normal stifle. The affected calves recovered from lameness, regained normal functions of the limb and no complications were observed up to 10 months of the surgical correction.

Surgical correction of the patellar luxation required realignment of the extension mechanism and stabilization of the patella in the femoral trochlea [13]. Using trochlear chondroplasty it was possible to stabilize the femoropatellar joint by deepening of the trochlear groove that furnished adequate space for the patella and its ligament to ride in. The newly reconstructed trochlear groove remained as such and did not become flattened or shallow again. The cartilage flap healed without any complication. These findings were in agreement with earlier reports of similar experiments in dogs [8, 11, 13], cats [3], sheep [10], calves [7, 13, 15] and also in horses [2, 6, 7]. It should be noted that a trochlear groove develops in the young animals because of
the presence of the patella in it. Therefore, young animals with LPL will not have a ready-made trochlear groove [4]. Patellar luxation causes tightening of the capsular tissues on the side of the luxation and stretching of the tissues opposite to the luxation. Thus releasing incision and imbrication techniques are usually necessary to allow neutral tracking of the patella in the trochlear groove [7, 8, 13]. The medial retinacular reinforcement prevents the kneecap from having sufficient slack to pop out of the trochlear groove. The lateral release incision relieves the lateral tension on the patella exerted by the contracted and thickened lateral retinaculum and joint capsule, thereby allowing it to ride in the trochlea [1, 2, 5–7, 12]. These findings were in agreement with earlier reports in dogs [8, 11, 13], cats [3], sheep [10], calves [7, 13, 15] and also in horses [2, 6, 7]. The muscle atrophy found might be due to malalignment, disuse or excessive stretch which disappeared 4 weeks after the surgical correction. This finding is in consistent with the report of Leitch and Kotlikoff [7]. This study suggests that grade III Lateral patellar luxation in bovine calves can be satisfactorily treated with trochleoplasty along with medial retinacular reinforcement and lateral release of the joint capsule. The prognosis is better when corrective surgery is performed early in the course of the disease, and the affected animal may regain the normal functions of the limb.

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REFERENCES