UDC 636.084.1:616-089.591.182 https://doi.org/10.15407/animbiol21.02.035

SURGICAL MANAGEMENT OF PERONEAL NERVE PARALYSIS IN CALF

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This article describes a case of peroneal nerve paralysis of left hind limb in 2 month old Holstein calf, weight 60 kg. The final diagnosis of the case was done based on clinical investigation. The severity of the paralysis was based on clinical findings as well as peroneal nerve motor and sensory function. Protective bandage and medical treatment was applied for three weeks. Due to poor prognosis after three week tendon transposition was performed.

The operation was performed in general anaesthesia. Musculus vastus lateralis was dissected at the insertion and musculus extensor digitalis longus and musculus fibularis tertius were dissected at the origin. Ends of tendons were sutured by using the Bunnel suture with 4 simple interrupted sutures around. A bandage was applied to the extremity for three weeks.

Postoperatively, no complications such as suture dehiscence or failure of the tendon anastomosis was seen. After the period of three weeks the bandage was removed and calf was allowed to move freely and put weight on leg correctly.

Results of the case confirm that peroneal paralysis can be successfully treated by a tendon transposition technique.

Keywords: PARALYSIS, PERONEAL NERVE, CALF, MEDICAMENT THERAPY, MUSCLE TRANSPOSITION

Traumatic injury of peripheral nerves is a worldwide problem and can result in significant disability [10]. Partial nerve injuries can have variable therapeutical response depend on complete nerve laceration. The generation of endogenous neurotrophic factors such as brain-derived neurotrophic factor and glial cell-derived neurotrophic factor are known to play a critical role in supporting axon regeneration during peripheral nerve repair [12]. Hind limb peripheral nerve abnormalities in adult cattle are most commonly associated with calving trauma most often to the sciatic (peroneal branch) and obturator nerves. In calves, femoral nerve injury may be associated with forced extraction, particularly in posterior presentation [4]. The sciatic nerve branches into the peroneal and tibial nerve dorsal to the stifle. In case of high nerve damage (gluteal area) for example due to abscess or irritating injections, hip, stifle, and hock appear dropped and the fetlock may be knuckled. The limb can support weight but may drag along the ground in advanced stadium. Lack of sensitivity may occur distal to the stifle if the nerve is severely damaged [7]. The common peroneal nerve originates as a terminal branch of the sciatic in the mid-thigh region. The nerve crosses the lateral aspect of the stifle joint and then divides into superficial and deep branches. The peroneal nerve supplies motor innervations to the muscles that flex the hock (cranial tibial, *peroneus tertius*) and extend the digits (digital extensors). It also supplies sensory innervations along the cranial aspect of the tarsus and metatarsus [3]. The peroneal nerve is the cranial division of the sciatic nerve. It passes superficially over the lateral femoral condyle and the head of the fibula, which makes it vulnerable to external trauma or pressure from recumbency. An affected animal stands with the digit knuckled over onto the dorsal surface of the pastern and fetlock. The hock may appear to be overextended. Testing of reflexes may demonstrate that hock flexion is absent, but stifle and hip flexion are normal [1]. The prognosis in peroneal paralysis is considered to be guarded, although it depends on the cause, its direct relationship to the nerve and the severity of the lesion [2].

Materials and methods

Holstein calf weighting 60 kg was admitted to the Clinic with knuckling left hind limb. It was diagnosed as peroneal paralysis based on clinical observation and examination results including leg posture, walking, needle pricks and

responses of the animal to passive forcing (extensor pushing and flexor pulling reflexes). Examination revealed moderate muscle atrophy below to knee joint of the left hind limb with sensory analgesia (superficial and deep) on the lateral and dorsal surfaces, and proprioceptive deficit. All cranial nerve reflexes were normal. At first medical treatment was administered with vitamins B two times in week, anti-inflammatory drugs (NSAIDS), and protective bandage for 28 days. The medical treatment was not successful and therefore we decided to perform tendon transposition. Animal was prepared with 12 hours starvation and last 8 hours without water. Patient was sedated with diazepam (0.5 mg/kg) intramuscularly (IM). Surgery was performed in general anaesthesia with xylazine (0.25 mg/kg) and ketamine (2 mg/kg) IM. Calf in general anaesthesia was placed in right lateral recumbency. Surgical site was clipped and scrubbed at the proposed incision site. The incision was made parapatelar about 20 cm long. After preparation of muscles we identified *musculus vastus lateralis* and the *musculus extensor digitorum longus*. The *musculus vastus lateralis* was dissected at the transition of the muscle into the tendon and *musculus extensor digitorum longus* was released at the origin. Both of free ends of the *musculus vastus lateralis* and the origin of *musculus extensor digitorum longus* with *musculus fibularis tertius*, were brought together and connected with the Bunel suture technique with non-absorbable suture material (*Tervalon EP 6*). In addition four simple interrupted sutures were placed around the muscle anastomosis with absorbable material (*Chirlac EP 4*). Surgery site was flushed with sterile solution and subcutaneous suture was performed with absorbable suture material (*Chirlac EP 4*). After suture of subcutaneous we continued with suture of skin with U-suture and we used non- absorbable material (*Tervalon EP 6*). Operation wound was controlled every second day. Skin suture was removed after 10 days. The leg was kept in bandage for 21 days. Medicament care after operation involved antibiotic ceftiofur (*Cevaxel-RTU*, 50 mg/ml) in doses 3 mg/kg subcutaneously during 10 days and nonsteroidal anti-inflammatory drugs flunixin meglumine (*Flunixin a.u.v.*, 50 mg/ml) in doses 2.2 mg/kg intramuscularly during 4 days after surgery.

Results and discussion

Three weeks after surgical intervention we removed the bandage and calf was allowed to walk free showing mild limping. The calf put weight on the leg correctly with complete surface of sole. Two months after surgery calf was walking uneventfully. Post operatively no complications with wound like suture dehiscence or failure of tendon anastomosis were seen but clinical investigation of surgery area on day 5 showed swelling in the place of anastomosis of muscles. The swelling area size was about 5 cm and was located under skin. Sonography confirmed muscle tissue. For the anastomosis of muscles we used non-absorbable material (*Tervalon EP 6*). The most probable reason of non-absorbable sutures eliciting intense inflammatory response may be attributed to being a foreign body reaction in muscle tissue based on the finding that non-absorbable material produces more reactivity to internal tissue than external [9]. The swelling was non-palpable on day 21 after surgery. Aetiology of peripheral nerve dysfunction is commonly based on trauma. Trauma to a nerve may be associated with direct injury or it may arise secondary to pressure from oedema, neoplasia, or fractures. Aetiology also influences prognosis [3]. According to authors [8] and [11], medicament therapy should be performed in case of peroneal paralysis. Treatment of sciatic nerve dysfunction includes bandaging to prevent abrasions of the fetlock and encouragement of weight bearing [4]. We performed medicament therapy with vitamins B, anti-inflammatory drugs, and applied the protective bandage on the leg for 28 days to prevent complications. Result of medicament therapy was negative therefore we decided for surgical intervention. There was positive result after 21 days after surgery. Similar result with a surgical treatment of peroneal paralysis caused by intramuscular injection was reported by [5] in sheep. Recently, the same treatment was used with positive outcome in calves [6].

Conclusion

The aim of our study was to present possibility of surgical management of peroneal nerve paralysis. Surgery tendon transplantation proce-

dures appear to be superior to conservative treatments in the management of patient with peroneal nerve paralysis. This method helps to avoid complications associated with injury of affected limb.

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