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IATROGENIC SCIATIC NERVE MONOPARALYSIS IN PIGS

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SUMMARY

An outbreak of locomotor disorders in suckling pigs in a 150-sow piggery with a morbidity rate of 10% and a case fatality rate of 70% was shown to be due to sciatic nerve injury. Gross and microscopic post mortem findings confirmed the clinical diagnosis of sciatic nerve paralysis. Poor technique of administering iron injections intramuscularly was believed to be responsible as new cases ceased following the adoption of another site for intramuscular injection.

Keywords: Sciatic nerve, paralysis, pigs.

INTRODUCTION

The term *monoparesis* or *monoparalysis* refers to partial or complete loss of motor function in one limb resulting from neurologic dysfunction (Oliver and Lorenz, 1993). Monoparalysis is usually due to disease or injury to the lower motor neurons innervating the affected limb. Sciatic nerve paralysis is a common calving injury in cattle (Cox *et al.*, 1975) while in small animals, it is frequently caused by fractures of the shaft of the ilium, acetabular fractures, fractures of the proximal femur and following retrograde placement of the intramedullary pins in the femur (Chambers and Hardie, 1986; Walker, 1981; Palmer *et al.*, 1988; Fanton *et al.*, 1983). In dogs, it may also occur due to intramuscular injections (Autefage *et al.*, 1990). However, there have been no published reports concerning sciatic nerve injury in pigs. The present report describes an outbreak of monoparesis and monoparalysis in a herd of pigs due to sciatic nerve injury caused by poor injection technique.

CASE HISTORY

An outbreak of locomotor disorders involving about 10% of suckling piglets was reported in a 150-sow piggery. The problem commenced four months shortly after the employment of a new worker whose duties included administering iron injections to piglets. The case fatality rate was estimated to be about 70%. At the time of the farm visit, about 15 pigs aged between four and six weeks were observed to show varying degrees of monoparesis and monoparalysis involving the right or left hind limb. There were also several two to three-month old pigs showing similar but ilder degrees of gait dysfunction. According to the farmer, these pigs with milder signs of paresis apparently improved with time while those with more severe gait dysfunction usually die before they were two months old. The clinical signs ranged from mild paresis with knuckling to severe locomotor dysfunction with "dropped hock" (Figure 1), knuckling of the hoof, loss of all cutaneous (including deep pain) sensation below the stifle, absence of withdrawal reflex with presence of the patellar reflex. Weight bearing was still present. Swelling of the affected limb distal to the hock together with severe ulceration of the digits, were present in severe cases. Based on the neurological examination, a diagnosis of proximal sciatic nerve injury was made. The new worker was then retrained to administer injections in the muscles behind and below the base of the ear instead of in the hind quarters. Following the adoption of this new technique, all further cases ceased.

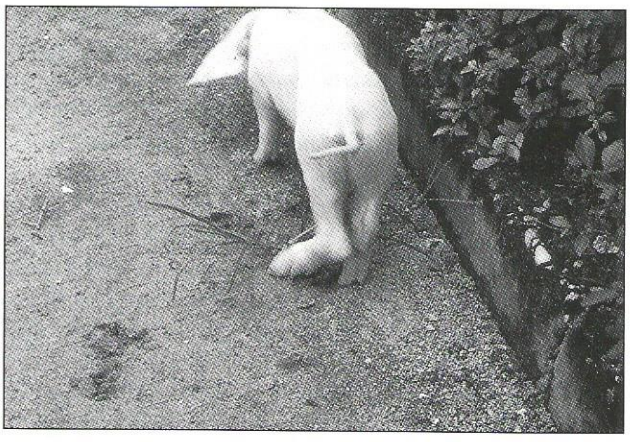

Figure 1. A pig with locomotor dysfunction showing the "dropped hock" appearance characteristic of sciatic nerve injury.

POST MORTEM FINDINGS

Two pigs were submitted for post mortem examination. Suppurative arthritis of the tarsal joints of the affected limbs was observed in both pigs, together with enlargement of the popliteal and inguinal lymph nodes. A dissection of the peripheral nerves and the musculature of the hind legs revealed a brownish staining of the muscles near the mid-shaft of the femur around the location of the proximal part of the sciatic nerve. At this region, the nerve appeared gelatinous and indistinct in its progression from the proximal to the distal parts of the nerve. This was especially evident when the sciatic nerve of the affected limb was compared to that from the opposite unaffected limb (Figure 2).

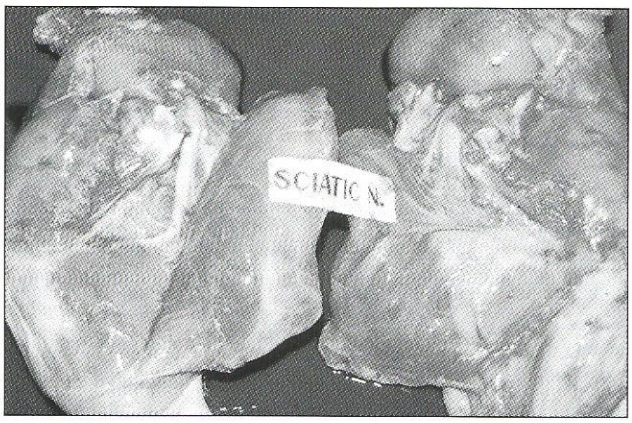

Figure 2. The proximal part of the sciatic nerve of the affected leg (L) of a pig with sciatic nerve paralysis, showing a gelatinous and indistinct area (arrow). The same area of the nerve on the opposing leg (R) appeared normal (arrow).

Microscopically, there were a few loosely packed nerve bundles within the affected sciatic nerves. These nerve bundles consisted of myelinated and unmyelinated axons, Schwann cells and endoneurium. The perineurium was thickened and irregular in shape. The epineurium which normally consisted of connective tissue, blood vessels and fat cells was replaced by extensive fibrosis (Figure 3). There were also many empty spaces within the epineurium which either may be indicative of phagocytosis of nerve bundles or areas of secondary demyelinaton. Haphazard regeneration of the nervous tissue was detected whereby the axons were located within the epineurium instead of the perineurium (Figure 4). A neuroma consisting of nerve fibers and fibrous tissue was identified. Myositis and myonecrosis with extensive fibrosis were seen as islands of muscle cells surrounded by fibrous tissue. Among these necrotic muscle cells, macrophages were seen actively phagocytising them. A myxomatous area which was an accumulation of sparse connective tissue was located at the periphery of the nerve tissue itself indicating a possible site of deposition of injected substances (Figure 5). The sciatic nerve of the unaffected limb was normal.

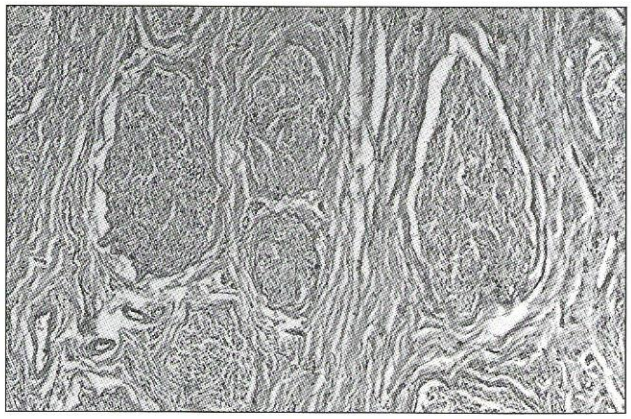

Figure 3. Histological section of the sciatic nerve from a pig with sciatic nerve paralysis showing extensive fibrosis of the epineurium.

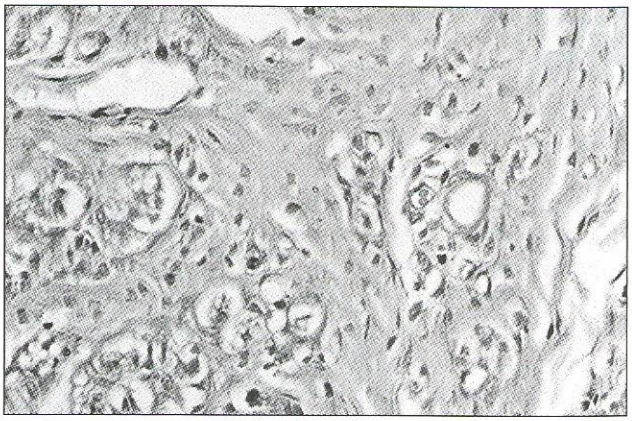

Figure 4. Histological section of the sciatic nerve from a pig with sciatic nerve paralysis showing haphazard regeneration of the nervous tissue where newly formed axons were located within the epineurium.

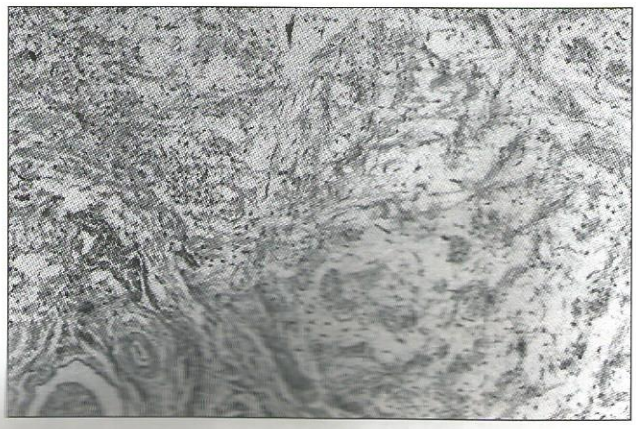

Figure 5. Histological section of the sciatic nerve from a pig with sciatic nerve paralysis showing a myxomatous area located at the periphery of the affected nerve indicating a possible site of injection.

DISCUSSION

The hind limbs are supplied by the lumbosacral plexus consisting of the obturator, femoral, sciatic, peroneal and tibial nerves. The absence of splay legs together with the presence of the patellar reflex indicated that the obturator and femoral nerves were intact. Sciatic nerve injury can be divided into proximal or distal depending upon the involvement of the peroneal or tibial branches of the nerve. The findings of the neurological examination in this case indicate a mixture of both peroneal and tibial nerve injury. The absence of superficial and deep pain sensation distal to the stifle indicate proximal sciatic nerve injury.

The post mortem findings confirmed the clinical diagnosis of sciatic nerve paralysis. The lesions of the peri and endoneurium together with the formation of a neuroma in these two pigs are indicative of the condition often known as neurotmesis which denotes complete severance of the nerve.

The cessation of new cases of gait dysfunction following the adoption of another site for intramuscular injections indicated that the damage to the sciatic nerve is probably caused by intramuscular injections intended for the biceps femoris or semimembranosus muscles going into the fascial planes between these muscles. The brownish discolouration of the muscles surrounding the nerve at the site of the lesion is suggestive of iron. As iron injections are routinely given to the piglets at 3 days of age, it would seem that the iron dextran complex injected directly into the nerve may be responsible for the condition. Injury to the nerve may also be caused by direct laceration of the nerve by the hypodermic needle or secondary scarring of the tissues surrounding the nerve. However, this was considered unlikely since the damage appeared too extensive for mere laceration. Moreover, signs of neurological deficit can be expected to be evident shortly after the injection if it were due to physical trauma caused by the hypodermic needle.

It is recommended that workers giving intramuscular injections to suckling pigs be properly trained.

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RINGKASAN

MONOKELUMPUHAN SARAF SIATIK IATROGENIK PADA BABI

Satu wabak gangguan lokomotor yang kadar kemorbidannya 10% dan kadar kematian kes 70% di kalangan babi menyusu dalam sebuah ladang babi yang mempunyai 150 ekor ibu adalah disebabkan kecederaan saraf siatik. Penemuan post mortem kasar dan mikroskopi mengesahkan diagnosis klinikal kelumpuhan saraf siatik. Adalah dipercayai keadaan ini disebabkan teknik suntikan ferum intraotot yang buruk kerana tiada kes baru berlaku selepas tapak lain diguna untuk suntikan intraotot tersebut.