Abstract

The hip joint is one of the joints most exposed to injuries and diseases. They are often the cause of pain, lameness and discomfort. The most common diseases are: osteoarthritis, hip dysplasia, osteochondrosis, Legg Calve Perthes disease. Regardless of whether the factors causing these diseases are: injuries, primary diseases or genetic factors, each of them leads to damage within the cartilage, joint capsule and surrounding structures, which in turn leads to lameness and even inability to move.

The aim of this study is to examine the course and development of nerves supplying the hip joint during fetal life and just after birth, to examine the order in which biologically active substances appear and changes in the number of nerve fibers containing these substances in the elements of the hip joint and in the surrounding structures.

The research was carried out on animals of 4 age groups. The dogs were obtained by abortion ovariohysterectomy of pregnant bitches and euthanasia of blind litters. The group included fetuses: group I (n=10) - 3 weeks old fetuses, group II (n=10) - 5 weeks old fetuses, group III (n=10) -8 weeks old fetuses and group IV (n=10) 3 day old puppies. Morphological examinations and immunohistochemical staining were performed. Stainings were performed on the sections with antibodies against: AccTub, SP, CGRP, DβH, VAChT, VIP, GAL, NPY.

The hip joint was found to be supplied by the following nerves: obturator, sciatic, anterior gluteus, and femoral. At an early stage of development in group I, the fetuses did not yet have limbs, only their buds. Only a bundle of nerve fibers was found, which at a later stage form the appropriate nerves. In group II (5-week-old fetuses) the fetuses have developed limbs, which makes it possible to identify the nerves and examine them more thoroughly. With age, the number of nerve fibers increases, and the nerves themselves become thicker and less transparent. Also with age, the innervation of the surrounding structures surrounding the joint

increases. In group IV, the innervation was the best developed, with the largest number of nerve branches. In that regard, it did not differ from the innervation of adult animals.

Staining with acetylated tubulin showed a gradual increase in the number of nerve fibers. Immunoreactive fibers were observed in all joint structures and in major nerve trunks. Staining with antibodies against SP, CGRP, DβH, VAChT, GAL, NPY and VIP allowed to determine the amount and nature of the nerve fibers supplying the developing hip joint.

The this study we found an increasing number of SP, CGRP and SP/CGRP positive fibers in the main nerve trunks and joint structures, especially in the joint capsule, with the age of the examined animals. Similarly, a gradual increase in the amount of immunoreactive nerve structures was observed for the remaining studied substances. Their localization may indicate their potential function. The nerves located in the vessel walls are involved in the regulation of blood flow, those found in the fibrous membrane are probably sensory fibers, and those present in the synovium of the capsule are probably involved in the regulation of synovial fluid production. Until now, no studies have been conducted on the development of the innervation of the hip joint in the dog. The obtained test results may contribute to facilitating the diagnosis and treatment of diseases of the hip joint and may be the basis for further clinical research.