

Histological Observation of Canine Acupoints

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Abstract : The purpose of this study was to document the histology of canine acupoints. Acupunctural needles were inserted by 0.5 to 1 cm depth into acupoints Nei-guan (Inner pass, PC06), Gan-shu (Liver Association Point, BL18), Shen-shu (Kidney Association Point, BL23) and Panguang-shu (Bladder Association Point, BL28) in 4 dogs, and the tissues around the acupoints were examined. Light microscopy was used to observe the surrounding structures of each point. Nerve fibres, small vessels and muscle spindles were found around the tip of the needle in every case, although they occurred not so often at nonacupoint in nearby region or nonacupoint in the areas, such as skin, subcutaneous tissue and muscle. Therefore, it is suggested that nerve fibres, small vessels and muscle spindles may be potential acupoint receptors.

Key words : Acupoint, Acupuncture, Dog, Histological observation.

Introduction

Acupuncture is an ancient Chinese art of healing. Needles are placed in special locations, the acupuncture points (acupoints), to influence certain physiological processes (2,5,13,14). Acupoints are specifically designated locations on the body surface. They are sometimes called stimulating points. They are located in or near muscle, blood- or lymph- vessels, or peripheral nerves. Each acupoint is unique not only in its location but in its biophysiological effect (1). According to Chinese medical concepts, acupoints are not isolated sites on the surface of the body of humans and animals, but are linked with visceral organs (6). Acupuncture at specific points activates the defence mechanism of humans and animals via reflex neural effects, autonomic effects, neuroendocrine, endocrine and humoral effects. Sensory input to the hypothalamus is most important in these effects (9).

Questions on the structural basis of acupoints have not resolved despite thousands of years of practical use and more than 40 years of research (10). In recent years, acupoints have received a considerable amount of study. Acupoints have lower skin resistance, radiate more heat than another regions, and are localized preferably in muscle valleys, near joints, tendons and peripheral nerves. The structures of acupoint also seem to have different histological properties that cannot found in skin surrounding the acupoint. Because of the dif-

ferent properties, they can be detected by the use of an acupoint detector, which is a sophisticated Wheatstone Bridge (4).

The purpose of this study was to document the histological structures at acupoints, and compare them with peri-acupoint region of Nei-guan (Inner pass, PC06), Gan-shu (Liver Association Point, BL18), Shen-shu (Kidney Association Point, BL23) and Panguang-shu (Bladder Association Point, BL28) in dogs.

Materials and Methods

An Acupoint Detector (CS-202A, Sankyo Denshi, Japan) was used to identify the acupoints Nei-guan, Gan-shu, Shen-shu and Panguang-shu bilaterally in 4 mongrel dogs, 2 males and 2 females, aged 6 months to 9 years. Acupoint was the point of lowest electrical resistance at locations transposed from human acupoint charts. Needles were inserted into each acupoint by 0.5 cm depth at Nei-guan and by 1 cm depth at Gan-shu, Shen-shu or Panguang-shu. Also, non-acupoint was marked with same method. The dogs were sacrificed with the needles in position.

Relevant samples of tissue around each needle were taken for light microscope. The specimens were immersed in Schaffer's fixative (alcohol/formaldehyde) and embedded in paraffin, after which 5 mm serial sections were prepared. Representative sections of each tissue were stained with hematoxylin and eosin for microscopic examination. The acupoints were observed using light microscope after surrounding tissue of each acupoint was sectioned continuously by 0.5 or 1 cm

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depth.

Results

Light microscopy was used to observe the surrounding structures of each point. At Nei-guan there was nerve fibers and arteries around the hole at the needle tip in the acupoint (Fig 1). At Gan-shu there was many nerve fibers and artery near the hole at the needle tip in the acupoint (Fig 2). At Shen-shu there was an artery near the hole at the needle tip in the acupoint (Fig 3). At Panguang-shu there was a muscle spindle near the hole at the needle tip in the acupoint (Fig 4).

Nerve fibres, small vessels and muscle spindles were found around the tip of the needle in every case, although they occurred not so often at nonacupoint in nearby region or nonacupoint in the areas, such as skin, subcutaneous tissue and muscle.



Fig 1. Photomicrograph of Nei-guan (Inner pass, PC6) in dog 1. Arrow; acupuncture point of Nei-guan, Black arrow head; nerve fiber, White arrow head; artery, $\times 100$.

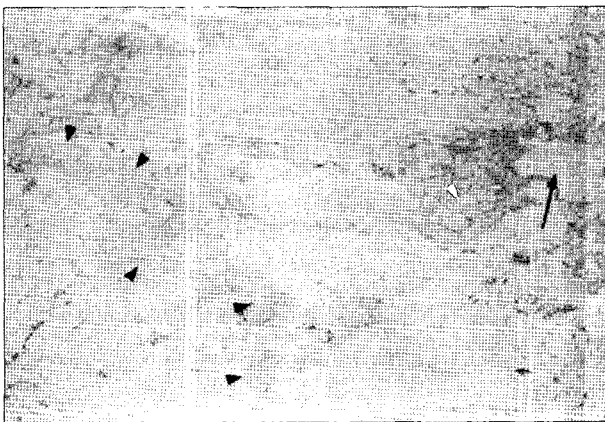


Fig 2. Photomicrograph of Gan-shu (Liver Association Point, BL18) in dog 2. Arrow; acupuncture point of Gan-shu, Black arrow head; nerve fiber, White arrow head; artery, $\times 40$.

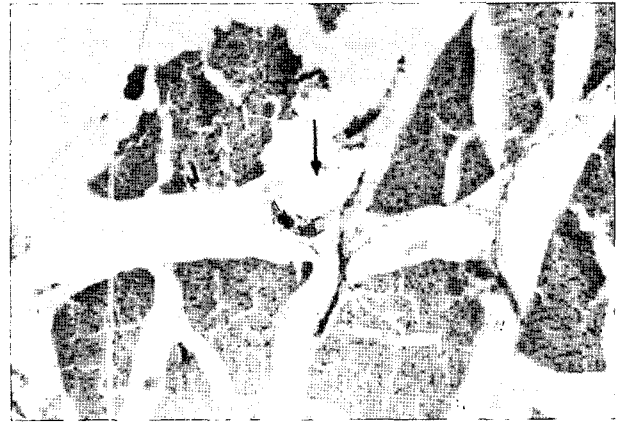


Fig 3. Photomicrograph of Shen-shu (Kidney Association Point, BL23) in dog 3. Arrow; acupuncture point of Shen-shu, White arrow head; artery, $\times 100$.



Fig 4. Photomicrograph of Panguang-shu (Bladder Association Point, BL28) in dog 4. Arrow; acupuncture point of Panguang-shu, small arrow; muscle spindle, $\times 40$.

Discussion

According to traditional Chinese medical theory, each acupoint communicates with a specific organ and reflects the conditions of that organ. When an organ is subject to pathophysiological changes, related acupoints may become tender or show other signs of abnormality, such as altered colour or hardness of the skin at the points. Schoen *et al.* (10) reported that the effect readily reach the communicating organ through the point and the meridian when the points are treated by acupuncture.

Schoen (11) reported acupuncture points are organized according to 2 different structural principles: the points are found at the perforation site of nerves and vessels through the fascia, or the site where a cutaneous nerve enters the dermis, medially to the site of its penetration of the fascia.

Heine (3) proposed that nerve-vascular bundles enwrapped by asleeve of loose connective tissue perforates the superficial

fascia to reach the subcutaneous area underneath the acupoint.

Matusmoto and Hayes (7) reported extensive capillary loops with sympathetic wrappings under acupoints.

Plummer (8) found a perforating or communicating vein beneath acupoint loci in people, pigs, cows and chickens.

In previous studies, the histological finding of acupoint including hole at needle tip was not reported yet. However, in our study we observed histological findings of acupoint including the hole at the needle tip in the acupoint.

In this experiment, nerve fibres, small vessels and muscle spindles were found around the tip of the needle in every case. However they occurred not so often at nonacupoint in the nearby region or nonacupoint in the areas, such as skin, subcutaneous tissue and muscle. Therefore, it is suggested that nerve fibres, small vessels and muscle spindles may be related closely with effect of acupuncture and are potential acupoint receptors.

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개에서 경혈의 조직학적 관찰

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요 약: 본 연구의 목적은 개의 경혈에 관한 조직학적 소견을 관찰하는 것이다. 개(4마리)에서 내관(PC06), 간유(BL18), 신유(BL23) 및 방광유(BL28)에 1 cm 깊이로 자침을 실시하고, 경혈주위의 조직을 관찰하였다. 각 경혈의 주위조직을 현미경학적으로 관찰하였다. 신경섬유, 소혈관, 및 근방추체들은 인근 지점에서 비경혈, 또는 피부, 피하조직 및 근육과 같은 부위에서의 비경혈에서도 가끔 발견 되지만, 모든 예의 침의 선단 주위에서 신경섬유, 소혈관, 및 근방추체가 발견되었다. 따라서, 신경섬유, 소혈관 및 근 방추체는 잠재성 경혈 수용체일수도 있다는 가능성이 제시된다.

주요어: 개, 경혈, 조직학 소견, 간유, 신유, 방광유