

Study on the Skin of Hand Lesser Yang from the Viewpoint of Human Anatomy

Kyoung-Sik Park

Dept. of Anatomy, College of Oriental Medicine, Sangji University

Objectives: This study was carried out to analyse the skin of the Hand lesser yang in human.

Methods: The Hand lesser yang meridian was labeled with latex in the body surface of the cadaver, subsequently dissecting a body among superficial fascia and muscular layer in order to observe internal structures.

Results: This study has come to the conclusion that a depth of the skin has encompassed a common integument and a immediately below superficial fascia, and this study established the skin boundary with adjacent structures such as relative muscle, tendon as compass. The skin area of the Hand lesser yang in human is as follows: The skin close to the ulnar root angle of 4th finger nail, above between 4th and 5th metacarpal bone, between extensor digit. minimi tendon(t.) and extensor digit. t., extensor digit. m(muscle). at 2, 4, 7 cun above dorsal carpal striation, triceps brachii m. t., deltoid m., trapezius m., just around the ear, upper orbicularis oculi m.

Conclusions: The skin area of the Hand lesser yang from anatomical viewpoint seems to be the skin area outside the superficial fascia or the muscle involved in the pathway of the Hand lesser yang meridian, the collateral meridian, the meridian muscle, with the condition that we consider adjacent skins.

Key Words : The skin of the Hand lesser yang, the collateral meridian, the meridian muscle, muscle, tendon

Introduction

The skin theory of Su wen alludes the existence of the skin, mentioning that “the skin shows the property of face, whereas meridian vessel shows the property of line, and the skin of the body is classified into 12 regions as the meridian vessel is composed of 12 sets. it shows both entirety and localization in relation with a disease.” The theory adds, “The skin is located at the most surface of body, controls a swiching of the pore, visceral condition, defends the attacks of xie qi(wicked energy, pathogens), and reflects some diseases”¹⁻⁵⁾. But the ancient chinese lituratures only describe the skin as the surface

subdivision of the 12 meridians^{1,2,6,7)}, the first skin atlas in Jingluo Shijiang(ten preachs for meridian) has drawn following the distribution of the 12 meridians, or twig meridian⁷⁾, it is still not well known for the definite distribution and boundary of the 12 skins despite its clinical importance^{1,3,6-8)}. As regards the clinical application of the skin theory, the skin is said to represent the syndrome of shidong disease(meridian-based disease) or suosheng disease (meridian-related organ disease) expressed in the meridian chapter of Ling shu as in a narrow sense of the skin.⁶⁾. it is also necessary to treat the corresponding skin for the prevention of metastasis to the internal organ.

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• Correspondence to : Kyoung-Sik Park
Dept. of Anatomy, College of Oriental Medicine, Sangji University
Woosan-dong 660, Wonju, Gangwon-do, Korea
Tel : +82-33-730-0667, Fax : +82-33-730-0653, E-mail : Ksikpark@sangji.ac.kr

Ascending to the skin theory of Su wen, if xie qi attacks the skin, pores open, comes into the collateral meridian(luo mai), if the collateral meridian fills with xie qi, xie qi comes into the meridian (or meridian vessel), if the meridian fills with xie qi, xie qi comes into the Viscera and Bowels^{1,3,4,6}. Meanwhile the theory of the meridian, explaining the meridian and the collateral meridian as the main axis of theory, formulates a concept that the meridian is distributed to deep body, while the collateral meridian is distributed to shallow body. The skin theory of Su wen explains again that the skin is surface area which 12 main meridians is circulating, therefore the skin area is divided into, corresponding to the division of 12 main meridians, the collateral meridian is called the skin in other words when distributed to the body surface, all meridians are matched to the corresponding skin area, otherwise it is evidence of disease. The literature goes on to describe the collateral meridian as significant factor to manifest 5 colors in the skin in the theory of the meridian, and on to explain the twig meridian as the branch of the collateral meridian.

The collateral meridian is related to the meridian muscle and the skin⁶, and also the distribution of meridian muscle and the skin almost coincides with that of the meridian^{9,11}. Wei lun(theory) of Su wen also explains that liver manages the fascia of the body.

The collateral meridian floated in body surface is called float meridian, the skin capillary among these float meridians is blood vessel meridian¹. In phlebotomy therapy of Donguibogam(Treasured Mirror of Eastern Medicine), meridian vessel is capillary bed, that is to say the collateral meridian¹⁰.

Herein is possible to guess that the distribution of the skin may be related to 12 meridians, the collateral meridian, meridian muscle, capillary bed. So this study was carried out to assume the skin area and skin boundary of the Hand lesser yang(Shou shao yang) from the anatomical point of view.

Material and method

1. Preservative preparations and injection

1) The preparation of a preservative

Phenol was dissolved in methyl alcohol at the rate of one to one W/V(The 1st solution). Glycerin was dissolved in methyl alcohol at the rate of one to four V/V and thereafter additional same amounts of glycerin was dissolved in this solution (the 2nd solution). The 1st and 2nd solutions were mixed well, and warmed (30min, 20 °C). Same amounts of methyl alcohol was added to this mixed solution and stirred for 10 minutes. Finally additional 1.5 times of formalin was added to the mixed solution.

2) Injection to cadaver

The sheath of the femoral artery & vein was exposed by vertical incision at the medial third of the inguinal ligament, and the femoral artery was carefully separated from the femoral vein. A preservative was injected into the femoral artery at a speed of 150 ml per minute. After 6 l of preservative was injected, the needle-inserted part was ligated, and subsequently an injector needle was inserted downwards for the preservation of the leg.

2. Embalment of cadaver

1) Cadaver was pending in the embalment system for 40 hrs at 40°C.

2) Cadaver was exposed for 1hr at room temperature, and after that, kept in refrigerated storage (3 °C, 30% humidity).

3. Experimental procedure

1) The Hand lesser yang meridian was labeled with latex in the body surface of the cadaver.

2) Meridian points were based on standard Korean acupuncture point locations¹¹.

3) Pores were made by a drill in the vertical direction at each meridian point.

- 4) Skin and superficial fascia were dissected in order, investigating vessels and nerves and the exposed deep fascia surface was thereafter labeled by latex, and then deep fascia was removed.
- 5) Subsequently muscle with vessels and nerves were investigated.

Result

A depth of the skin encompasses a common integument and a immediately below superficial fascia, it is not easy to establish a border, so this study describes the skin boundary with adjacent structures such as relative muscle, tendon as compass.

From the anatomical point of view the skin area assumed belong to be the skin of the Hand lesser yang are as follows:

The skin close to the ulnar root angle of 4th finger nail, The ulnar skin above dorsal interosseous muscle between 4th and 5th metacarpal bone, The ulnar skin above the 4th extensor digitorum tendon, The skin above extensor retinaculum, dorsal radiocarpal ligament between extensor digit. minimi tendon and extensor digit. tendon, The skin just outside extensor digit. muscle. and extensor digit. minimi at 2 cun(chon) above dorsal carpal striation, The skin outside extensor digit. muscle. at 4 cun above dorsal carpal striation, The skin outside extensor digit. muscle. at 7 cun above dorsal carpal striation, The skin above triceps brachii m. tendon, The skin outside acrmion and deltoid muscle, The skin outside superior angle of scapular and trapezius muscle, The skin outside splenius muscle, The skin outside styloglossus muscle, The skin outside sternocleidomastoid muscle, The skin close to superior margin of auricularis posterior muscle, The skin outside auricularis superior muscle, The skin outside auricularis anterior muscle, The skin outside temporalis muscle, The skin close to upper orbicularis oculi muscle.

Discussion

As a afore-mentioned, there is the first skin atlas in Jingluo Shijiang, but it only drew following the distribution of 12 meridians, or twig meridian⁷⁾. Recent literatures also allude the existence of the skin in like manner, but don't explain concrete its boundary or situation^{2,3,6-8)}.

The skin theory, Su wen (or Basic Questions) of HUANGDI NEIJING explains that the main meridian is the basis of the skin, and also qi xue chapter of Tai su describes that the main meridian branches off from the meridian point, so becomes the float meridian, becomes the twig meridian again, which is distributed on the skin.

With regards to a depth of the skin, moxibustion related literature explains the skin as the branch of meridian situated on a depth(mai-zhong)¹⁾, a phase of the skin is situated on the superficial fascia⁷⁾, the collateral meridian is situated on a hypodermis and the twig meridian, on a dermis¹²⁾, another literatures insist that the skin pierces a adjacent muscle¹³⁾, meridian vessel travels in hiding intermuscular space, so isn't seen, if seen, it is the collateral meridian¹⁴⁾. Overall, the skin is situated on common integument or superficial fascia.

The distribution of the skin basically accords with that of main meridian, as the skin is divided into 12 areas in accordance with those of 12 meridians^{1,6)}. Wei qi(protective energy) circulating among the skin or the muscle or around the outside of the main meridian connects to ying qi(nutrient energy) circulating among the main meridian¹⁾. The collateral meridian represent a skin disease with distribution in the skin, if it is blue, implies pain syndrome, if black, implies bei syndrome(tingling sensation), if yellowish red, implies re syndrome(hot sensation), if white, implies han syndrome(cold sensation), if the collateral meridian is filled with xie qi, then xie qi invades the main meridian¹⁵⁾. The theory of the meridian outlining the main meridian and the

collateral meridian explains that these are continued to the muscle meridian and the skin on the body surface. The collateral meridian, the meridian muscle, and the skin correspond to the superficial part of body in the main meridian system¹⁶⁾, and it is also reported that a disorder of meridian muscle can be cured through the meridian point of the main meridian or the collateral meridian¹⁶⁾. the distribution of 12 muscle meridians and 12 skins accords with 12 meridians¹⁾, the pathway of the meridian muscle of Hand lesser yang is similar to that of the collateral meridian of the Hand lesser yang to the exclusion of the part of neck to thorax.^{1,7)}, also showing similar symptoms of disease. At the other hand, Donguibogam identifies the collateral meridian with the capillary bed in phlebotomy therapy, and yong ju(abscess on back) of Ling shu also explains that qi from the Middle burners(zhong ziao) flows down into the twig meridian along the collateral meridian, so next to mixing with body fluid, becoming blood. On the base of aforementioned studies, we guess the skin area of the Hand lesser yang through the dissection of cadaver in response to the main meridian¹⁷⁻¹⁹⁾.

Considering a relation between the skin, the meridian, and a disease, it is possible to apply the skin to the diagnosis and the treatment of disease as well as to skin acupuncture, because the skin is related to the main meridian, the collateral meridian^{1,6,16)}. If the skin is invaded by wai xie(outside pathogen), a corresponding organ is injured⁶⁾. According to kai lun of Su wen, if lung is weak, wei qi becomes weak too, so xie qi penetrates the skin, and then xie qi reaches the corresponding organ. And also volume 12. of Tai su indicates that wei qi created by the Upper burner(shang ziao) makes the skin hot and brightened⁶⁾. Yijingbianqi (cure for mind and body) of Su wen describes that it is possible to observe face color, shape, meridian pulse type for diagnosing the patient exactly²⁾.

Conclusion

This study was carried out to analyse the skin of the Hand lesser yang in human, dissecting and splitting a body among superficial fascia and muscular layer in order to expose internal structures such as muscles, nerves, blood vessel related to the skin of the Hand lesser yang. We obtained the conclusions as follows:

1. The skin area of the Hand lesser yang in human seemed to be closely matched to the main meridian vessel, collateral meridian, meridian muscle as a part of the meridian system, To put it more concretely, including The skin close to the ulnar root angle of 4th finger nail, The ulnar skin above dorsal interosseous muscle between 4th and 5th metacarpal bone, The ulnar skin above the 4th extensor digitorum tendon, The skin above extensor retinaculum, dorsal radiocarpal ligament between extensor digit. minimi tendon and extensor digit. tendon, The skin just outside extensor digit. muscle and extensor digit. minimi muscle at 2, 4, 7 cun above dorsal carpal striation, The skin above triceps brachii muscle tendon, The skin outside acromion and deltoid muscle, The skin outside superior angle of scapular and trapezius muscle, the skin area just around the ear, The skin close to upper orbicularis oculi muscle.

2. The skin of the Hand greater yang and the skin of the Hand yang in a trunk zone, the skin of the Hand greater yang and the skin of the Leg lesser yang in a head zone should be considered when a boundary of the skin area of the Hand lesser yang is decided.

3. From the viewpoint of the anatomy, the skin of the Hand lesser yang in human appears to be made up of the histological common integument, superficial fascia in depth, including the relevant nerves or blood vessels.

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