

Tracing of lipiodol using x-ray along the meridian line

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Abstract: Lipiodol, iodized poppy seed oil, is widely used as a contrast media and can be traced by x-ray. Although it was very slow, lipiodol injected to acupoints flowed along the meridian line upward or downward as was suggested by traditional meridian theory. Tracing of injected lipiodol by x-ray revealed that the meridians are a concrete ductal structure through which the material flows.

Key words: lipiodol, acupoints, meridian line, Bonghan duct, x-ray

1. Introduction

Acupuncture is the representative therapy of oriental medicine, and the principle of acupuncture lies in meridian theory. It explains that there are energy transmission lines called meridians, through which life energy called Qi flows, and along which the acupuncture points(acupoints) are distributed. By stimulating those acupoints with needle, a balanced state of the body is restored. Despite thousands of years of history and countless empirical cases, meridian theory is still regarded just mysterious due to the lack of scientific evidence.

The correlation between acupoints which were traditionally used for the treatment of eye disorders and the corresponding brain localization affecting visual stimulation was recently revealed using functional MRI, demonstrating internal relationship between acupoints and the corresponding internal organ(1).

In the early 1960's the North Korean Bonghan Kim showed the anatomical entity of the acupoints, and explained the meridian system as the concrete ductal system in which a liquid containing certain granules flow(2,3). He showed that meridian line is not confined to under the skin as traditionally believed, but is ubiquitous. Kim and Kong(4) reviewed Bonghan theory. Recently, Soh and his research team published many data demonstrating the presence of ductal lines inside blood vessel and lymphatic vessel called as 'primo' (5), both of which are mentioned as 'intravascular Bonghan duct' in Bonghan theory. Very recently structure of Bonhan duct was isolated from the abdominal wall of rabbit. The Bonghan duct consisting of 3 different levels of layers was suggested (6).

Despite the very concrete description of Bonhan theory and the ample evidences suggesting the existence of meridian lines, the research on the meridian is still regarded outside the viewpoint of current science and medicine. Present investigation trace the meridian lines by injecting lipiodol into the specific acupoints using x-ray image.

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2. Material and Methods

Lipiodol, iodized poppy seed oil, is widely used as a contrast media and can be traced by x-ray. Lipiodol is injected into a acupoint(Gan-sa:間使) on the pericardium meridian(手厥陰心包經) of the left hand and to a random point on the right hand of human volunteer. Lipiodol is also injected into a acupoint(Oe-gwan:外關) on the triple warmer meridian(手少陽三焦經) of human volunteer and to a random point. Injected lipiodol was traced using x-ray and the acupoint where lipiodol was injected was marked small metal pin(Fig. 1).

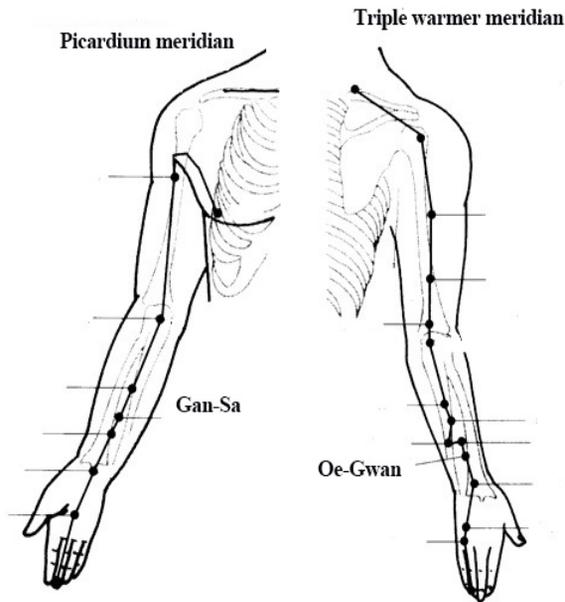


Fig. 1

3. Results

Pericardium meridian is traditionally known to flow downward. It is expected that if the material is injected to any of acupoints on the pericardium meridian, it would flow downward. When lipiodol was introduced to a acupoint(Gan-Sa:間使) on the pericardium meridian(手厥陰心包經), x-ray image

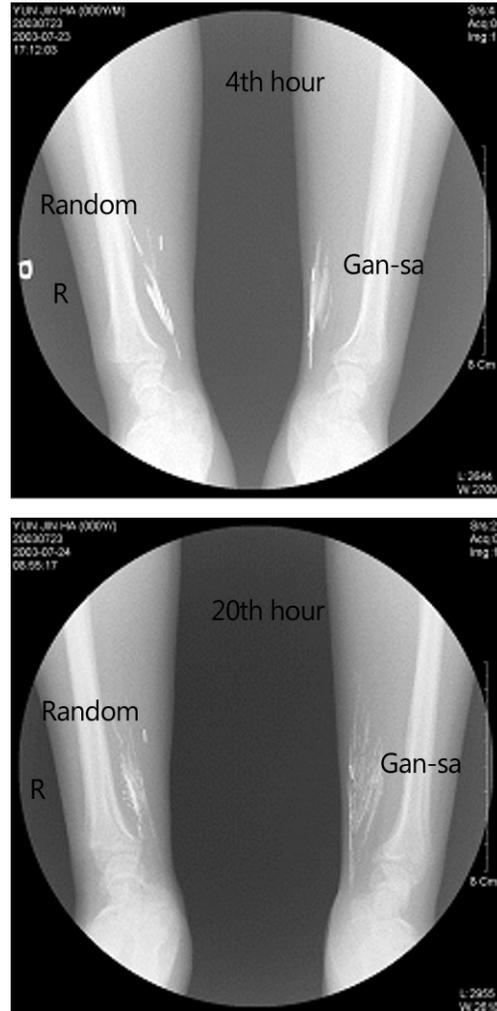


Fig. 2 Migration of lipiodol along the pericardium meridian

showed that lipiodol flowed downward along the meridian line from the point injected time dependently, while the lipiodol injected to random point just dispersed(Fig. 2).

Lipiodol was also injected into a acupoint (Oe-gwan:外關) on the triple warmer meridian(手少陽三焦經) which is known to flow upward. This time x-ray image showed that lipiodol flowed upward along the meridian line from the point injected time dependently, while the lipiodol injected to random point did not spread (Fig. 3).

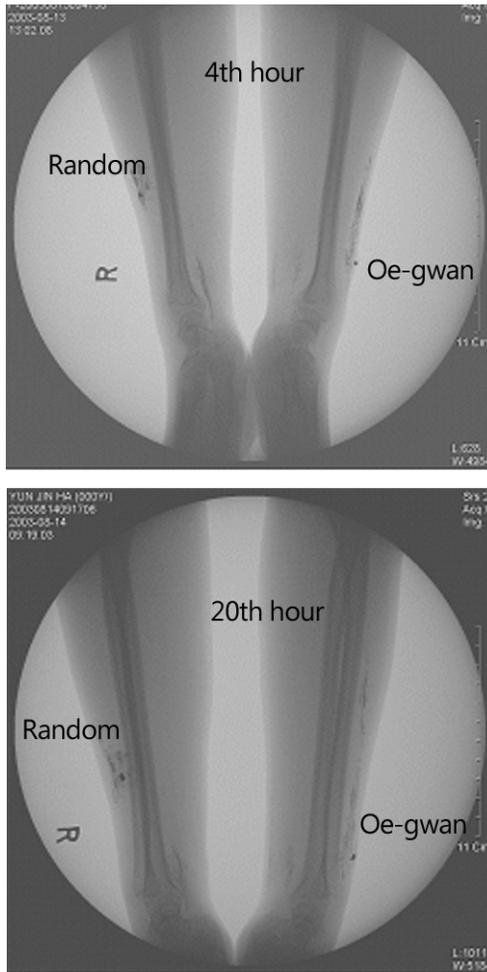


Fig. 3 Migration of lipiodol along the tri warmer meridian

4. Discussion

Present investigation confirmed the results of Vernejoul(7) and Sohn (8) who demonstrated that injected radioactive ^{99m}Tc migrated along traditional meridian line, while injection of isotope into random point on the skin just diffused. In 1960's Bonghan Kim of North Korea also showed that radioactive phosphorus ^{32}P followed the path of traditional acupuncture meridian (2). Recent successful clinical application of so-called 'drug acupuncture' which injects the extracts of herb or pharmacologically active materials into acupoints also suggests the

anatomical existence of meridian line as a ductal system.

We used lipiodol as a contrast media to trace the meridian using x-ray. Although it was very slow, lipiodol injected to acupoints flowed upward (pericardium meridian) or downward (tri warmer meridian) according to the direction suggested by traditional meridian theory, while lipiodol injected to random points on the skin did not spread.

As lipiodol is very viscous lipid, it is possible that only a small portion of the injected lipiodol might enter into the meridian and thus flow through the line very slowly compared to natural circulation. X-ray image of lipiodol flowing along the meridian revealed that the meridians are a unique and separate ductal system through which the materials flow.

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