Blood Perfusion Effect of Acupuncture on Acute Facial Paralysis Observed by Laser Speckle Technique

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Abstract

Objective: To observe effect of acupuncture for acute facial paralysis patients with ocular skin blood perfusion, and to explore the safety and effectiveness of acupuncture in treating acute facial paralysis.

Methods: Thirty patients with acute facial paralysis were enrolled and acupunctured in facial points and bilateral Hegu (LI 14), and the PeriCam laser speckle flow video monitoring system was used not only for recording ocular skin blood perfusion condition in both normal and affected sides before acupuncture, at 15 min after acupuncture and after removing needles immediately, but also for calculating reduction ratio of ocular skin average perfusion in the affected side face compared with the healthy side.

Results: Compared with the healthy side of face, the ocular skin blood perfusion of the affected side after acupuncture was significantly different from that before intervention. The blood perfusion levels after 15-minute acupuncture and at the time of remaining needles were significantly different from the basic line (all P<0.01).

Conclusion: Acupuncture can significantly improve eye blood perfusion of the acute facial paralysis, enhance metabolic activity of the affected facial tissues, and promote the recovery of facial nerve function.

Key Words

Acupuncture Therapy; Facial Paralysis; Bell Palsy; Perfusion; Blood Circulation

Facial paralysis is one of the common diseases in acupuncture clinic, and many clinical reports have shown that acupuncture is significantly effective for facial paralysis and more effective than conventional Western medicine[1-2]. According to years of clinical studies, the majority of acupuncture doctors believe that the best time for acupuncture intervention for facial paralysis is during the acute phase. The earlier acupuncture intervenes, the better efficacy there is and the shorter the treatment course is[3-5]. However, some doctors still doubt whether acupuncture intervention in acute phase will aggravate nerve damage. And strong evidence in clinical acupuncture has been absent regarding that what effect acupuncture produces in acute phase. By using the PeriCam PSI system (laser speckle blood perfusion video monitoring system), we observed the facial microcirculation improvement in facial paralysis of acute stage after acupuncture thus to seek the objective evidence of acupuncture in treating this disease during acute phase. Now, the report is given as follows.
1 Clinical Materials

1.1 Diagnostic criteria

On the base of the diagnostic criteria of Bell’s facial paralysis in Science of Acupuncture and Moxibustion[6] and Clinical Neurology[7], diagnostic criteria were formulated as follows: an acute onset and a history of exogenous pathogen invading face such as cold, wind; the affected side of the face shows stiff muscles, numbness and paralysis, the wrinkles of forehead disappear, rima oculi enlarges so as to expose eyeball and increase tears secretion, nasolabial fold becomes shallower, mouth corner droops and twists to the contralateral side; the affected side of face cannot frown, knit brows or close eye completely, and cannot show teeth, pouch cheek or whistle properly; there also may be ear pain, taste sensitivity of the posterior show teeth, pouch cheek or whistle properly; there may also be may be ear pain, taste sensitivity of the posterior; the affected side of the face shows stiff muscles, numbness and paralysis, the wrinkles of forehead disappear, rima oculi enlarges so as to expose eyeball and increase tears secretion, nasolabial fold becomes shallower, mouth corner droops and twists to the contralateral side; the affected side of face cannot frown, knit brows or close eye completely, and cannot show teeth, pouch cheek or whistle properly; there also may be ear pain, taste sensitivity of the posterior; the affected side of the face shows stiff muscles, numbness and paralysis, the wrinkles of forehead disappear, rima oculi enlarges so as to expose eyeball and increase tears secretion, nasolabial fold becomes shallower, mouth corner droops and twists to the contralateral side; the affected side of face cannot frown, knit brows or close eye completely, and cannot show teeth, pouch cheek or whistle properly; there also may be ear pain, taste sensitivity of the posterior; the affected side of the face shows stiff muscles, numbness and paralysis, the wrinkles of forehead disappear, rima oculi enlarges so as to expose eyeball and increase tears secretion, nasolabial fold becomes shallower, mouth corner droops and twists to the contralateral side; the affected side of face cannot frown, knit brows or close eye completely, and cannot show teeth, pouch cheek or whistle properly; there also may be ear pain, taste sensitivity of the posterior.

1.2 Inclusion criteria

Met the above mentioned diagnostic criteria; 15-50 years old; disease duration \(\leq 7\) d; volunteered to participate in the study and signed informed consent forms.

1.3 Exclusion criteria

Failure to meet the inclusion criteria; face paralysis was caused by other diseases; without other serious diseases affecting the implementation of the treatment.

1.4 General data

Thirty outpatients with peripheral facial paralysis were enrolled from the Acupuncture Department of Shenzhen Hospital of Traditional Chinese Medicine from January to October 2013, and their ages ranged from 23 to 50 years old with an average age of \((33\pm4)\) years, including 16 males and 14 females with 1-7 d duration, and none of the patients had received any treatment of Western or traditional Chinese medicine. There was no dropout case in treatment process.

2 Acupuncture Methods

Points: Cuanzhu (BL 2), Yangbai (GB 14), Taiyang (EX-HN 5), Sibai (ST 2), Quanliao (SI 18), Dicang (ST 4), Jiache (ST 6), Yingxiang (LI 20), and Yifeng (TE 17) on the affected side, and bilateral Hegu (LI 4).

Operation: Stainless steel needles of 0.3 mm in diameter and 25 mm or 40 mm in length were used. Inserted the needles subcutaneously downwards into Cuanzhu (BL 2) and Yangbai (GB 14) for 0.3 cun; inserted the needle perpendicularly upwards into Taiyang (EX-HN 5) and Quanliao (SI 18) for 0.3 cun; inserted subcutaneously upwards into Sibai (ST 2) for 0.3 cun; inserted the needle from Dicang (ST 4) toward Jiache (ST 6) for 1 cun, and also from Jiache (ST 6) toward Dicang (ST 4) for 1 cun; inserted obliquely into Yingxiang (LI 20) along nasolabial fold for 0.2 cun; inserted perpendicularly into Yifeng (TE 17) and Hegu (LI 4) for 0.5 cun. After qi arrival, retained needles for 30 min, and manipulated the needles every 10 min gently. The treatment was given 5 times per week with 2 d rest between 2 weeks and therapeutic efficacy was observed after 4 weeks.

3 Result Observations

3.1 Observation conditions and environment

Observation room was quiet and comfortable with low noise and soft lights, its temperature maintained at 23-26 °C, and humidity between 45% and 50%.

3.2 Equipment

PeriCam PSI system manufactured by Perimed AB was used. This system is based on laser speckle contrast analysis (LASCA) technology, and can monitor a large area of tissue perfusion by real-time dynamic imaging. With high spatial and temporal resolution, this system can monitor the region perfusion up to 100 fps by 1 388 × 1 038 pixel CCD camera laser detection. After the computer’s process, the photographs taken by the camera will be displayed as a perfusion map on the screen. There is also a color camera used to record the behavior of the measured object, color photographs and perfusion image shows the same area, which can assist to determine whether the object is moving during monitoring process, in order to help blood perfusion volume and intensity image evaluation. In addition to real-time display more than two monitoring images, the PIMSoft program analysis function also can perform statistical analysis of the perfusion area in a freely defined region of interest (ROI). The instrument uses a laser wavelength of 785 nm as a monitoring light source with maximum output power of 70 mW, which is in line with the relevant safety standards of IEC 60825-1: 2007 class 1 requirements. The instrument is class 2A medical devices and compliance with medical devices MDD 93/42/EEC authentication requirements. During facial monitoring, no special protection is required but only closing eyes.

3.3 Operating methods and statistical analysis

PeriCam PSI system was used to record blood perfusion data during patients’ first acupuncture treatment for statistical analysis. Because of thin skin and rich blood flow, the eyes were selected as ROI to reflect the facial blood flow. Patients entered the investigation room, lying 10 min on the couch quietly with eyes closed and same head posture in a stereotypes pillow. The lens was placed just 13-18 cm above the patient’s face, and then acupuncture as