Original article

Acupuncture combined with Chinese herbs for the treatment in hemivertebra French bulldogs with emergent paraparesis

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ABSTRACT

This study follows the treatment of six French bulldogs with paraparesis caused by congenital hemivertebra which were structurally mild but clinically severe. A standardized acupuncture (灸 zhēn jū) treatment using Hua-Tuo-Ji ji (HTJJ) as local points and other distant points combined with Chinese herbs improved the clinical signs. Few, if any, published papers mention Traditional Chinese Veterinary Medicine (TCVM) for treatment of hemivertebrea paraparesis in French bulldogs. Based on the rapid treatment outcome, we encourage practitioners to integrate this form of conservative management into emergency treatment.

We found a lack of published reports of TCVM treatment in hemivertebra French bulldogs with paraparesis. This report describes 6 cases of French bulldogs with hemivertebra resulting in paraparesis that underwent acupuncture and herbal treatment with favourable outcomes.

1. Introduction

Hemivertebra in French bulldogs is a breed-predisposed congenital anomaly. Nonetheless, it does not commonly cause clinical signs. A recent study found 9.8% (n = 41) of French bulldogs had compressive spinal cord disease associated with hemivertebra. However, once clinical signs appear, the disorder is considered urgent. The most common clinical findings are pelvic limb ataxia and paresis ranging from very mild ataxia to loss of voluntary movement of the pelvic limbs. More severe symptoms include faecal and urinary incontinence. The diagnosis is based on clinical signs and diagnostic imaging such as X-radiography, CT or MRI.

Treatment options depend on the severity of clinical signs and vertebral angulation, and range from conservative to invasive methods, including vertebral stabilizing surgery with or without decompression. Advanced imaging under anaesthesia or surgery is risky especially in emergency cases in this brachycephalic breed. Some clinicians choose conservative treatment such as medication, restriction, rehabilitation or acupuncture (灸 zhēn jū). Among these, acupuncture is proactive and has few side effects.

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there is pain, there is lesion,” we applied dry needle acupuncture to this dog at selected local and distant acupoints. The local points were Hua-Tuo-Jiaji (HTJJ) on T9, T11 and T13 which were the region of hyperaesthesia. Distant points were GB30 (Huan Tiao), GB34 (Yang Ling Quan), LI4 (He Gu) and LIV3 (Tai Chong) (Fig. 2). The local points and distant points on the trunk were stimulated using stainless steel needles (0.3 mm in diameter, 25 mm in length; Yu Guang Corp., New Taipei, Taiwan) with a perpendicular insertion depth of 0.5 cm. Distant points on extremities were stimulated using stainless steel needles (0.27 mm in diameter, 13 mm in length; Yu Guang) with a perpendicular insertion depth of 0.25–0.50 cm. With the dry needle method, the needles were inserted and remained in place for 15 min. Chinese herbs consisted of double PII (Jing Tang, Gainesville, FL, USA) and Bu Yang Huan Wu Tang (Sun Ten Pharmaceutical Co., Taipei, Taiwan). The dosage was 0.1 g per 5–10 kg of body weight given orally twice daily until recovery. According to TCVM, the treatment principles of Double PII are to break down stasis in the spine, move Qi, and relieve pain. The Bu Yang Huan Wu Tang tonifies Qi and smooths the channels (Table 1). The owner was instructed on intensive home care of the dog, which included restriction of the dog to a non-slippery flat floor, manually emptying the dog’s bladder every 6 h, and passive range of motion therapy for the pelvic limbs. Caging was not recommended. After two treatments, the dog regained motor movement and tried using its pelvic limbs. After the 4th treatment, the dog had obvious improvement in walking, with stiffle extension, and without assistance. The dog regained use of his hind limbs after six treatments although he occasionally dribbled urine. Based on the treatment experience of dog 1, we hypothesized that sudden paraparesis in young hemivertebra French bulldogs could be well treated by TCVM after ruling out major structural changes via radiography.

A further two French bulldogs were referred to our veterinary hospital emergency department for sudden paraparesis with non-ambulation (paraplegia). Three more French bulldogs were referred to our veterinary service with sudden ambulatory paraparesis. There was no history of trauma. Neurological examination localized lesions in T3–L3 with deep pain perception; these were graded from grade 2 to grade 3 with hyperaesthesia of the middle thoracic region. Survey radiographs revealed hemivertebra from T4 to T13 with single or multiple vertebral deformities respectively (Fig. 3). Because of the owners’ economic concerns and regarding the risk of surgery, anaesthesia (2 non-ambulatory dogs) and the ambulatory status (3 ambulatory dogs), they only received radiography to rule out spinal dislocation. Treatment-wise we applied dry needle acupuncture. HTJJ points corresponded to regions of hyperaesthesia associated with hemivertebra. Distant points were the same as dog 1. Only 1 dog (dog 3) received electrical acupuncture (EAP) because of sedation for taking the radiographs. In EAP, two pairs of electrical electrodes were applied including an HTJJ pair covering T6, T7, T8 and T9 as local points, and electrodes connecting T6 to T9 bilaterally. Additional electrodes connected GB30 to GB34 as distant points. An electrostimulator (Ching Ming Tens Model-05B, Ching Ming Corp., New Taipei, Taiwan) was used to provide stimulation for 15 min at 0.2 Vp-p (voltage peak to peak) at a frequency of 20 Hz (interrupted wave type). The intensity of stimulation was adjusted to provide visible muscle contraction surrounding the needles and hind limb vibration. The other distant points were LI4 and LIV3 with dry needles. Chinese herbs consisted of double PII and Bu Yang Huan Wu Tang; the same dosage as dog 1 were used for all dogs. They improved after 3 treatments and recovered within 6 treatments.

3. Results and discussion

The 6 dogs in this study comprised 1 intact female and 5 intact males with an average age of 3.5 ± 0.5 years (range, 3–4) and an average BW of 11.2 ± 1.8 kg (range, 8.8–14.0). The average time of duration of signs prior to TCVM treatment was 2.7 ± 2.0 days (range, 1–6). The average improvement time was 5.5 ± 2.9 days (range, 2–10), with an average recovery time of 19.8 ± 17.1 days (range, 5–49).

In this study, 3–4 year old intact male French bulldogs tended to suffer from paraparesis. The clinical signs were acute onset. Hemivertebrae in brachycephalic, screw-tailed dogs such as French bulldogs typically affects the T7–T9 region,1 with lesions ranging from T3–L3. The cause of neurological signs is spinal cord compression.4 The reason paraparesis in French bulldogs with congenitally deformed vertebrae happens so abruptly is unknown. The conventional treatment is conservative if there is no obvious structural change. Analgesics such as NSAIDs or steroids, cage rest, and physical therapy are the main form of management.6 In this study, all referred dogs were treated by medication before referral except dog 2. However, this did not resolve the paraparesis. The six cases of French bulldogs with hemivertebrae resulting in sudden paraplegia were successfully treated with TCVM and responded rapidly within 4 treatments.
The important effect of local point (HTJJ) stimulation is that it activates the local immune-inflammatory systems. This effect is similar to that of micro trauma in local area and induces inflammatory material to heal the local lesion. The purpose of stimulation to GB30, GB34, LI4 and LIV3 is to stimulate the distal extremities arousing conscious proprioception. Stimulation of the afferent nerves enters the spinal cord and courses up to the brain and then travels via the efferent nerves down to extremities to re-educate nerves and help nerve healing.

The decision to use EAP was to counteract the effects of sedation and strengthen the effects of acupuncture (针灸 zhen jiu). Once sedated, the needling sensation decreases. The use of EAP theoretically replaces manipulation of the needles by hand and empirically strengthens the effects of AP. There was one case receiving EAP. The acupuncture treatment was performed daily for three days, then twice per week while significant improvement was achieved. The electrical current used was 20 Hz (interrupted wave) for 15 min. A previous study revealed that stimulation at 20 Hz elicited the maximal release of substance P, which is associated with the regulation of neurogenesis. The possible reasons why acupuncture was beneficial and reduced the neurological signs were pain relief, local anti-inflammation, and elimination of local swelling and nerve arousal.

Comparing the six cases (Table 2), all were emergency referrals. All six dogs had mild vertebral deformities (Cobb angle less than 15°). The duration of paraplegia ranged from 1–4 days. Within four treatments, all of the dogs demonstrated obvious improvement in paraparesis, from inability to stand and were able to walk without assistance. Within six treatments, all dogs had recovered, although dog 1 continued to exhibit residual urinary incontinence. In the non-ambulatory group, the duration before TCVM was initiated was relatively short, and recovery time was quick. Dog 3 had the shortest improvement time (3 days) to complete recovery (10 days), possibly because of the integration of electrical stimulation into the acupuncture treatment. Applying electrical stimulation to acupoints reinforces their effects. In the ambulatory group, dog 5 had the longest recovery time (49 days) because of long treatment interval time (49 days/5 treatments). The other 2 dogs recovered rapidly within 3 treatments, possibly because their severities were low.

**4. Conclusions**

In conclusion, acupuncture (针灸 zhen jiu) combined with Chinese herbs is a good treatment choice for caudal paralysis due to mild congenital hemivertebra in French bulldogs. TCVM is especially useful for neurological emergencies in hemivertebra young French bulldogs when deep pain exists. Unfortunately, TCVM did not eliminate urinary incontinence.

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### Table 1

| Chinese herbs | Ingredients | Actions |
|---------------|-------------|---------|
| Double P II   | Angelica    | Break down stasis and relieve pain |
|               | Dang Gui    |         |
| Myrrh         | Mo Yao      | Break down stasis and relieve pain |
| Olibanum      | Ru Xiang    | Break down stasis and relieve pain |
| Strychnos     | Ma Qian Zi  | Move Qi and relieve pain |
| Lindera       | Wu Yao      | Move Qi and relieve pain |
| Notoginseng   | Tian San Qi | Break down stasis |
| Sangus        | Xue jie     | Break down stasis |
| Draconis      |             |         |
| Bethus        | Quan Xie    | Break down stasis |
| Pheretima     | Do Long     | Break down stasis |
| Ligusticum    | Chuan Xiong | Break down stasis |
| Paeonia       | Chi Shao    | Break down stasis |
| Carthamus     | Hong Hua    | Break down stasis |
| Eucomia       | Du Zhong    | Move Qi |
| Dipsacus      | Xu Duan     | Move Qi |
| Drynaria      | Gu Sui Bu   | Move Qi |
| Morinda       | Bu Ji Tian  | Move Qi |
| Cyathula      | Chuan Nu Xi | Move Qi |
| Psolarea      | Bu Gu Zhi   | Move Qi |
| Astragalus    | Huang Qi    | Move Qi |
| Aconite       | Fu Zi       | Move Qi |
| Glycyrrhiza   | Gan Cao     | Harmonizes |
| Bu Yang Huang Wu Tang | Angelica | Break down stasis and relieve pain |
|               | Dang Gui    |         |
| Paeonia       | Bai Shao Yao| Blood activator |
| Pheretima     | Do Long     | Break down stasis |
| Ligusticum    | Chuan Xiong | Break down stasis |
| Carthamus     | Hong Hua    | Break Stasis and relieve pain |
| Persica       | Tao Ren     | Break Stasis and relieve pain |

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* Xie H.S., Frank L.R., Preast V., Trevisanello L., 2011.
Table 2
Signalment, lesion location, diagnosis, severity, treatment methods and different time courses in 6 French bulldogs.

| Case no. | Signalment | Chief complaint/duration of signs prior to acupuncture/previous medication | Lesion localization | Imaging/diagnosis | Severity grade | Treatment methods: acupuncture/Chinese herbs | Improvement time | Outcome |
|----------|-------------|--------------------------------------------------------------------------|---------------------|-------------------|---------------|---------------------------------------------|-----------------|---------|
| 1        | M, 3 yr, 10.1 kg | Sudden non-ambulatory paraparesis/4 days/steroid | T3-L3 | X ray, CT/T6-T10 | Hemivertebra Cobb angle < 15° | 4 | AP*: HTJJ, GB30, GB34, LIV3, LI4 Chinese herbs | 10 days (4 treatments) | Ambulatory | 28 days (6 treatments) | Residual dribbling urine |
| 2        | M, 3 yr, 11.2 kg | Sudden non-ambulatory paraparesis/1 days/none | T3-L3 | X ray/T5-T7 | Hemivertebra Cobb angle < 15° | 3 | AP*: HTJJ, GB30, GB34, LIV3, LI4 Chinese herbs | 6 days (2 treatments) | Ambulatory | 22 days (6 treatments) | Recovery |
| 3        | M, 4 yr, 12.2 kg | Sudden non-ambulatory paraparesis/1 days/steroid | T3-L3 | X ray/T8,T12-T13 | Hemivertebra Cobb angle < 15° | 3 | AP*: LIV3, LI4 EAP*: HTJJ, GB30 + GB34 | 3 days (3 treatments) | Ambulatory | 10 days (4 treatments) | Recovery |
| 4        | M, 3 yr, 11 kg | Sudden ambulatory paraparesis/2 days/steroid | T3-L3 | X ray/T6 | Hemivertebra Cobb angle < 15° | 2 | AP*: HTJJ, GB30, GB34, LIV3, LI4 Chinese herbs | 2 days (2 treatments) | Improve | 5 days (5 treatments) | Recovery |
| 5        | F, 4 yr, 8.8 kg | Sudden ambulatory paraparesis/2 days/steroid | T3-L3 | X ray/T4-T5 | Hemivertebra Cobb angle < 15° | 2 | AP*: HTJJ, GB30, GB34, LIV3, LI4 Chinese herbs | 7 days (2 treatments) | Improve | 49 days (5 treatments) | Recovery |
| 6        | M, 4 yr, 14 kg | Sudden ambulatory paraparesis/6 days/NSAID | T3-L3 | X ray/T6-T9 | Hemivertebra Cobb angle < 15° | 2 | AP*: HTJJ, GB30, GB34, LIV3, LI4 Chinese herbs | 5 days (2 treatments) | Improve | 5 days (2 treatments) | Recovery |

a AP: acupuncture with dry needle stimulation.
HTJJ: acupuncture Hua-Tuo-jiaji.
Chinese herbs: Double P II, Bu Yang Huan Wu Tang.
EAP: acupuncture with electric stimulation.
GB30 + GB34: connect GB30 to GB34.
NSAID: non-steroid anti-inflammatory drug.

Conflict of interest
We declare there is no financial and personal relationship with other people or organizations that could inappropriately influence this research.

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