

Assessment of the outcome of Ayurvedic treatments for vertebral fracture with motor dysfunction

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Abstract

Assessment of outcome following Ayurveda treatment protocol was done in a complicated case of spinal fracture with motor dysfunction and having a past history of Pott's disease. A 52-year-old man was suffering from motor dysfunction after a spinal fracture at D5/D6 level. The patient sought *Ayurveda* treatments because he did not gain any significant improvement according to mainstream medical treatments what he underwent for several years. According to *Ayurveda*, the patient was treated following immobilization, external and internal application of herbal preparations followed by physiotherapy. The outcome of the treatments were monitored by motor function assessment, quality of life assessment and computed tomography scan. Initial signs of improvement were observed just after 1 month of commencing *Ayurveda* treatments. Continuously following the treatments for 24-month duration, the patient was reverted back to his normal life. This complicated case of spinal fracture was successfully cured using Ayurveda treatment. Therefore, the observations made here would be useful for organizing a future clinical trial.

Keywords: Ayurveda, motor dysfunction, physiotherapy and quality of life, spinal fracture

Introduction

The traditional medical system practiced in Sri Lanka is a subdivision of Ayurveda. It is widely believed that Ayurveda fracture management is promising, thus herbs composite in Ayurveda treatments likely facilitate the bone growth at the fracture site.

Mainstream medical practice (Western medicine) basically applies bone reduction, immobilization and physiotherapy in fracture management. In present era, Ayurveda also follows the same procedure of bone reduction, immobilization as mentioned in classic along with physiotherapy.^[1] However, in addition to that, in between immobilization and physiotherapy, the external and internal application of various herbal medications makes the improved outcome of Ayurveda fracture healing compared to allopathic medicine.

Among the bone fractures, vertebral fractures are more critical and life threatening.^[2] Many people living with a spinal cord injury tend to develop depression as a result of lifestyle changes.^[3]

Here, we present a case report of a person who had recovered successfully following Ayurveda treatment with vertebra fracture and spinal tuberculosis who initially followed mainstream medical advice for several years' without a success.

Case Report

A 52-year-old taxi driver was suffering from chronic back pain from 10 years. During the last 3 years, his back pain became progressively worse and developed numbness in both lower limbs.

Following the consultation of neurologist at a hospital at Kandy, a computed tomography (CT) was done in 2012 and diagnosed as infective spondylitis at D5/D6 level of the dorsal spine. It was identified as Pott's disease (spinal tuberculosis).

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Anti-tubercular therapy (ATT), was given for 1-year period. After ATT, the patient was unable to walk without support. After that, he was referred to neurology unit. While he was in neurology unit, he suffered accidental fall from the bed causing him unable to move his lower limbs, but his sphincter control was intact (sensory intact with motor defect). Repeated CT of dorsal spine showed D5/D6 fracture [Figure 1a]. Since his condition did not improved, he was asked to take follow-up at the rehabilitation unit for conservative management, which was continued up to 1 year at rehabilitation unit. Observing no improvement, the patient decided to seek Ayurveda treatment starting from June 2013.

At the time of reporting for Ayurvedic consultation and management, patient complained of a heaviness and numbness over lower body and difficulty to move his legs. He could not bend and raise his lower limbs. The patient was treated using three treatment regimens while assessing the outcome at the end of each regimen.

1. Treatment regimen 1 (1–6 months): *Seethodaka* oil^[4] (30 ml) with paste of *Katakaladi* (*Bridelia retusa* [L.] A. Juss) was applied externally over the fractured area. *Triphala* decoction (30 ml), *Vasa-Guduchi* decoction^[4] (120 ml) and *Gandharva-Hastadi*

decoction^[4] (120 ml) was administered orally twice a day, for first 3 months of this phase [Table 1]. After 1 month and when the patient showed first signs of improvement [Table 2], simultaneously passive exercises were started. Active exercises were started later, when further recovery was noted

2. Treatment regimen 2 (6–12 months): *Triphala* decoction (30 ml) treatment was continued for next 6 months in the same dose similar to first 6 months. In addition to that, *Pinda* oil^[4] (30 ml) with paste of *Katakala* (60 g) was applied topically daily. *Dantimooladi* decoction^[4] 120 ml was administered twice a day in the first 3 months of this phase. In the second 3-month period, *Dashamoola-Bala-Eranda* decoction^[4] (120 ml) was given. The patient recovered from symptoms of numbness and heaviness along with gaining ability to move his lower limbs

3. Treatment regimen 3 (12–24 months): During this period, *Tarpana Chikitsa* which was continued throughout 12-month period along with application of *Narayana* oil^[4] (30 ml) with paste of *Ashwagandhadi*^[4] (60 g), externally. *Maharasnadi* decoction^[4] (120 ml) was administered twice a day at initial 3 months of this phase

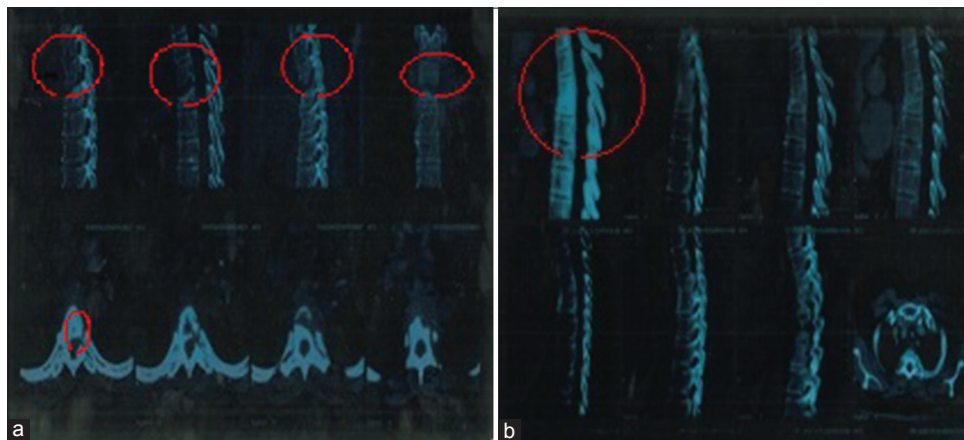


Figure 1: (a) Initial computed tomography images of thoracic vertebrae showing D5/D6. Fracture site is circled in red. (b) After 18 months of treatment, fused D5/D6 shows the healing

Table 1: Summary of treatment protocol from day 1 to 24 months

Number	Treatment	Duration
1	<i>Seethodaka</i> oil 30 ml and paste of <i>Katakaladi</i> 60 g topical application <i>Triphala</i> decoction 30 ml and <i>Vasa-Guduchiyadi</i> decoction 120 ml twice a daily orally	Day 1 to Day 90 (first 3 months)
2	<i>Seethodaka</i> oil 30 ml and paste of <i>Katakaladi</i> 60 g topical application <i>Triphala</i> decoction 30 ml and <i>Gandharva-Hastadi</i> decoction 120 ml twice a daily orally	Day 90 to Day 180 (3-6 months)
3	<i>Pinda</i> oil 30 ml and paste of <i>Katakaladi</i> 60 g externally topical application <i>Triphala</i> decoction 30 ml and <i>Dhanthimooladi</i> decoction 120 ml twice a daily orally	Day 181 to Day 270 (6 months to 9 months)
4	<i>Pinda</i> oil 30 ml and paste of <i>Katakaladi</i> 60 g topical application <i>Triphala</i> decoction 30 ml and <i>Dashamoola-Bala-Eranda</i> decoction 120 ml twice a daily orally	Day 270 to Day 360 (9 months to 12 months)
5	<i>Narayana</i> oil 30 ml and paste of <i>Ashwagandhadi</i> 60 g topical application <i>Maharasnadi</i> decoction 120 ml twice a day orally	Day 360 to Day 450 (12 months to 15 months)
6	<i>Narayana</i> oil 30 ml and paste of <i>Ashwagandhadi</i> 60 g topical application <i>Masha-Baladi</i> decoction 120 ml twice a day orally	Day 450 to Day 730 (15 months to 24 months)

and after that *Masha-Baladi* decoction^[4] (120 ml) was started twice a day for the remaining 9 months.

The fractured bone was immobilized using lumbar thoracic corset. It was applied throughout the day in the 1st year and after that until the treatment concludes it was applied over the day time only. Altogether, after 24 months of commencing initial treatment, the patient recovered completely.

Preparation of drugs

Seethodaka oil was prepared according to the classical text of Ayurveda Pharmacopeia.^[4] *Pinda* oil and *Narayana* oil were prepared according to the classical text *Bhaishajya Ratnavali*.^[5] *Triphala* decoction, *Vasa-Guduchi* decoction, *Gandharava-Hastadi* decoction, *Dantimooladi* decoction, *Dashamoola-Bala-Erandadi* decoction, *Maharasnadi* decoction and *Masha-Baladi* decoction were prepared according to the guidelines and methods mentioned by the classical text of Ayurveda Pharmacopeia.^[4]

Paste of *Katakaladi* and paste of *Ashwagandhadi* were prepared according to the guidelines of Sri Lankan traditional physician family of “*Arangala Veda Parapura*.” Preparation of paste of *Katakaladi*: 240 ml of juice extracted from bark of each drugs *Bridelia retusa* (L.) A. Juss. (*Katakala*), *Syzygium cumini* (Linn) skeel’s (*Jambu*) and root of *Hemidesmus indicus* (L.) R. Br. (*Sariva*) and 30 g of each powdered rhizomes of *Zingiber officinale* Roscoe (*Shunthi*), fruits of *Piper longum* Linn (*Pippali*), stem of *Coscinium fenestratum* (Gaertn.) Colebr. (*Daruharidra*), pericarp of *Terminalia chebula* Retz (*Abhaya*), *Terminalia belerica* Roxb (*Vibhitaka*) and *Phyllanthus embillica* L. (*Dhatri*) were added together and heated over mid fire until a semi solid paste is obtained. Preparation of paste of *Ashwagandhadi*: Powder of *Withania somnifera* (L.) Dunal. (*Ashwagandha*, 60 g), powder of *Vigno mungo* Linn (*Masha*, 30 g), *Cinnamomum zeylanicam* blume (*Twak*, 15 g) and powder of *Syzygium aromaticam* (L.) Merr. and Perry (*Lavanga* 15 g) were grinded

with 120 ml egg white and mixed with 60 ml of honey to obtain semi-solid paste.

Radiological assessment

Images of CT scan of fracture site before [Figure 1a] and after the Ayurveda treatment [Figure 1b].

Motor function assessment

Motor function assessment^[6] with the time, after commencing the Ayurveda treatment [Table 2].

Quality of life assessment

Quality of life was assessed before the treatment, 1 month, 3 months, 6 months, 1 year, 18 months and 3 years of the treatment. Quality of Life was assessed by the ferrans and powers quality of life index (FPQLI) spinal cord injury version-III.^[7]

At the commencement of treatment, the total quality of life score was 84/420. Following 3 months, the 4 subscales increased significantly ($P < 0.05$). After 24 months of commencing the treatment, the patient recovered and the total score of FPQLI became 410/420 ($P = 0.02$) [Table 3].

Analysis of the quality of life

Statistical analysis was conducted using Wilcoxon signed rank test. Statistical software SAS version 9.1 (New Jersey, USA. 2005) was used for the analysis. Initially, from 1 to 6-month period, the parameters were compared at 3-month intervals. After 6 months, until completion of treatment, it was compared at 6-month intervals.

Discussion

A wide range of herbal applications in fracture management has been mentioned in *Ayurveda* scripts which facilitate the bone growth and helps in remolding of callus. In present case study, the patient presented with a vertebral fracture and likely spinal cord compression/damage, causing paralysis of lower part of the body.

Table 2: Motor function assessment with the time, after commencing the Ayurveda treatment

Parameter	Duration of the treatment (months)							
	0 (day-1)	1	3	6	12	18	24	36
Tone	Hyper	Hyper	Hyper	Hyper	Normal	Normal	Normal	Normal
Power	0	+1	+2	+2	+4	+5	+5	+5
Knee jerk	Brisk	Brisk	Brisk	Brisk	Brisk	Normal	Normal	Normal
Ankle jerk	Brisk	Brisk	Brisk	Brisk	Brisk	Normal	Normal	Normal

Table 3: Assessment of quality of life with the time, after commencing Ayurveda treatment

Category (maximum score)	Day-1	3-month	6-month	12-month	18-month	24-month	P*
Total FPQLI score (420)	84	178	252	296	331	410	0.02
Health and functioning (180)	30	76	107	131	142	178	0.001
Social economic (84)	22	32	45	51	61	80	0.001
Psychological (84)	14	36	55	59	68	81	0.001
Family (72)	18	34	48	55	60	71	0.001

FPQLI: Ferrans and Powers Quality of Life Index * $P < 0.05$ was taken as significant

After 24 months of commencing of Ayurveda treatment, the tone, power, knee jerk and ankle jerk became normal indicating that the motor neuron functions were restored. In our treatment procedure, oral and topical applications were used with large number of herbs. All the medicines were used to facilitate the bone healing mechanism. Oral and topical medicine were selected as per the treatment principles of *Shodhana Chikitsa* (purificatory treatment), *Shamana Chikitsa* (pacificator treatment) and *Tarpana Chikitsa* (nourishment treatment). The treatment commenced with *Shodhana Chikitsa* of *Virechana Karma* to correct the deranged *Dosha* (*Vata* and *Kapha*) which signifies the concept of eradicating the disease. The *Shodhana Chikitsa* of *Virechana Karma* comprises the *Ama-Pachana* (enhancing the digestive power) and *Purva Karma* (preparatory purification process). To achieve the process of *Purva Karma*, *Snehana Karma* (oleation therapy) and fomentation were applied over the fractured area. *Seethodaka* oil and paste of *Katakaladi* were applied for the *Virechana Karma* of *Shodhana Chikitsa* and it probably regularized the blood circulation around the fractured bone. It initiates the formation of hematoma subsequently resolving into granulation tissue with the typical inflammatory cascade. In this case, it is in a nonunion state thus *Virechana Karma* of *Shodhana* treatment would trigger the granulation tissue formation which subsequently leading to soft callus and finally trigger the hard callus formation. Initial 6-month period topical (*Seethodaka* oil and *Katakaladi* paste) and oral medicines (*Triphala* decoction, *Vasa-Guduchiyadi* decoction and *Gandharva-Hastadi* decoction) were selected which has properties of *Virechana* while next 6 months medicines were administered having properties of *Shamana*. Last 1-year period, oral and topical *Tarpana* medicines were administered to enhance the strength of the bones, nerves and muscles.

Following fracture, the *Kapha* and *Vata Dosha* are prominent around the fractured area. Pain and swelling are due to *Dosha Vriddhi* (increased *Vata* and *Kapha Dosha*) However, the basic treatment plan was to normalize the *Vriddhi* (increase) and *Ksheena* (decrease) *Dosha* over the fractured bone. The herbs used in the treatment regimes, possess different pharmacological and biological properties.^[8] Ingredients of *Triphala* decoction, *Vasa-Guduchi* decoction, *Gandharva-Hastadi* decoction possess property for *Virechana Karma*; *Dantimooladi*, *Dashamula-Bala-Eranda* and *Maha-Rasnadi* decoction has *Shamana* property and *Masha-Baladi* decoction has *Tarpana* property. *Sheetodaka* oil possess *Virechana* property, *Pinda* oil has *Shamana* property and *Narayana* oil has *Tarpana* property. Paste of *Katakaladi* has both *Virechana* and *Shamana* property. Paste of *Ashwagandhadi* has the *Tarpana* property. Main ingredient of the *Ashwagandhadi* paste is *Withania somnifera* (L.) Dunal which is capable of enhancing muscle strength leading to recovery.^[9] All the medicines possess the properties of *Vata-Shamana* (pacify the vitiated *Vata*), *Vedana-Sthapana* (sedative), *Shoola-Prashamana* (analgesic), *Tarpana* (enhance the nutrition), *Balya* (promote strength) and *Sroto-Shodhana* (purify the channels) which help to

improve the qualities of *Asthi-Dhatu* (bones) and reformation of wasting tissues.^[10]

Further, herbs in the treatment procedure, have antioxidant and anti-inflammatory properties. *Jambu* (*Syzygium cumini* (Linn) skeel's) has *Sheeta Virya* (cool potency) and it is a diuretic. It is a main ingredient of the paste of *Katakala*. *Haritaki* and *Vibhithaka* have a *Ushna Virya* (hot potency) and it possess anti-inflammatory property. *Phyllanthus emblica* (*Dhatri*) has also antioxidant and anti-inflammatory activities. In this study *Sheetodaka* oil was used for *Shodhana Chikitsa* (purificatory treatment) which consists of *Nimba* (*Melia azadirachta*) and also possess *Shodhana* (purificatory) and *Ropana* (healing) properties. It purifies blood surrounding the fractured area and regulates blood circulation around the nonhealing fracture. Free radicals are associated with inflammation, swelling, further breakdown of bone collagen and excessive bone turnover. The antioxidants neutralize free radicals.^[11] In addition to that, applying a hot, fresh burdock leaf poultice reduces the swelling induced by a fracture.^[10,12-14]

In present case, patient was on ATT for 1 year and another 1 year later when presenting to Ayurveda treatment CT scan showed a fracture. Also, motor function assessment and FPQLI spinal cord injury version-III showed signs/symptoms of spinal cord compression with poor quality of life respectively. This would imply prior to *Ayurveda* treatment, patient was ill.

In summary, first 6 months period, *Shodhana Chikitsa* was started which would have facilitated the granulation tissue formation over fractured area. After *Virechana Karma* as *Shodhana Chikitsa*, *Shamana Chikitsa* was initiated topically and orally, which might had influenced the body as a whole. *Shamana Chikitsa* might had enhanced the balance more toward osteoblast formation and induced nervous system. Finally, the *Tarpana Chikitsa*, might had led to strengthening of muscles, nervous system and remoulding the bone, thus, delivered a better outcome.^[15,16]

Conclusion

Thus complicated case of vertebral fracture with motor dysfunction has been successfully treated with holistic Ayurvedic treatment plan like *Shodhana* (*Virechana*), external application (*Sheetodaka* oil, *Katakaladi* paste) and internal *Shamana* medicines decoctions of *Triphala*, *Vasa-Guduchiyadi*, *Gandharv-Hastadi*, *Dantimooladi*, *Dashmoola-Bala-Erandadi*, *Tarpana*, local-*Narayan Taila* with *Ashwagandhadi* paste and oral *Maharasnadi* and *Mashabaladi* decoction with exercise. The observations of this case report would be useful for organizing future clinical trials and mechanistic studies on Ayurveda fracture management.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understand that his name

and initials will not be published and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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