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Case Report

Use of Ayurveda and Sri Lankan traditional medicine for healing shaft of humerus fracture following nonunion

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ABSTRACT

Sri Lanka comprises of a well-established traditional orthopedic treatment system. A 14 year old child had a compound fracture over shaft of humerus. The internal fixator Kirschner (k) wire was applied following allopathic treatment and after three weeks, it was removed as there was no healing of wound over fracture site. Patient was asked to follow orthopedic clinic but defaulted and presented to Ayurveda management. X-ray reports showed nonunion of the humerus. Initially, nonunion bone was immobilized for six months using bamboo splints. Prior to applying the splints, during every visit, herbal oil and herbal paste were applied. Subsequently up to six months, motor, sensory functions assessment and quality of life (QoL) assessment was done using Quality of Life of the International Osteoporosis Foundation (QLIOF) questionnaire. Initial power of wrist and fingers were graded 1 and in 6- months time, improved to grade 5. The difference in the QLIOF scores were analyzed using Wilcoxon signed rank test. There was a significant ($p = 0.03$) difference between the pre-treatment (14) and post-treatment (59) QLIOF scores. The anterior- posterior and lateral X-ray showed complete healing of the fracture. This report indicates that the methods and medicines in Ayurveda and traditional orthopedic system can successfully treat a nonunion of humerus fracture.

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1. Introduction

Bone reduction, immobilization and rehabilitation are the basic principles of fracture management. Immobilization is useful to prevent displacement or angulation of the broken fragments [1]. Further, prevention of movements relieves the pain and enhances the healing. In modern medicine, permanent modes of immobilization are application of: plaster of Paris cast; continuous traction; external fixation and internal fixation [2]. Nonunion is a serious complication of a fracture and thus warrants surgical management to remove the scar tissues between bone fragments and immobilization with a mode of fixation.

Ayurvedic medical system has a long history and the school of surgery is qualified with a vast array of methods for fracture treatment. From the past, it has been overlapped with native orthopedic methods which are practiced in Sri Lanka. Currently, traditional orthopedic medicine is popular among laymen as an effective treatment modality. Most of the treatments used by native practitioners were verbally transmitted and sometimes written in palm-leaf manuscripts of which one common book was published in 1893 as *Handi Veda Pota* (treating fractured joints) [3]. In traditional medicine, various preparations like *pattu, mallum*, and oils are commonly used as external applications for fracture healing. In addition, internal medicines like decoctions, gruels, pills and powders are used in management of other symptoms and complications during the treatment.

According to Ayurveda, multiple types of fractures are described at the shaft of bones and are termed as *Kanda Bhagna* [4]. Twelve types of *Kanda Bhagna* are described in *Susruta Samhita*. The fracture was classified according to local symptoms and it's shape. In our case, shaft of humerus seemed to be *Ashwakarna Bhagna* (fracture appearing like the ear of a horse) and according to the International Classification of Diseases (ICD-10), shaft of humerus

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fracture is classified under S42.3. The shaft of humerus fracture is common among middle aged and over one-third population. The aim of this study was to identify the fracture healing effect of Ayurveda treatment combined with the traditional orthopedic medical system after nonunion of a fracture.

2. Case report

A 14 year old male had a compound fracture over the shaft of the humerus and presented to Ayurveda treatment following failure of allopathic treatment. During the allopathic treatment which lasted for over two months, the mode of internal fixation, the Kirschner (k) wire, was applied and in three-weeks time it was removed while asking to follow the orthopedic clinic. Patient was having a discharging wound with features of inflammation over fracture site suggesting bone and soft tissue infection. The reason for removal of k wire at the orthopedic treatment unit was planned due to acute osteomyelitis. The patient was having wasted forearm associated with restricted movements of arm including elbow, wrist and fingers. The X-ray showed nonunion of humerus. Physical examination revealed difficulty in adduction, abduction, flexion and extension of upper arm and the power was 1/5. Pain, edema, local tenderness and stiffness over wrist joint and fingers were observed at the initiation of the Ayurvedic treatment.

3. Diagnosis

Diagnosis was done according to the evidence of radio imaging (X-ray) and inflammatory markers (ESR- 114 mm/first hour and CRP-76 mg/L) as having nonunion following acute osteomyelitis. The radio imaging, motor, sensory function and quality of life (QoL) assessment were sequentially done to monitor the progress of fracture healing. The difference in the QoL scores, sign and symptoms were analyzed using Wilcoxon signed rank test. Statistical software of SAS 9.1 version (USA) was used for the study [5].

4. Treatment

4.1. First treatment regimen (day 1–60)

During the first two months, external application of 120 ml of *Seetodaka* oil [6,7] was carried out every other day and *Bamboo* splints were applied in the lateral and medial position of elbow to shoulder joint [7]. During the entire treatment of six months, splints were kept in lateral side and medial side of the humerus from elbow joint to shoulder joint. Bandaging was done moderately every other day while external herbal applications were applied to the fractured area for over the six months period.

4.2. Second treatment regimen (day 61–120)

Following 2 months of above treatment, 30 ml of *Pinda* oil [6] with 30 g of *Katakaladi* paste applied was applied with bamboo splints and the patient was asked to perform passive and active exercises.

4.3. Third treatment regimen (day 121–180)

During the last two months, 30 ml of *Narayana* oil with 30 g of paste of *Ashwaganda* was applied with bamboo splints. Patient was asked to do the active exercises.

4.4. Preparation of drugs

Oil of *Seethodaka* was prepared according to the classical text of Ayurveda Pharmacopeia [6] and oils of *Pinda* and *Narayana* were prepared according to the methods given in the classical text *Bhaishajya Ratnavali* [8]. Preparation of paste of *Katakaladi* and paste of *Ashwagandada* were done according to the methods mentioned by the eminent Sri Lankan traditional physician "*Arangala Veda Parapura*".

4.4.1. Preparation of paste of Katakaladi

240 ml of juice was extracted from the bark of *Bridelia retusa* (*Katakala*), *Syzygium cumini* (*Jambu*) and *Hemidesmus indicus* (*Shariva*) and powder of rhizomes of *Zingiber officinale* (*Shunti*), fruits of *Piper longum* (*Pippali*), stem of *Coscinium fenestratum* (*Daruharidra*), pericarp of *Terminalia chebula* (*Abhaya*), pericarp of *Terminalia bellerica* (*Vibhithaka*) and pericarp of *Phyllanthus embillica* (*Dhathri*) were added to it and heated until a semi-solid paste was obtained.

4.4.2. Preparation of paste of Ashwagandada

60 gms of powdered *Withania sominifera* (*Ashwagandha*), 30 gms of powdered *Vigno mungo* (*Masha*), 15 gms of powdered *Cinnamomum zeylanicam* (*Thwak*) and 15 gms of powdered *Syzygium aromaticam* (*Lavanga*) were grinded with 120 ml of egg white and mixed with 60 ml of bee honey to form a semi-solid paste.

5. Treatment outcomes

5.1. Sequential x-ray images

Sequential x-ray images from before, during and after completion of treatment are given in Image 1.

5.2. Motor function assessment and follow up

Motor function assessment (upper arm) was done initially following the commencement of treatment and during the treatment. Power of flexion, extension, adduction and abduction moments was graded as 1 in upper arm. After 20 weeks of treatment, it improved to the normal level (Grade 5).

5.3. Sensory function assessment and follow up

Sensory functions including sensation of pain, temperature, vibration and fine touch was intact at commencement and throughout the treatment.

5.4. Assessment of QoL

QoL was assessed before the treatment and at 1, 2, 4 and 6 months of treatment (Table 1) using the Quality of Life of the International Osteoporosis Foundation (QLIOF) wrist fracture questionnaire [9]. It consists of 12 questions.

All parameters in QoL showed sequential improvement and reached to maximum after 6 months (Table 1). Comparisons of the QoL scores on different period of the treatment shows significant difference between the mean of QoL scores, day one comparing with day 90 and day 90 comparing with day 180 ($p = 0.03$) (Annex I). Compared to first visit, ESR ($p = 0.02$) and CRP ($p = 0.03$) declined and at the 4th month were significant.

6. Discussion

With modern treatment methods, most fractures heal without any problems. Some fractures do not heal even when they get the best surgical or non-surgical treatment. In some cases, certain risk

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