Case Report

Integrative approach combining Ayurveda, counselling, Yoga and meditation with conventional management of Ankylosing Spondylitis — A case report

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A B S T R A C T

Lifelong medications are required for symptomatic relief in Ankylosing Spondylitis (AS). We report the potential of an integrative approach in reducing dependence on steroids and pain medications in chronic AS. A 59-year-old HLA-B27 positive male patient suffering from AS for 40 years sought Ayurvedic treatment for relapse of pain, stiffness, fatigue, intermittent constipation and disturbed sleep. Ayurvedic diagnosis was Amavata (a clinical condition characterised by joint inflammation) The patient was managed as outpatient for eleven days and hospitalised for thirty three days. Internal medicines and external therapies with diet modification, lifestyle adjustments, counselling, Yoga and IAM Technique (Integrated Amrita Meditation Technique ) were administered during the hospital stay. At yearly follow up, C-Reactive Protein was reduced to 15.7 mg/L from the baseline value of 37.5 mg/L, and ESR from 103 mm/h to 8 mm/h indicating reduction in inflammation. The dose of NSAID and DMARD (Disease Modifying Antirheumatic Drug) could be reduced from once in twenty-four hours to once in eighty-four hours and steroids from twice daily to once in a week. There was significant reduction in pain and stiffness. Integration of Ayurveda and Yoga with conventional treatment can reduce drug dependence and improve quality of life in AS.

1. Introduction

Ankylosing spondylitis (AS) is a chronic, systemic, inflammatory, rheumatic disorder of uncertain etiology primarily affecting the axial skeleton [1,2]. The treatments suggested are non-steroidal anti-inflammatory drugs (NSAIDs) and corticosteroids which are of limited benefit [3]. Long term dependence on NSAIDs and corticosteroids leads to side effects and many patients are concerned about such consequences of prolonged treatment. Stress and anxiety are also strong contributing factors in the progress of this disease [4,5]. The features of Ankylosing spondylitis correlate with descriptions of amavata [Ma.Ni. 25.8–10] [6], in the classical Ayurvedic texts.

Rigorous clinical studies have not been conducted to establish the role of Ayurvedic interventions in the management of AS. On the other hand, it has been categorically stated in a leading journal of rheumatology that there is no ground to recommend Ayurvedic treatment for patients with a western diagnosis of Ankylosing Spondylitis [7]. Two [8,9] published case reports that discuss outcomes of Ayurvedic treatment in AS do not cover the entire spectrum of clinical presentations, challenges and scope of Ayurvedic interventions in the management of the disease. In this case report, we are pointing out the potential of an integrative approach incorporating Ayurveda and Yoga in reducing dependence on steroids, NSAIDs and DMARD in an elderly patient suffering from AS for 40 years. Reporting clinical outcomes from the point of care can help to generate preliminary data that can help in understanding the role of Ayurvedic interventions in management of AS in the absence of larger clinical studies.
2. Patient information

2.1. De-identified demographic and other patient information

A 59-year-old gentleman, native of and living in Pune, presented at our hospital in Kollam, Kerala, India seeking Ayurvedic treatment for his complaints.

2.2. Main concerns and symptoms of the patient

He presented with symptoms of stiffness, swelling and pain in neck, back and bilateral hip with more pain in the right hip joint. He also complained of pain in joints of knee, ankles and shoulders as well as interphalangeal joints for 40 years. His symptoms have aggravated since last 4 years. He also complained of intermittent constipation and disturbed sleep due to pain. At the time of the first clinical assessment, the patient did not have much pain or stiffness as he had taken NSAIDs and steroid medications. He sought Ayurvedic treatment in the hope of reducing dependency on these medications and if possible, to withdraw these medications completely.

2.3. Family and psychosocial history including relevant genetic information

His mother suffered from arthritis. The patient reported anxiety due to chronic pain interfering with sleep. He is concerned about dependency on painkillers. He is a businessman and reported work related stress. HLA B27 genetic marker was found to be positive.

2.4. Medical history and relevant past interventions and their outcomes

In 1976, at the age of 17, he developed swelling and stiffness in the joints especially in the metacarpal joints and was on Ayurvedic medications for 9 years, the treatment details he was not able to recollect. In the hope of improvement in pain and stiffness, he started allopathic medicines which gave transient symptomatic relief. In 1986, he was diagnosed with Ankylosing Spondylitis by a modern medical doctor and was found to be HLA-B27 positive. He took medications prescribed to him for about twenty years. He also underwent physiotherapy from 1986 to 2017. From 2003 to 2018, he practiced meditation regularly. The patient was operated for left inguinal hernia in 2009 and recovered fully. From 2014 to 2018, he practiced meditation regularly. The patient was operated for his complaints.

2.5. Relevant physical examination

At the time of admission, he was found to be overweight with a BMI of 29.03 kg/M² (height of 5’ 2” and weight of 72 kg). The skin appeared normal with no soft tissue swelling, synovial thickening, periarticular swelling, nodules or effusion could be observed. Neck muscle spasm was found to be present, but no muscle wasting was observed. Tenderness was elicited on deep palpation and pain was reported on motion especially in the neck region. He complained of non-radiating pain in knee joints and hip joints, which was more in the right hip than the left. Crepitation was observed in the knee joints. His posture was affected with a forward bend, subluxation of vertebrae was present, lateral flexion and rotation of neck were limited. Both scoliosis and kyphosis were present, but the patient was able to ambulate without aid and has a short striding gait.

3. Clinical findings

3.1. Relevant physical examination

At the time of admission, he was found to be overweight with a BMI of 29.03 kg/M² (height of 5’ 2” and weight of 72 kg). The skin appeared normal with no soft tissue swelling, synovial thickening, periarticular swelling, nodules or effusion could be observed. Neck muscle spasm was found to be present, but no muscle wasting was observed. Tenderness was elicited on deep palpation and pain was reported on motion especially in the neck region. He complained of non-radiating pain in knee joints and hip joints, which was more in the right hip than the left. Crepitation was observed in the knee joints. His posture was affected with a forward bend, subluxation of vertebrae was present, lateral flexion and rotation of neck were limited. Both scoliosis and kyphosis were present, but the patient was able to ambulate without aid and has a short striding gait.

3.2. Other clinical findings

Tenderness in sacroiliac joints was present. Inflammation, pain and stiffness was observed in axial as well as appendicular skeletal joints. Shoulders, hips, ribs, heels, small joints of hands and feet, neck, back, knee joints and ankles were all found to be involved. Reduced appetite, lack of enthusiasm in daily activities, burning sensation under the palmar and plantar aspects of hands and feet, incomplete bowel evacuation and disturbed sleep were reported, presenting a clinical picture suggestive of amavāta [Ma.Ni. 25.8–10] [6].

4. Timeline

See Fig. 1.

5. Diagnostic assessment

5.1. Diagnostic methods

5.1.1. Lab investigation

Human Leukocyte Antigen B27(FLAG-B27), C-Reactive Protein (CRP), Erythrocyte Sedimentation Rate (ESR) and Hemoglobin (Hb) were assessed.

5.1.2. Diagnostic criteria and outcome measures

Functionality, activity and metrology were assessed with: Bath Ankylosing Spondylitis Functional Index (BASFI) and Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) [10]. Anxiety and depression were assessed with: Zung Self-Rating Anxiety Scale (SAS) and Zung Self-Rating Depression Scale (SDS) [11].

5.2. Diagnostic challenges

The diagnosis of Ankylosing spondylitis was confirmed by the treating rheumatologist previously. We reviewed available reports and clinically assessed the patient to confirm the diagnosis. As the patient has a long medical history of forty years, older reports were not accessible, though relevant documents for confirming diagnosis could be accessed.

5.3. Diagnostic reasoning and differential diagnosis

Clinical examination and medical records confirmed that the patient met the ESSG (European Spondyloarthropathy Study Group) [12,13] criteria for diagnosis of AS with inflammatory spinal pain and sacroiliitis. Additionally the patient also tested HLA-B27
positive and the diagnosis was also confirmed by the treating rheumatologist.

We considered the probable modern diagnosis of Rheumatoid Arthritis due to the presence of symptoms like pain in the joints, shifting pain at times and stiffness. This diagnosis was excluded because ACR 1987 or ACR-EULAR 2010 criteria for RA was not met.

We considered the probable Ayurvedic diagnosis of majjaavṛtata (Vata affliction of the marrow), vataṭhadikavatāraka (Vata predominant type of vataraka — inflammatory disease of joints) and asthimajjaagatavatī (vata disorder affecting bone and marrow).

Majjaavṛtata was considered due to the bending of the body (vinamattā), twisting pain (pariveśa), and colic pain (sūla) seen in the patient, but he did not obtain relief of pain by deep pressing with fingers, which is a characteristic sign of this condition [A.H.Ni.St.16.37] [14].

Vataṭhadikavatāraka was considered due to the presence of following symptoms stiffness of joints and fingers (dhamanyugulī-santhinam sankocha), stiffness of body (angagraha) as well as aversion to and aggravation by cold (śītadeśavas被)anapashayau). However, the pain was not extreme (atīrūk) as seen in this condition. Also, other typical signs like throbbing (sphurana) dryness (raukṣyā), blackish discoloration (krishnavas被)ata) and increased (vṛddhi) or decreased (hāni) swelling (śopha) was not observed [A.H.Ni.St.16.12–13] [14].

Asthimajjaagatavatī was considered for differential diagnosis as the patient complained of pain in joints of fingers (parvābheda) pain in joints (sandhiśūla) sleeplessness (āsāvapana) and continuous...
pain (satataruk). But features of asthiyajāgatavatā like depletion of muscular mass (māṃsakṣaya), stabbings pains in bones (asthibhedā) or marked decrease in vitality and strength (balakṣaya) were not found to be the dominant symptoms in the course of the disease ruling out a primary diagnosis of asthimajāgatavatā. However, involvement of āsti and māja as a stage (avasthā) of disease progression was possible considering the chronicity of the disease [Ca.Ci.St.28.33] [15].

This case was diagnosed as ānavatā [Ma.Ni. 25.5–10] [6] based on matching of clinical symptoms with textual descriptions such as involvement of sacroiliac joints, stiffness of the axial skeleton as seen in arthritis, and diminution of physical performance (vasthi) with decreased appetite (aśītī). The symptoms persisted even during the follow up period, while it may worsen in others. Most people are able to remain functional, though quality of life is affected [16]. The present patient had developed long term dependency on NSAIDs, painkillers and steroids. Inflammatory markers continued to be raised and his quality of life was affected.

5.4. Prognostic outlook

The outlook for patients suffering from Ankylosing spondylitis is variable and life expectancy is affected only in those patients who are in a stage (avasthā) of disease progression where the disease process is progressing, while it may worsen in others. Most people are able to remain functional, though quality of life is affected [16]. The present patient had developed long term dependency on NSAIDs, painkillers and steroids. Inflammatory markers continued to be raised and his quality of life was affected.

6. Therapeutic interventions

6.1. Types of interventions (modern pharmacological)

At the time of Ayurvedic consultation the patient was taking Predmet 2 mg (Steroids), per day and Etooshine 90 mg (NSAID), Sazo 500 mg and Izra 40 mg once in 24 h.

6.2. Types of intervention (traditional, complementary, alternative medicine)

Amapacana (use of digestive), sramsana (laxatives), snehana (treatment for inducing unctuousness) and brhmhana (treatment for nourishment of bodily tissues) were done with both internal medicines and external therapies along with diet which included early dinner and specific dietary advice like avoiding potato, brinjal, raw salads, green peas, chickpea, soybeans, lentils, curds and to include boiled vegetables in the diet during the hospital stay. He was advised not to work for extended hours. He was also counselled on work related stress management. He was advised not to sleep during day time and not stay awake for long hours at night. During his stay in the hospital, he underwent five sessions of counselling which included behaviour modification therapy and motivation counselling. Further, he also practiced Yoga and IAM Technique® (Integrated Amrita Meditation Technique®) for twenty days [17,18]. Each IAM session is of twenty minutes duration and consists of a combination of exercises and yogic postures, followed by meditation. The technique integrates movement, breath, sound and visualization. These practices were avoided during the days of administration of purgatives and medicated enema.

6.3. Administration of therapeutic intervention

6.3.1. Internal medications

Treatment started with āmapacana medications such as ānavatāraśčāṣṭāya, nimbāṃrūtāya [A.H. Clst. 21.58–61] [14], paṇcakolayāṇavā [C.Su. St. 2.18] [15] paṇcakolapāṇiyāṇ [A.H. Clst. 3.46] [14], sādhanaśvātiśāya [A.H. Clst. 21.45–47] [14] and dasāmuḥalatāki [A.H. Clst. 17.14–16] [14]. Kāncanāraguggulū [Bh.Ra. Calogandadi Adhikara.p.583. 64–69] [19] was added as a support medication for hypothyroidism based on clinical experience. Meanwhile, as the frequency of use of NSAIDs and corticosteroids was decreased to once in 36 hours, the patient started experiencing burning sensation under the feet. Trayodashāroguggulū [Bh.Ra. Varavādyadi Adhikara.p.382. 99–101] [19] was given internally. He was also advised to apply Kālas jeewan ointment (Coconut oil (Cocos Nucifera), Pandhari Ral (Shorea robusta) resin, candan taila (Santalum Album) essential oil, Bhimsen Kapoor (Camphor) flakes, Shankhijire (Talc) powder, Kadunimb (Azadirachta indica) leaves kadhā, Gokhāri (Tribulus terrestris) fruit kadhā, Doorva (Cynodon dactylon) panchang kadhā, Pahadnoo (Cissampelos pareira) roots kadhā, Sudhajal (Calixium hydroxide), which he was already using occasionally. As the patient had incomplete bowel evacuation, nimphāṃrūtāya (A.H. Clst. 21.58–61) [14], Abhayārīṣṭam [Bh.Ra. Arshoroda Adhikara.p.226.175–180] [19], Dāsāmārūtāya [Shu.Sa.Ma.Kh.6.78–92] [20] and dhāvanātāraguggulū [S.V. Gilka Prakarana. p. 427] [21] were given. For disturbed sleep and anxiety, Sārūvatāṭāya [Bh.Ra. Rasāyana Prakarana.p.775. 192–199] [19] Manasātramvaṭāya [S.V. Gilka Prakarana. p. 437] [21] and Susuptikārupa were administered. See Table 2 for complete list of internal medications.

6.3.2. External treatments

The treatment started with rūkṣāna (inducing dryness), and was achieved with dhāvanāyādharā (fermented sour liquid made out of grains) [A.H. Su. St. 17.6–7] [14], Chinchadi Tailam (Medicated oil) [S.V. Taila Prakarana.p. 485, 486] [21] and Kottamchukkadi Tailam (Medicated oil) [S.V. Taila Prakarana.p. 481] [21] were applied sparingly prior to the treatment to prevent excess rūkṣānan. After this, snehana (inducing unctuousness) procedure was administered with jambhirapāṇiśveda with Dhanwartara Tailam (Medicated oil) [S.V. Taila prakarana.p. 496] [21] and Karpasasthya Tailam (Medicated oil) [S.V. Taila prakarana.p. 479] [21] as well as patrapāṇiśveda [22], with Dhanwartara Tailam (Medicated oil) [S.V. Taila prakarana.p. 496] [21]. This was followed with Sarvanga Abhyanga and Bhashpa Sweda [A.H. Su. St. 18.59] [14] (Whole body oil massage and steam fomentation) with kottamchukkadi Tailam (Medicated oil) [S.V. Taila prakarana.p. 481] [21]. Internal administration of pācana (digestive) medicines aimed to neutralise the āma (harmful metabolic by products). Accumulated wastes after the process of digestion were eliminated by sramsana (laxatives). After these procedures, treatments were done to normalise the bowel movements and the functions of apanaāvata. This was achieved by the administration of Niruha and amvāsana vasti [Bh.Ra. Varavādyadi Adhikara.p.396–397.332–342] [19]. This treatment also addressed the vata imbalance and prepared the patient for brhmhana (treatment for nourishment of bodily tissues) treatment. Śaṣṭī-kāśīlēpāṇiśveda [22] (fomentation with śaṣṭīkāśīlē rice and milk) was administered in the last phase of the treatment to nourish and strengthen the muscles, bones and joints.

See Table 2 for complete list of external medications administered.

6.3.3. Changes in interventions with explanations

Paṇcakolayāṇavā (Rice gruel medicated with paṇcakola) was changed to paṇcakolatāyapāṭikā (Water boiled with paṇcakola) as the patient was not able to take it. Kāncanāraguggulū was replaced with trayodashāroguggulu for better management of joint pain. The other treatments were administered in logical sequence starting with mild rūkṣāna followed by snehana, pācana, sramsana, vasti and brhmhana.

6.3.4. Treatments during the follow up period

During the follow up period, the goal of treatment was to balance āma digesting (āmapacana) treatment and dōṣa pacifying treatment (dōṣāsamaṇa) with nutritive treatment (brhmhana). Śad-dhāranācūrṇa [A.H. Clst. 21.45–47] [14], Guggulustikātam Kaśyām...
Table 1
Administration of internal medicines (dosage, strength, duration).

| Date           | Rationale                                      | Medicines                                      | Dosage                     | Adjuvant               | Duration |
|----------------|-----------------------------------------------|-----------------------------------------------|----------------------------|-------------------------|----------|
| 15/10/2019 to 18/11/2019 | Amapācanam (digestion of harmful metabolites) and To pacify Pitta Support for hypothyroidism | Amapācanam (500 mg) and Nimbāntāsavanam (300 mg) and Daismalalharitaki | 15 ml twice daily before food and 1 tab twice daily after food and 25 ml twice daily after food and 5 g at bed time | With warm water and Along with Nimbāntāsavanam and Warm water | 33 days 12 days 33 days |
| 21/10/2019 to 25/10/2019 | To address ever burning sensation | Kailas jeevan (50 ml) and Dīpanapācana | 350 g at lunch time and 1 L to be taken through out the day in sips | — and — | 2 days |
| 24/10/19 | For reducing, inflammation, swelling and for bowel clearance | Paricakolayapakā | 1 tab twice daily after food | Warm water | 25 days |
| 25/10/2019 to 18/11/2019 | For mental stress and disturbed sleep | Sādhantaracira and To address joint pain | 5 g twice daily before food and 1 tab twice daily after food | Along with Amapācanam | 24 days |
| 31/10/2019 to 6/11/2019 | Patient complained of bloated abdomen, flatulence and discomfort in sitting as well as pain in the abdomen and back | Abhayāyāṣṭa and Dhāṅvāntaraṇa Gufākā (125 mg) and Paricakolayapakā | 5 ml at bedtime and 1 L to be taken through out the day in sips | Warm water | 7 days |
| 3/11/2019 to 18/11/2019 | For mental stress and disturbed sleep | Abhayāyāṣṭa | 25 ml twice daily after food and 1 tab twice daily after food | — and — | 16 days 15 days |
| 5/11/2019 to 18/11/2019 | To address flatulence and facilitate downward movement of Vāta | Dāsamalāraṣṭa and Mānasamitravatikā | 12.5 ml twice daily after food and 25 ml twice daily at 5 pm and at 8 pm | with Abhayāyāṣṭa and — | 13 days 7 days |
| 11/11/2019 to 18/11/2019 | For mental stress and disturbed sleep | Dāsamalāraṣṭa | 5 ml at bedtime and 1 tab at 5 pm and at 8 pm | Along with Mānasamitravatikā | 7 days 7 days |
|                        |                                               | Suṣuptikārāpaka (nutmeg with milk) | 50 ml at bedtime | — | 7 days |

As assessments done before treatment (BT) and after treatment (AT) in the patient revealed that BASFI score was 6.1 (BT) and 4.8 (AT), BASDAI score was 4 (BT) and 2.8 (AT). The Lab investigations done before treatment (BT) and after treatment (AT) in the patient revealed that ESR was 103 mm/h (BT) and 95 mm/h (AT), CRP was 37.5 mg/L (BT) and 25.9 mg/L (AT), Hb was 9.7 g/dl (BT) and 10.1 g/dl (AT), T3 was 80 mIU/L (BT) and 89 mIU/L (AT), TSH was 48.59 μIU/mL (BT) and 52.69 μIU/mL (AT). At the time of discharge from the hospital, the patient had lost four kilos, but he was still in the overweight category with BMI of 27.1 kg/m².

See Table 3 for details of follow up medications.

7. Follow up and outcomes

7.1. Clinician assessed outcomes

The patient assessed intensity of pain using the VAS. He reported moderate pain before starting treatment and no pain after the treatment. Patient also self assessed anxiety using the Zung Self-Rating Anxiety (SAS), which gave a score of 80 before treatment suggestive of moderate depression and 43 after treatment suggestive of little or not depression.

7.2. Patient assessed outcomes

The patient underwent lab investigations, and the following are the results after 12 months of discharge- CRP was 15.7 mg/L, ESR was 10 mm/1hr, HB was 12 g/dl, T3 was 72.31 ng/dl, T4 was 6.64 μg/dl, TSH was 1.57081 mIU/L.

The patient consulted telephonically after 4 months, 7 months and 12 months of being discharged from the hospital. At the last telephonic follow up, the patient had decreased the frequency of...
administration of NSAID, DMARD and Proton Pump Inhibitor to once in 84 h and steroids to once in a week.

Table 5 gives details of the tapering of allopathic medications.

### 7.4. Intervention adherence and tolerability

Initially patient had difficulty in tolerating the diet in the form of medicated gruel which was later modified to medicated water. Otherwise, the patient adhered to the entire treatment and dietary regimen.

### 7.5. Adverse and unanticipated events

No adverse events were reported during the entire course of the treatment.

Intervention adherence and tolerability as well as adverse and anticipated events were assessed by interrogation of the patient.

### 8. Discussion

#### 8.1. Strengths and limitations in the approach to treating this case

Limitations: All the assessments to evaluate the particular case before and after treatment could not be done. The allopathic medications could not be completely weaned off after the first course of treatment. Physical assessment could be done only after three months after discharge. Thereafter, the follow up assessments were done virtually. It is possible that hypothyroidism and prolonged use of steroids could have masked symptoms and interfered with clinical assessment of muscle wasting and reflexes.

Strengths: This case report demonstrates the benefits of integrative approach to treat Ankylosing Spondylitis adding Ayurveda, counselling, Yoga and IAM Technique® to standard of care. The patient got considerable relief from the symptoms, especially pain and stiffness of joints which in turn helped to taper the dose of allopathic medications that the patient was dependent on for more than twenty years. After one course of hospitalization, the quality of life of the patient improved significantly and his anxiety levels were reduced markedly.

#### 8.2. Discussion of the relevant medical literature

Research papers in indexed and peer reviewed journals exploring the role of Ayurveda in management of AS are scarce. PubMed search returns only three results. Falkenbach and Oberguggenberger have pointed out that there is no association between a certain *dosa* imbalance and the manifestation or severity of AS. However, they referred to symptoms and signs of *vāta*, *pitta* and *kapha* proposed by Rudolph in 1997 and apparently did not consult with experienced Ayurveda clinicians [7]. Two case reports have highlighted the benefits of *dosa* assessment in developing a treatment plan for management of AS. SK Singh and Khipra Rajoria reported substantial clinical improvement in a patient suffering from AS following Ayurvedic treatment for *arthitājāgātavatā* — *vāta* disorder involving bone and bone marrow [8]. Mukesh Edavalath has reported the beneficial outcomes of Ayurvedic intervention for *anavata* in curbing the progression of AS [23]. In both cases, the involvement of *vāta* *dosa* was found to be an important element in the pathogenesis, addressing, which led to favourable outcomes. In the present case, we found that addressing *vāta* *dosa* resulted in clinical improvement and significantly reduced dependence on pain killers and steroids. However, the two published case reports dealt with AS patients with different clinical presentation, age group as well as chronicity of the disease. Our case report presents the outcomes in an elderly AS patient with a long duration of forty years of active disease and prolonged use of steroids, NSAIDs and DMARDs. Outcomes of

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### Table 2

| Date               | Therapeutic interventions with explanations | Interventions                                      | Quantity used for treatment | Duration |
|--------------------|---------------------------------------------|---------------------------------------------------|-----------------------------|----------|
| 15/10/2019 to 21/10/2019 | For ānhyātyukṣātavā (inducing dryness externally) and vātātuṣulomanam (facilitating movement of vāta) | dhānyā Malta hārī (Pouring of liquid made by fermenting grains over the body) | Approx. 5 L/day | 7 days |
| 22/10/2019 to 26/10/2019 | For bāhu (external) snehana (unctuous therapy) and śvēdana (fommentation) | Patrāpiṣaṇavāda (Leaf bolus fommentation) with Dhāvantaraṭālaṇam (Medicated oil) — 30 min | Approx. 20 mL/day | 5 days |
| 27/10/2019 to 03/11/2019 | For bāhu (external) snehana (unctuous therapy) and śvēdana (fommentation) | Pāṃjirākṛtapatrapāṇavāda (Leaf bolus fommentation with lemon) with Dhāvantaraṭālaṇam + Kāraṇāṣṭhāyaṭālaṇam — 30 min | Approx. 20 mL/day | 8 days |
| 4/11/2019          | For bāhu (external) snehana (unctuous therapy) and śvēdana (fommentation) | Sarvāṇyābyarṣa (whole body massage) with Kottāraṭaṭālaṇam 30 min and bāpasaṭva (steam fommentation) — 10 min | Approx. 120 mL/day | 1 day |
| 4/11/2019          | For cleansing of bowels before vāṣi (medicated enema) | Śrāmamana (mild purgation) | Nirbāmāṭāla Eroṇḍa 50 mL with 1 glass of milk at 7 am | 1 day |
| 6/11/2019 to 13/11/2019 | Ardhānatīrakā vāṣi (A type of decoction enema + medicated oil enema) | Anuvāsaṇa vāṣi (Enema with medicated oil) — immediately after lunch | Approx. 20 mL/day | 5 days |
|                   |                                            | Nīrīha vāṣi (Decoction enema) — 8 am in empty stomach |                            |          |
| 12/11/2019 to 18/11/2019 | Bowels was evacuated but not satisfactory | Local oil massage with Dhāvantaraṭālaṇam around the umbilicus in circular motion followed by fommentation with a hot water bag — 10 min | Approx. 10—15 mL/day | 7 days |
| 14/11/2019 to 18/11/2019 | For nourishing and strengthening the joints and muscles | Svedānmaṇḍuṭiṣa vāṣa (Rice bolus boiled in milk with roots of *Sida rhombifolia* var. retusa) with Dhāvantaraṭālaṇam — 45 min | Approx. 20 mL/day | 5 days |
Ayurvedic treatment in such a patient group of AS has not been reported before. Descriptions resembling AS are referred to as the guideline to formulate the treatment in our patient. His digestion, appetite is good, bowel movements are better and Sleep is better.

24-10-2020 to till date
Appetite increased, Sleep is better.

Table 3
Follow-up and outcomes.

| Date       | Important follow-up                        | Diagnostics and other test results | Interventions                                      | Dosage                                      | Adjuvant                  | Duration |
|------------|--------------------------------------------|------------------------------------|---------------------------------------------------|---------------------------------------------|---------------------------|----------|
| 20-3-2020  | Patient consulted                           | CRP – 7.9 mg/dL, ESR – 40mm/1hr, HB-11.4 g/dL, T3-74 ng/dL, T4 – 74ug/dL | Sādhakaṇuvarācāra | 1 tsp twice daily after food | With warm water | 198 days |
|            | telephonically after 7 months from getting discharged. | Patient was feeling much lighter as he reduced 4 Kgs of weight and was maintaining it, flexibility of joints were better, pain in all the joints were reduced, sleep was sound, bowels were regular. The time interval between two doses of all the modern medications were increased to 48 h from 40 h. | Guggulitiktakaṭaṭaśāyana | 15 ml twice daily before food | 45 ml with warm water | 198 days |
|            | from getting discharged.                 |                                    | Kānchana A ṇggu ṽula | 1 tab twice daily before food. | With warm water | 198 days |
|            |                                           |                                    | Saraswatārtaśālaṁ | 25 ml twice daily at 5 pm and at 8 pm | With Sarasa ṭwatārtaśālaṁ | 198 days |
|            |                                           |                                    | Mandura Vatakam (250 mg) | 1 tab twice daily after food. | With warm water | 198 days |
|            |                                           |                                    | Mānuṣa Mira ṽatakam (125 mg) | 1 tab twice daily at 5 pm and at 8 pm | With Sarasa ṭwatārtaśālaṁ | 198 days |
|            |                                           |                                    | Tab. Brōhami (1 mg) | 1 tab twice daily after food | With warm water | 198 days |
|            |                                           |                                    | Nimbambārdi Eranda (Medicated oil) | 10 ml at bedtime | With warm water | 198 days |
|            |                                           |                                    | Dīhanavantaram Tailaṁ (Medicated oil) – 10 min | External application around the umbilical region (Approx. 10 | With warm water | 198 days |
| 3-6-2020   | Improvement in the climbing up the stairs without much strain, Flexibility – able to sit in Padmasana Improvement in general disability. Which he was not able to for many years. His digestion, appetite is good, bowel movements are better and Sleep is better. | No investigations were advised | Maharārāṇi Kashāyaṁ | 15 ml twice daily before food | 45 ml with warm water and warm milk | 142 days |
|            |                                           |                                    | Aṅgukūmara Rasa (125 mg) | 1 tab twice daily before food. | Taken along with Kashāyaṁ | 142 days |
|            |                                           |                                    | Simhānanda Gṛgbūla (300 mg) | 1 tab twice daily after food. | With warm water | 142 days |
|            |                                           |                                    | TāṬaṭaṇa (1 mg) | 1 tab twice daily after food | With warm water | 142 days |
|            |                                           |                                    | Ṭasabīgol | 10 g at bed time | with warm water | 142 days |
|            |                                           |                                    | Śwarma Gṛgbūla (125 mg) | 1 tab at bedtime | With warm water | 142 days |
| 24-10-2020 | Appetite increased, Sleep is better.       | CRP – 15.7 mg/L, ESR – 8mm/1hr, HB-72.31 mg/dL, T3-6.64 μg/dL, TSH/-1.5081 μIU/ml | Dīhanavantaram Tailaṁ + Ṭotuṇcakūkāṭīṭaṭaṁ | External application, (Approx. 10–15 ml/day) | With warm water | 240 days |
| to till date| The time interval between two doses of DMARD AND NSAID medications were increased from 72 h to 84 h and the duration of corticosteroids from once in 72 h to once in a week. | Gṛgbūla ṭiktakaśaśāyaṁ | Gṛgbūla ṭiktakaśaśāyaṁ | 15 ml twice daily before food | With warm water | 240 days |
|            |                                           | Kānchana āṅggu būla (500 mg) | 2 tsp morning in empty stomach | 1 tab twice daily after food. | With Kashāyaṁ | 240 days |
|            |                                           | ṬrāṬolokya Viṭṭha Vati (125 mg) | Saraswatārtaśālaṁ | Once in a 30 h | With warm water | 240 days |
|            |                                           | Mānuṣa mītra vatakam (125 mg) | Saraswatārtaśālaṁ | Once in a 30 h | With Sarasa ṭwatārtaśālaṁ | 240 days |

Ayurvedic treatment in such a patient group of AS has not been reported before. Descriptions resembling AS are referred to as the guideline to formulate the treatment in our patient. Langhāna (depleting therapy) along with svedaṇa (fomentation therapy), dipana (digestive stimulants) and herbs with bitter and pungent taste are administered in the first phase. This is to be followed by virecana (purgation), administration of sneha (medicated fats) and vusti (medicated enema).

8.3. The rationale for the conclusions

The clinical presentation of AS is described in the Madhavanidana [Ma.Ni. 25.5–10] [6], a classical Ayurvedic text devoted to diagnosis of diseases. In Cakradatta [24], the line of treatment for amavātā has been well described, which was referred to as the guideline to formulate the treatment in our patient. Langhāna (depleting therapy) along with svedaṇa (fomentation therapy), dipana (digestive stimulants) and herbs with bitter and pungent taste are administered in the first phase. This is to be followed by virecana (purgation), administration of sneha (medicated fats) and vusti (medicated enema).

| Date  | DMARD | NSAID | Corticosteroid | Proton Pump Inhibitor |
|-------|-------|-------|----------------|-----------------------|
| 2017  | Twice in 24 h | Twice in 24 h | Twice in 24 h | Twice in 24 h |
| 2018  | Twice in 24 h | Twice in 24 h | Twice in 24 h | Twice in 24 h |
| 17/10/19 | Once in 24 h | Once in 24 h | Once in 24 h | Once in 24 h |
| 18/10/19 | Once in a 30 h | Once in a 30 h | Once in a 30 h | Once in a 30 h |
| 20/10/19 | Once in a 36 h | Once in a 36 h | Once in a 36 h | Once in a 36 h |
| 22/10/19 | Once in a 30 h | Once in a 30 h | Once in a 30 h | Once in a 30 h |
| 29/10/19 | Once in a 31 h | Once in a 31 h | Once in a 31 h | Once in a 31 h |
| 2/11/19  | Once in 36 h | Once in 36 h | Once in 36 h | Once in 36 h |
| 10/11/19 | Once in 40 h | Once in 40 h | Once in 40 h | Once in 40 h |
| 10/12/19 | Once in a 48 h | Once in a 48 h | Once in a 48 h | Once in a 48 h |
| 20/03/20 | Once in a 72 h | Once in a 72 h | Once in a 72 h | Once in a 72 h |
| 24/10/20 | Once in 84 h | Once in 84 h | Once in a Week | Once in 84 h |

Corticosteroid – Predment (Methylprednisolone) 2 mg, NSAID – Etoshine (Etoricoxib 60 mg + Thiocolcicoside 4 mg), DMARD – Sazo (Sulfasalazine) 500 mg, Proton Pump Inhibitor – Ira (Esomeprazole) 40 mg.
to the joints and increase in vata. In the acute stage of the disease, treatment has to address ama by administering rukṣaṇa ((inducing dryness) interventions. However, in the chronic stage, drastic rukṣaṇa measures can aggravate vata and so rukṣaṇa procedures were done with use of oils sparingly. The Ayurvedic treatment targeted the underlying chronic ama (metabolic aberrations that trigger inflammation). This was achieved by treatments like pācana (digestives), rukṣaṇa and sā mansa (administration of laxatives). This resulted in the reduction of inflammatory markers like CRP and ESR. Clinically the patient experienced reduction in pain, which was a positive outcome considering the prognostic outlook of the disease. This was followed by snehana (inducing unctuousness) and bṛmha (nourishing and strengthening the body) which mitigated vata. Clinical improvement of stiffness and improvement in flexibility was observed after bṛmha treatment. Considering the samprāpti of ama vata, the treatment strategy adopted was the digestion and removal of ama from the system in the first phase. Simultaneously, dietary modifications and lifestyle adjustments including counselling were done to prevent further development of ama. In the last phase, vata dosha was addressed following bṛmha line of treatment.

8.4. Primary take away lessons from this case report

Chronic illnesses like Ankylosing spondylitis create dependence on anti-inflammatory drugs, pain killers and steroids, which can have side effects. Withdrawal of medication can lead to flare up of the symptoms. This case report points to the benefits of adding Ayurveda, Yoga and IAM Technique® meditation with standard of care that helped the patient to reduce the frequency of use of NSAID, DMARD and steroids and also achieve improvement in clinical symptoms and quality of life. Integrative care should be considered as an option in chronic AS patients with long term dependence on medications.

9. Patient perspective

"It used to be difficult for me to climb even 2–3 floors which I can easily do now. My flexibility has improved and daily routine is comfortable at present compared to October 2019 when I first visited the hospital. I used to take allopathic medicines everyday but after the treatment and the lifestyle modifications, I take medicines once in 72 hours now which I feel is a great achievement for me. I would say, compared to October 2019 I can feel 25–30% improvement in my condition. My whole routine has changed, flexibility has improved and subsequently the comfort level has improved. The practicing Yoga exercises on the floor was not possible before but now I am able to do it comfortably. This is the prominent change I can observe. In Yogasana, I was not able to do Padmāsana or Vajrāsana but now I can do it for half an hour. There have not been any adverse effects of the treatment. I am grateful to my Doctors and their staff for helping me improve my health. The result is also evident in the investigations after discharge from hospital. The results are explaining everything”.

Informed consent

Informed consent was obtained from the patient for publication of de-identified medical information.

Author contributions

Naranappa Salethoor Sushma: Writing — Original Draft, Kulangara Shyamasundaran: Visualization, Validation, Edamala Narayanan Prajeesh Nath Resources, Formal Analysis, Rammann Puthiyedath: Writing — Review and Editing.

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Declaration of competing interest

None.

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