



Case Report

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



Naranappa Salethoor Sushma, Kulangara Shyamasundaran,
Edamala Narayanan Prajeesh Nath, Rammanohar Puthiyedath *

Amrita School of Ayurveda, Amrita Vishwa Vidyapeetham, Kollam, Kerala 690525, India

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ABSTRACT

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.

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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.

* Corresponding author.

E-mail: rammanoharp@gmail.com

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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 2017, he was on an integrated management with allopathic (painkillers only used for extreme pain) and homeopathy medications. He was unable to recollect the details of homeopathic treatment. Though he responded well to this treatment initially, his ESR values remained high. Therefore, he started allopathic medications such as Predmet 2 mg (Steroids) per day, Etoshine 90 mg (NSAID), Sazo 500 mg (DMARD) and Izra 40 mg (Proton Pump Inhibitor) twice in 24 h from 2017 to 2019 until he approached us. Patient reported obtaining only short term symptomatic relief with the above medications. Climbing stairs and standing up from sitting posture aggravated the pain while painkillers, continuous movements, Yoga and meditation were the relieving factors.

He was diagnosed with Hypothyroidism in 2017, and was on Thyronorm 125 mg per day for 13 months and thereafter 75 mg for five months when he discontinued the medication. For six months prior to his first visit, he was not taking Thyronorm and presented with elevated levels of TSH. We advised him to continue Thyronorm and monitor Thyroid Function Tests.

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 *amavata* [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(HLA-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 Spondyloarthritis Study Group) [12,13] criteria for diagnosis of AS with inflammatory spinal pain and sacroiliitis. Additionally the patient also tested HLA-B27



Fig. 1. Timeline.

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 *majjāvṛtvāta* – (*Vāta* affliction of the marrow), *vātādhikavātarakta* (*Vāta* predominant type of *vātarakta* – inflammatory disease of joints) and *asthimajjāgatavāta* (*vāta* disorder affecting bone and marrow).

Majjāvṛtvāta was considered due to the bending of the body (*vinamatā*), twisting pain (*pariveṣṭana*), and colic pain (*śūla*) 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].

Vātādhikavātarakta was considered due to the presence of following symptoms stiffness of joints and fingers (*dhamanyangulisandhinam sankocha*), stiffness of body (*angagraha*) as well as aversion to and aggravation by cold (*śitadveshānupashayau*). However, the pain was not extreme (*atiruk*) as seen in this condition. Also, other typical signs like throbbing (*sphurana*) dryness (*rauکشya*), blackish discoloration (*kṛishnatvashyavata*) and increased (*vṛiddhi*) or decreased (*hāni*) swelling (*śopha*) was not observed [A.H.Ni.St.16.12–13] [14].

Asthimajjāgatavāta was considered for differential diagnosis as the patient complained of pain in joints of fingers (*parvabheda*) pain in joints (*sandhiśūla*) sleeplessness (*asvapana*) and continuous

pain (*satataruk*). But features of *asthimajjāgatavāta* like depletion of muscular mass (*māmsakṣaya*), stabbing pains in bones (*asthibheda*) 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 *asthimajjāgatavāta*. However, involvement of *asthi* and *majjā* 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 *āmavāta* [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 well as involvement of the other joints with chronic inflammation.

5.4. Prognostic outlook

The outlook for patients suffering from Ankylosing spondylitis is variable and life expectancy is affected only in those patients who develop complications. In some patients, the disease may stop 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, pain-killers 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 Etoshine 90 mg (NSAID), Sazo 500 mg and Izra 40 mg once in 24 h.

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

Āmapācana (use of digestives), *sraṃsana* (laxatives), *snehana* (treatment for inducing unctuousness) and *bṛṃhaṇa* (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 *āmapācana* medications such as *āmavātārikaśāyam*, *nimbāmṛtāsava* [A.H. Ci.St. 21.58–61] [14], *pañcakolayavāgu* [C.Su.St. 2.18] [15] *pañcakolapānīyam* [A.H.Su.St. 3.46] [14], *śaḍdharaṇacūrṇam* [A.H.Ci.St. 21.45–47] [14] and *daśamūlaharīṭaki* [A.H.Ci.St.17.14–16] [14].

Kāncanāraguggulu [Bh.Ra.Galagandadi 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. *Trayo-daśāṅgaguggulu* [Bh.Ra.Vatavyadhi Adhikara.p.382. 99–101] [19] was given internally. He was also advised to apply *Kailas jeevan* ointment [Coconut oil (*Cocos Nucifera*), *Pandhari Ral* (*Shorea robusta*) resin, *čandan taila* (*Santalum Album*) essential oil, *Bhimseni Kapoor* (*Camphor*) flakes, *Shankhji* (*Talc*) powder, *Kāḍunimb* (*Azadirachta indica*) leaves *kadha*, *Gōkharu* (*Tribulus terrestris*) fruit *kadha*, *Doorva* (*Cynodon dactylon*) *panchāṅg kadha*, *Pahadmool* (*Cissampelos pareira*) roots *kāḍha*, *Sudhajal* (*Calcium hydroxide*)], which he was already using occasionally. As the patient had incomplete bowel evacuation, *nimbāmṛtādi eraṇḍa* [A.H.Ci.St. 21.58–61] [14], *Abhayāriṣṭam* [Bh.Ra.Arshoroga Adhikara.p.226.175–180] [19], *Daśamūlāriṣṭam* [Sha.Sa.Ma.Kh. 6.78–92] [20] and *dhānvantaramguṭikā* [S.Y. *Gulika Prakarana*. p. 427] [21] were given. For disturbed sleep and anxiety, *Sārasvatāriṣṭam* [Bh.Ra. *Rasāyana Prakarana*.p.775. 192–199] [19] *Mānasamitravaṭakam* [S.Y. *Gulika Prakarana*. p. 437] [21] and *Suṣup-tikṣṛapāka* were administered. See Table 1 for the complete list of internal medications.

6.3.2. External treatments

The treatment started with *rūkṣaṇa* (inducing dryness), and was achieved with *dhānyāmladhārā* (fermented sour liquid made out of grains) [A.H.Su.St. 17.6–7] [14]. *Chinchadi Tailam* (Medicated oil) [S.Y. *Taila Prakarana*.p. 485, 486] [21] and *Kottamchukkadi Tailam* (Medicated oil) [S.Y. *Taila prakarana*.p. 481] [21] were applied sparingly prior to the treatment to prevent excess *rūkṣaṇam*. After this, *snehana* (inducing unctuousness) procedure was administered with *jambīrapiṇḍasveda* with *Dhanwantara Tailam* (Medicated oil) [S.Y. *Taila prakarana*.p. 496] [21] and *Karpasasthyadi Tailam* (Medicated oil) [S.Y. *Taila prakarana*.p. 479] [21] as well as *patrapīṇḍasveda* [22], with *Dhanwantara Tailam* (Medicated oil) [S.Y. *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.Y. *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 *sraṃsana* (laxatives). After these procedures, treatments were done to normalise the bowel movement and the functions of *apānavāta*. This was achieved by the administration of *Nirūha* and *anuvāsana vasti* [Bh.Ra. *Vatavyadhi Adhikāra*.p.396–397.332–342] [19]. This treatment also addressed the *vāta* imbalance and prepared the patient for *bṛṃhaṇa* (treatment for nourishment of bodily tissues) treatment. *Ṣaṣṭi-kaśālipīṇḍasveda* [22] (fomentation with *ṣaṣṭikaśāli* 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 treatments administered.

6.3.3. Changes in interventions with explanations

Pañcakolayavāgu (Rice gruel medicated with *pañcakola*) was changed to *pañcakolatoyapāka* (Water boiled with *pañcakola*) as the patient was not able to take it. *Kāncanāraguggulu* was replaced with *trayodaśāṅgaguggulu* for better management of joint pain. The other treatments were administered in logical sequence starting with mild *rūkṣaṇa* followed with *snehana*, *pācana*, *sraṃsana*, *vasti* and *bṛṃhaṇa*.

6.3.4. Treatments during the follow up period

During the follow up period, the goal of treatment was to balance *āma* digesting (*āmapācana*) treatment and *doṣa* pacifying treatment (*doṣaśamana*) with nutritive treatment (*bṛṃhaṇa*). *Ṣaḍdharaṇacūrṇam* [A.H.Ci.St. 21.45–47] [14], *Guggulutiktakam* *Kaśāyam*

Table 1
Administration of internal medicines (dosage, strength, duration).

Date	Rationale	Medicines	Dosage	Adjuvant	Duration
15/10/2019 to 18/11/2019	Āmapācanam (digestion of harmful metabolites)	Āmavātārikaśāyam	15 mL twice daily before food	45 mL of warm water	33 days
	Āmapācanam (digestion of harmful metabolites) and Srotoviśodhana (Clearing the channels)	Kaiśoraguggulu (500 mg)	1 tab twice daily after food.	With warm water	12 days
	To pacify Pitta	Nimbāmṛtāsavam	25 mL twice daily after food	–	33 days
	Support for hypothyroidism	Kāncanāraguggulu (500 mg)	1 tab twice daily after food	Along with Nimbāmṛtāsavam	10 days
21/10/2019 to 25/10/2019	For reducing, inflammation, swelling and for bowel clearance	Daśamūlaharītākī	5 g at bed time	Warm water	33 days
	To address evert burning sensation under the feet	Kailas jeevan (Q,S)	External application over the feet	–	5 days
	24/10/19	Dīpanapācana (Appetising and digestive)	Pañcakolayavāgu	350 g at lunch time	–
25/10/2019 to 18/11/2019	Pañcakolayavāgu was changed to Pañcakolatoyapāka as it was not palatable for the patient.	Śaḍdharaṇacūrṇa	5 g twice daily before food	Along with Āmavātārikaśāyam	24 days
	Kāncanāraguggulu was changed to Trayodaśāṅgaguggulu for addressing joint pain. Śaḍdharaṇacūrṇa was added to Āmavātārikaśāya to address Vāta in Āmāśaya	Pañcakolatoyapāka	1 L to be taken through out the day in sips	–	2 days
		Trayodaśāṅgaguggulu (500 mg)	1 tab twice daily after food	Warm water	25 days
31/10/2019 to 6/11/2019	Daśamūlaharītākī was replaced with Niṃbāmṛtādi Eraṇḍam as the patient complained of constipation	Niṃbāmṛtādi Eraṇḍam	5 mL at bedtime	Warm water	7 days
3/11/2019 to 18/11/2019	Patient complained of bloated abdomen, flatulence and discomfort in sitting as well as pain in the abdomen and back	Abhayāriṣṭam	25 mL twice daily after food	–	16 days
		Dhānvantaram Guṭīkā (125 mg)	1 tab twice daily after food	Along with Abhayāriṣṭam	15 days
5/11/2019 to 18/11/2019	To address flatulence and facilitate downward movement of Vāta	Daśamūlāriṣṭam	12.5 mL twice daily after food	with Abhayāriṣṭam	13 days
11/11/2019 to 18/11/2019	For mental stress and disturbed sleep	Sārasvatāriṣṭam	25 mL twice daily at 5 pm and at 8 pm	–	7 days
		Mānasamitravaṭakam (125 mg)	1 tab at 5 pm and at 8 pm	Along with Sārasvatāriṣṭam	7 days
		Suśuptikṣirapāka (nutmeg with milk)	50 mL at bed time	–	7 days

[A.H.Ci.St. 21.57–60] [14], Mahārāsnādi Kaśāyam [Sha.Sa.Ma.Kh. 2.89–94] [20], Agnikumārārasam [Bh.Ra.Agnimandhya Adhikara.p.232.32] [19] and Simhanādaguggulu [Bh.Ra.Amavata Adhikara.p.486.16] [19] were administered in different stages for digesting residual āma and pacifying doṣas. niṃbāmṛtādi eraṇḍa [A.H.Ci.St. 21.58–61] [14] and Isabgol [Plantago ovata] were administered to ease bowel movements. Brāhmī Tab [Brahmi(Bacon monnieri) wh.pl], Tagara [C.Su.St. 26.65] [15], Sārasvatāriṣṭam [Bh.Ra. Rasayana Prakarana.p.775. 192–199] [19] and Mānasamitravaṭakam [S.Y. Gulika Prakarana. p. 437] [21] were administered in different phases to manage stress and anxiety. Trailokyavijayā Vaṭi [62.5 mg of Vijaya (Cannabis sativa linn) dried leaves, 62.5 mg of Vansh lochan (Bambusa arundianacea) and excipients q.s.] was administered for pain management. Guggulutiktakam Ghṛtam [A.H.Ci.St. 21.57–60] [14], was administered to pacify vāta and for bṛṃhaṇa. Dhānvantaram tailam (Medicated oil) [S.Y. Taila prakarana.p. 496] [21] and Kottamcukkādi tailam (Medicated oil) [S.Y. Taila prakarana.p. 481] [21] were administered externally for snehana and pacifying vāta. See Table 3 for details of follow up medications.

7. Follow up and outcomes

7.1. Clinician assessed outcomes

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), T4 was 3.8 µg/dL (BT) and 6.3 µg/dL (AT), TSH was 48.59 µIU/mL(BT) and 6.29 mIU/L (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 4 for details of lab investigations.

7.2. Patient 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 indicating anxiety. The score reduced to 46 after treatment suggestive of mild anxiety. Patient also self assessed depression using the Self-Rating Depression Scale (SDS) with a score of 61 before treatment suggestive of moderate depression and 43 after treatment suggestive of little or not depression.

7.3. Important follow-up diagnostic and other test results

The patient underwent lab investigations, and the following are the results after 12 months of discharge- CRP -15.7 mg/L, ESR -8mm/1hr, HB-12 g/dl, T3-72.31 ng/dL, T4 - 6.64 µg/dL, TSH - 1.57081 mIU/L.

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

Table 2
Administration of External Therapies (dosage, strength, duration).

Date	Therapeutic interventions with explanations	Interventions	Quantity used for treatment	Duration
15/10/2019 to 21/10/2019	For <i>bāhyarūksaṇam</i> (inducing dryness externally) and <i>vātānulomana</i> (facilitating movement of <i>vāta</i>)	<i>dhānyāmladhārā</i> (Pouring of liquid made by fermenting grains over the body) By sparingly applying <i>Cīncāditailam</i> + <i>Koṭṭamcukkādītāilam</i> – 45 min	Approx. 5 L/day	7 days
22/10/2019 to 26/10/2019	For <i>bāhya</i> (external) <i>snehana</i> (unctuous therapy) and <i>svedana</i> (fomentation)	<i>Patrapīṇḍasveda</i> (Leaf bolus fomentation) with <i>Dhānvantarātāilam</i> (Medicated oil) – 30 min	Approx. 20 mL/day	5 days
27/10/2019 to 03/11/2019	For <i>bāhya</i> (external) <i>snehana</i> (unctuous therapy) and <i>svedana</i> (fomentation) to activate the movement of <i>vāta</i> Considering the stiffness of neck, <i>Kārpāsāsthyadītāilam</i> was added along with <i>Dhānvantarātāilam</i> for <i>Pīṇḍasveda</i>	<i>Jambīrapatrapīṇḍasveda</i> (Leaf bolus fomentation with lemon) with <i>Dhānvantarātāilam</i> + <i>Kārpāsāsthyadītāilam</i> – 30 min	Approx. 20 mL/day	8 days
4/11/2019	For <i>bāhya</i> (external) <i>snehana</i> (unctuous therapy) and <i>svedana</i> (fomentation)	<i>Sarvāṅgābhyāṅga</i> (whole body massage) with <i>Koṭṭamcukkādītāilam</i> 30 min and <i>bāṣpasveda</i> (steam fomentation) – 10 min	Approx. 120 mL/day	1 day
4/11/2019	For cleansing of bowels before <i>vasti</i> (medicated enema)	<i>Sraṃsana</i> (mild purgation)	<i>Nīḃbāmṛtādi Eraṇḍa</i> 50 mL with 1 glass of milk at 7 am	1 day
6/11/2019 to 13/11/2019	<i>Ardhamātrika vasti</i> (A type of decoction enema + medicated oil enema)	<i>Anuvāsana vasti</i> (Enema with medicated oil) – immediately after lunch <i>Nirūha vasti</i> (Decoction enema) – 8 am in empty stomach	<i>Anuvāsana vasti</i> – 100 mL <i>Nārāyaṇātāilam</i> Honey – 50 mL	5 days 3 days
12/11/2019 to 18/11/2019	Bowels was evacuated but not satisfactory	Local oil massage with <i>Dhānvantarātāilam</i> around the umbilicus in circular motion followed by fomentation with a hot water bag – 10 min	<i>Saindhavalavaṇa</i> –10 g <i>Nārāyaṇātāilam</i> – 100 mL <i>Śatapuspākalkam</i> – 15 g <i>Daśamūlmaḥkaṣāyam</i> – 300 mL	Approx. 10–15 mL/day 7 days
14/11/2019 to 18/11/2019	For nourishing and strengthening the joints and muscles	<i>Ṣaṣṭīkaśālīpīṇḍasveda</i> (Rice bolus boiled in milk with roots of <i>Sida rhombifolia</i> var. <i>retusa</i>) with <i>Dhānvantarātāilam</i> – 45 min	Approx. 20 mL/day	5 days

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 *doṣa* 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 *doṣa* assessment in developing a treatment plan for management of AS. SK Singh and Kshipra Rajoria reported substantial clinical improvement in a patient suffering from AS following Ayurvedic treatment for *asthimajjāgatavāta* – *vāta* disorder involving bone and bone marrow [8] Mukesh Edavalath has reported the beneficial outcomes of Ayurvedic intervention for *amavāta* in curbing the progression of AS [23]. In both cases, the involvement of *Vata 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 doṣa* 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

Table 3
Follow-up and outcomes.

Date	Important follow-up	Diagnostics and other test results	Interventions	Dosage	Adjuvant	Duration	
20-3-2020	Patient consulted 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.	CRP – 7.9 mg/L, ESR – 40mm/1hr, HB- 11.4 g/dl, T3- 11.4 ng/dL, T4 – 74 ng/dL, TSH – 7.9ug/dL	<i>Ṣaḍḍharaṇacūrṇa</i>	1 tsp twice daily after food	With warm water	198 days	
				<i>Guggulutiktakaṃ Kaṣāyaṃ</i>	15 mL twice daily before food	45 mL with warm water	198 days
			<i>Kanchanāra Guggulu</i>		1 tab twice daily after food.	With warm water	198 days
				<i>Saraswatārishtam</i>	25 mL twice daily at 5 pm and at 8 pm	–	198 days
			<i>Mandūra Vatakam (250 mg)</i>		<i>Mānasa Mitra Vatakam (125 mg)</i>	1 tab twice daily after food.	With warm water
				1 tab twice daily at 5 pm and at 8 pm		With <i>Saraswatārishtam</i>	198 days
			<i>Tab. Brāhmi (1 mg)</i>	<i>Nimbāmritadi Eranda (Medicated oil)</i>	1 tab twice daily after food	With warm water	198 days
					10 mL at bedtime	With hot milk	198 days
			<i>Dhānwantaram Tailam (Medicated oil) – 10 min</i>		External application around the umbilical region (Approx. 10 – 15 mL/day)	–	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	<i>Mahārāsnaḍi Kashāyam</i>	15 mL twice daily before food	45 mL with warm water	142 days	
				<i>Agnikumāra Rasa (125 mg)</i>	1 tab twice daily before food.	Taken along with <i>Kashāyam</i>	142 days
			<i>Simhanāda Guggulu (300 mg)</i>		1 tab twice daily after food.	With warm water	142 days
				<i>Tab.Tagara (1 mg)</i>	1 tab twice daily after food	With warm water	142 days
			<i>Isabgol</i>		10 g at bed time	with warm water	142 days
				<i>Swarna Guggulu (125 mg)</i>	1 tab at bedtime	With warm water	142 days
24-10-2020 to till date	Appetite increased, Sleep is better. 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.	CRP – 15.7 mg/L, ESR – 8mm/1hr, Hb- 12 g/dL, T3 – 72.31 ng/dL, T4- 6.64 µg/dL, TSH – 1.57081 µIU/mL	<i>Dhānwantaram</i>	External application, (Approx. 10–15 mL/day)		240 days	
				<i>Tailam + Koṭṭamcukkāditailam</i>	15 mL twice daily before food	45 mL with warm water	240 days
			<i>Guggulu tiktaka kashāyam</i>		1 tab twice daily after food.	With <i>Kashāyam</i>	240 days
				<i>Kanchanāra guggulu (500 mg)</i>	2 tsp morning in empty stomach	With hot water	240 days
			<i>Guggulu Tiktaka Ghritam (10 mL)</i>		<i>Trailokya Vijaya Vati (125 mg)</i>	1 tab at bedtime	With warm water
				25 mL twice daily at bed time		–	SOS
			<i>Saraswatārishtam</i>	<i>Mānasa mitra vatakam (125 mg)</i>	1 tab at bed time	With <i>Saraswatārishtam</i>	SOS

Ayurvedic treatment in such a patient group of AS has not been reported before. Descriptions resembling AS are first found to be 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 *ānavāta* has been well described, which was referred to as the guideline to formulate the treatment in our patient. *Langhana* (depletive therapy) along with *svedana* (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 *vasti* (medicated enema).

8.3. The rationale for the conclusions

The clinical presentation of AS matches with the textual description of *ānavāta*. The early involvement of the *trikasandhi* (inflammation of sacroiliac joints), stiffness of the axial skeleton causing difficulty to turn the body (*gātrastabdhātā*) and later involvement (*yadā prakupitā*) of neck and other joints (*has-tapādasirōgulphatrikaṇūrusandhi*). In *ānavāta*, there is build-up of *āma*, which accumulates in the seats of *kapha* especially the axial skeleton and triggers inflammation that becomes chronic [Ma.Ni. 25.5–10] [6]. In the long run, chronic inflammation causes damage

Table 4
Tapering of Allopathic medicines after initiation of Ayurvedic treatment.

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 + Thiocolcoloside 4 mg), DMARD – Sazo (Sulfasalazine) 500 mg, Proton Pump Inhibitor – IZRA (Esomeprazole) 40 mg.

Table 5
Lab investigations.

Parameters	2/11/2017	10/10/2018	4/10/2019	6/11/2019	18/11/2019	20/03/2020	24/10/2020
CRP mg/L	32.85	28.6	37.5	29.6	25.9	7.9	15.7
ESR mm/hr	95	62	103	80	95	40	8
HB g/dl		9.8	9.7	10.1	10.1	11.4	12
T3 -80–220 ng/dL	0.90	61.92	80	89	–	74	72.31
T4 -5.0 to 12.0 µg/dL	7.34	6.84	3.8	6.3	–	7.9	6.64
TSH 0.5 and 2.0 µIU/mL	2.96	1.43	48.59 µIU/mL	6.29	–	0.81	1.57
RBC – mL/ul		4.32					
Haematocrit		31.7%					
Absolute lymphocyte count		3.47					
Total iron binding capacity		24					
Total iron binding capacity saturation		8					
HbA1c		5.8					
RBS mg/dl			104				
Vit D – ng/mL	17.05						
Vit B12 – pg/mL	73.4						

to the joints and increase in *vāta*. In the acute stage of the disease, treatment has to address *āma* by administering *ruksaṇa* (inducing dryness) interventions. However, in the chronic stage, drastic *ruk-saṇa* measures can aggravate *vāta* and so *ruk-saṇa* procedures were done with use of oils sparingly. The Ayurvedic treatment targeted the underlying chronic *āma* (metabolic aberrations that trigger inflammation). This was achieved by treatments like *pācana* (digestives), *rūkṣaṇa* and *Sraṃsana* (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 *bṛṃhana* (nourishing and strengthening the body) which mitigated *vāta*. Clinical improvement of stiffness and improvement in flexibility was observed after *bṛṃhana* treatment. Considering the *samprāpti* of *āmavāta*, the treatment strategy adopted was the digestion and removal of *āma* from the system in the first phase. Simultaneously, dietary modifications and lifestyle adjustments including counselling were done to prevent further development of *āma*. In the last phase, *vāta doṣa* was addressed following *bṛṃhana* 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*, *Yōga* 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 dependance 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 *Yogāsana*, I was not able to do *Padmasana* 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, **Ramma-nohar Puthiyedath:** Writing – Review and Editing.

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