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Case Report

Pulmonary Tuberculosis

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Ayurvedic approach in the management of Pulmonary Tuberculosis w.s.r. to Rajayakshma - A Case Report

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Pulmonary tuberculosis (PTB) is an infectious disease caused by Mycobacterium tuberculosis, primarily affecting the lungs. It is transmitted through airborne droplets generated when an infected person coughs, sneezes, or speaks. A 55-year-old female patient with chief complaints cough with yellowish expectoration, fever with chills, weight loss, generalized weakness, and breathlessness on exertion along with chest pain for 3 months visited the TB chest OPD of Kayachiktsa. She was diagnosed with Pulmonary tuberculosis by allopath hospital. After the initiation of anti-Koch's treatment (AKT) (Rifampicin300 + Isoniazid150 + Pyrazinamide800 + Ethambutol550) for 20 days, she was suffering from burning in abdomen, vomiting after every meal, loss of appetite, joint pain and severe weakness. The patient was not taking medicine properly and wanted Ayurveda as an alternate or adjuvant management for her sufferings. Ayurvedic treatment along with the ongoing medications that comprised Vishama Jwaraghana Vati in the dosage of 1g thrice a day, Sitopaladi Churna, 3g thrice a day with honey for 1 month, and after that Drakshavaleha in the dose of 10 grams twice a day with lukewarm milk after breakfast and dinner for the duration of next 5 months along with Pathya-Apathya was provided. The patient was monitored for clinical outcomes, sputum conversion, complete blood count, reduction in ESR, nutritional status, symptom improvement, and quality of life by WHO-BREF scale. Follow-up was taken for eight months. Significant improvements were observed after three months in terms of the clinical outcomes, including sputum conversion (BT:2+, AT: Negative, 6 month sputum culture-negative), complete blood count (BT: Hb-10.5, RBC-4.16, WBC-14500, Platelet count-469000, AT: Hb-11.9, RBC-4.36, WBC-11730, Platelet count-329000), reduction in ESR (BT:96, AT:27), improvement in nutritional status, early symptom improvement, and quality of life by WHO-BREF scale. This suggests that integrating Ayurvedic approaches with standard PTB therapy may improve treatment outcomes, enhance adherence to medication, support nutritional recovery, and improve patients' overall quality of life.

Keywords: Ayurveda, pulmonary tuberculosis, tuberculosis, Rajayakshma.

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Introduction

Tuberculosis (TB) is an infectious disease that continues to pose major threat to global health caused by *Mycobacterium tuberculosis*, highly adaptive and slow-growing bacterium, TB primarily affects lungs but can involve nearly any organ system.**[1]** Transmission occurs through airborne droplets when person with active pulmonary TB coughs or sneezes, making it highly contagious, especially in crowded or poorly ventilated settings.**[2]** Despite significant medical advances, TB remains one of the top ten causes of death worldwide and the leading cause of death from a single infectious agent.**[3]** According to the World Health Organization, more than 10 million people developed TB in 2022, and over 1.4 million died from the disease.**[4]** Many of those affected are among the world's most vulnerable-living in poverty, malnourished, immunocompromised, or without access to timely healthcare.**[5]**

The symptoms of active TB can be non-specific at first, including low-grade fever, fatigue, and weight loss. As the disease progresses, more recognizable signs such as chronic cough, night sweats, chest pain, and hemoptysis may emerge.**[6]** However, latent TB infection can remain asymptomatic for years, silently persisting until reactivation occurs under immunosuppressive conditions.**[7]** The standard intensive phase of anti-tuberculosis treatment includes a four-drug regimen: Isoniazid (H), Rifampicin (R), Pyrazinamide (Z), and Ethambutol (E)-collectively known as HRZE. While this combination is highly effective, it is associated with several notable adverse drug reactions that can compromise treatment adherence and clinical outcomes.**[8]**

While standard treatment is available and curative, challenges such as delayed diagnosis, poor adherence to therapy, drug resistance, and social stigma continue to hinder global eradication efforts.**[9]** In recent years, integrative approaches combining conventional Anti TB treatment (ATT) with traditional systems such as Ayurveda, nutrition therapy, have gained attention for their potential to enhance clinical outcomes, reduce adverse effects, and improve the quality of life.**[10]**

Integrative therapy seeks to address the biopsychosocial complexity of tuberculosis, not just the infection itself.

Herbal immunomodulators, hepatoprotective agents, and *Rasayana* (~rejuvenative) formulations from Ayurveda, when used as adjuncts, may help reduce drug-induced toxicity, support immune function, and restore homeostasis.**[11]**

Rajayakshma, described in classical Ayurvedic texts, is a complex disease involving the simultaneous vitiation of all three doshas (*Vata, Pitta*, and *Kapha*) and deterioration of *Dhatus* (body tissues). It is often correlated with pulmonary tuberculosis (PTB) due to similar clinical features such as chronic *Kasa* (~cough)), *Karshya* (~weight loss), *Jwara* (~fever), *Raktashtivana* (~hemoptysis), and *Ojokshaya* (~generalized debility).

The pathogenesis of *Rajayakshma* involves *Ojokshaya* (~loss of immunity and vitality), resulting in the progressive impairment of systemic strength and tissue metabolism. Ayurvedic management, especially when integrated with modern pharmacotherapy, has shown potential in enhancing nutritional status, immunity, and overall quality of life in patients with tuberculosis.

This case report highlights the potential role of adjunctive and integrative approaches- particularly traditional systems like Ayurveda- as supportive modalities alongside conventional PTB treatment. These approaches aim to enhance treatment adherence, immune function, and overall patient resilience while reducing side effects and improving quality of life.

Case Report

A 55-year-old female patient (housewife) came to the TB chest OPD of hospital on 10/10/2024 (ID no. PG24045320) with the complaints of cough with yellowish expectoration, fever with chills, weight loss, generalized weakness, and breathlessness on exertion along with chest pain for 3 months. She had also complaint of burning in abdomen, vomiting after every meal, loss of appetite, joint pain and severe weakness after initiation of Anti Kochs' treatment (AKT). She was diagnosed with pulmonary tuberculosis (PTB) by allopath hospital, having positive Acid-Fast Bacilli (AFB) sputum. So, she was recommended with HRZE (Rifampicin + Isoniazid + Pyrazinamide + Ethambutol) (mentioned in table no.1) for 15 days by the same hospital. She visited Ayurveda hospital to seek adjuvant support for the side effects of AKT.

Clinical findings

***Rogi Samanya Pareeksha* (~General examination as per Ayurveda)**

Ashtavidha Pareeksha (~eightfold physical examination) of the patient was performed, which showed *Pittaja Nadi* (~pulse) at 78/min, *Mala* (~stool) and *Mutra* (~urine) were found to be *Prakruta* (~normal), *Jihwa* (~tongue) of the patient was *Sama* (~white-coated tongue), *Shabda* (~speech), *Sparsha* (~temperature), and *Druka* (~vision) of the patient was *Prakruta* (~within normal limits). The patient had a *Krusha Akruti* (~malnourished), and the patient was of *Pitta Pradhan Kapha Anubandhi Prakruti* (~inherent characteristic).

General and systemic examination of patient

BP-110/80 mm of Hg, Pulse rate-78/min, Respiration rate-16/min, SpO_2 -99%, BMI (Kg/m^2) - 15.5, Previous history - Positive, Family History - No, Added sounds in chest - Ronchi present (right>left) Air entry bilaterally not equal (right diminished), AFB sputum - 2+, Chest X ray findings - Cavitation in right upper lobe, Co-morbidity - No, Gastrointestinal tract (GIT) examination - no tenderness, no swelling, no organomegaly, Central nervous system (CNS) examination - Patient is well oriented to time place and person, CVS examination - S1 and S2 sound (Normal), ongoing Treatment - Standard conventional therapy (HRZE).

Diagnostic assessment

The patient was pre-diagnosed from allopath hospital based on investigations which confirmed diagnosis i.e. AFB sputum, positive chest X-ray. Complete Blood Count (CBC), Erythrocyte Sedimentation Rate (ESR), Alanine transaminase (ALT), Aspartate transaminase (AST), Alkaline phosphatase, Random blood sugar (RBS), serum creatinine, serum uric acid and blood urea was carried out to rule out any associated disease before initiating Ayurvedic interventions and to know current status of patients. Serology was also done to rule out other immunocompromised condition.

Timeline

The details of the timeline of events of the patient during the treatment and follow up have been depicted in table 1.

Table 1: Timeline of the clinical events.

Date	Clinical events/ Investigation	Intervention
August 2024	Onset of symptoms	Take antibiotics and Paracetamol as advised by private physician but get temporary relief.
Oct 15-20, 2024	First visit to govt. allopath hospital where she was diagnosed with pulmonary tuberculosis Chest X ray - suspected PTB AFB sputum - 2+ FLLPA - No resistance found (First line - Line probe assay)	Tab HRZE - Once a day after food in morning Isoniazid (H) – 150mg Rifampicin (R) – 300mg Pyrazinamide (Z) – 800mg Ethambutol (E) – 550mg Tab. Pyridoxine - 100 mg once a day after food at night
Nov 06, 2024	First visit to TB chest OPD of Ayurvedic hospital Investigations done: Hb - 10.5 g% Total RBC - 4.16 milli/c.mm Total WBC - 14500/cu.mm Platelet count - 469000/cu.mm ESR - 96mm fall in first hour HIV - Non-reactive (NR) HBsAg - NR HCV - NR VDRL - NR Random Blood sugar - 104 mg/dl Urea - 11 mg/dl Uric acid - 3.66 mg/dl Creatinine - 0.77 mg/dl Total bilirubin - 0.29 mg/dl ALT - 12 U/L AST - 14 U/L Alkaline phosphatase - 81 U/L Clinically and vitally stable.	Vishama Jwarghana Vati in the dose of 2 Vati (500 mg each) thrice a day after breakfast, lunch and dinner with lukewarm water. Sitopaladi Churna (3g) thrice a day after breakfast, lunch and dinner with honey for the duration of 07 days along with ongoing treatment.

Nov 13, 2024	1st follow up Clinically and vitally stable.	Continue same treatment for next 7 days.
Nov 20, 2024	2nd follow up Clinically and vitally stable.	Continue same treatment for next 15 days.
Dec 05, 2024	3rd follow up Clinically and vitally stable.	Stopped Vishama Jwaraghana Vati and Sitopaladi Churna Drakshavaleha in the dose of 10 grams twice a day with lukewarm milk after breakfast and dinner for 15 days along with ongoing treatment.
Dec 20, 2024	4th follow up Clinically and vitally stable.	Continue same treatment for 15 days
Jan 06, 2025	5th follow up Clinically and vitally stable.	Continue same treatment for 15 days
Jan 20, 2025	6th follow up Clinically and vitally stable.	Continue same treatment for 15 days
Feb 10, 2025	Investigations done: Hb - 11.9g% Total RBC - 4.36 milli/c.mm Total WBC - 11730/cu.mm Platelet count - 329000/cu.mm ESR - 27 mm fall in first hour Random Blood sugar - 80mg/dl Urea - 17mg/dl Uric acid - 4.22 mg/dl Creatinine - 0.76 mg/dl Total bilirubin - 0.36 mg/dl ALT - 18U/L AST - 28 U/L Alkaline phosphatase - 110U/L *CBNAAT - Mycobacterium tuberculosis (MTB) not detected *Cartridge based nucleic acid amplification test Symptomatically improved, nutritional status enhanced, quality of life improved.	Drakshavaleha in the dose of 10 grams once a day with Luke warm milk before breakfast for the duration of ongoing treatment.
March 11, 2025	General examination was done BP - 110/80 mm of Hg PR - 76/min SpO2 - 100% Weight - 40.5 kg	Continue same treatment
April 21, 2025	General examination was done BP - 130/80 mm of Hg PR - 78/min SpO2 - 100% Weight - 42.5 kg	Continue same treatment
May 20, 2025	Investigations done: Hb - 12.3g% Total RBC - 5.26 milli/c.mm Total WBC - 8780/cu.mm Platelet count - 228000/cu.mm ESR - 14mm fall in first hour Random Blood sugar - 89mg/dl Urea - 28 mg/dl Uric acid - 3.36mg/dl Creatinine - 0.78 mg/dl Total bilirubin - 0.48 mg/dl ALT - 33U/L AST - 28 U/L Alkaline phosphatase - 98 U/L 6-month sputum culture - Negative No symptoms, nutritional status is intact	AKT stopped by the allopath hospital. Discontinued Drakshavaleha and patient was suggested to continue Chyawanprasha in the same dosage of Drakshavaleha for better immunity.
June 10, 2025	No reoccurrence of the symptoms	Patient was taking Chywanprasha.

Interventions

Ongoing AKT mentioned in table no.1. The Ayurvedic treatment comprised *Vishama Jwaraghana Vati* in the dosage of 1g thrice a day, after food with lukewarm water, *Sitopaladi Churna* (3g), thrice a day, after food with honey for one month, and then *Drakshavaleha* in the dosage of 10 grams twice a day with lukewarm milk after breakfast and dinner along with *Pathya- Apathya* was provided for next 2 months.

Then reduce the dose by half for next 3 months and after completion of the treatment, patient was suggested to continue *Chyawanprasha* for better immunity.

Pathya-Apathya

Pathya Aahara - Cereals like the old Barley, wheat, *Mudga* (green grams), *Saali* (red rice) as well as *Shashtika* Rice (Navara rice), *Shunthi* (dry ginger), *Haridra* (turmeric) *Yukt Dugdha* (milk), egg and meat (if non-vegetarian), Soup prepared from *Mulaka* (radish) and pulses like *Kulattha* (horse gram), Goat's milk, ghee, honey were advised to the patient.

Vihara - *Pranayama* (breathing exercise), *Chankram-an* (brisk walk), *Laghu Vyayama* (light exercise) etc.

Apathya Aahara - Brinjal, bitter guard, *Bilva Phala* (Bael fruit) or excessive citrus fruits, *Rajika* (mustard) etc.

Vihara - Sexual intercourse, excessive exercise, anger, sleep during day time etc.

Follow-up and Outcome

The clinical assessment was done on the basis of improvement of sign and symptoms of the patient (mentioned in table no. 2), nutritional status of the patient (mentioned in table no.3), quality of life by WHOBREF scale (mentioned in table no.4), and hematological investigations (mentioned in table no.5). The follow-ups were taken for seven months.

Table 2: Changes in grades of symptoms monitored weekly according to special clinical proforma for various symptomatology.

Chief complaints	BTNov 06,2024	2ndweek	4thweek	6thweek	8thweek	10th week	ATFeb 10, 2025	F/upMay 20, 2025	F/upJune 10, 2025
Cough	4	4	3	2	1	1	0	0	0
Fever	4	3	3	0	2	1	0	0	0
Dyspnea	3	3	2	2	2	1	0	0	0
Weight loss	3	3	1	0	0	0	0	0	0
Common side effect									
Anorexia	3	1	0	0	0	0	0	0	0
Gastritis	3	2	0	0	0	0	0	0	0
Vomiting	3	1	0	0	0	0	0	0	0
Generalized weakness	3	3	3	2	2	2	1	0	0
Joint pain	2	2	1	1	1	1	1	1	1

*BT- Before treatment, AT- After treatment, F/up- Follow up

Table 3: Improvement in Nutritional Status.

Parameters	BTNov 06,2024	2ndweek	4thweek	6thweek	8thweek	10th week	ATFeb 10, 2025	F/upMay 20, 2025	F/upJune 10, 2025
Weight (kg)	34	34	34	35.5	36.5	38	38	41	42.5
BMI (kg/m2)	15.5	15.5	15.5	16.2	16.6	16.9	16.9	17.5	18.01
Body fat	18%	18%	18%	18%	18%	18%	19%	19%	19%
Caloric intake (Kcal)	700	700	850	850	900	1000	1500	1800	2000

*****BMI- Body mass index

Table 4: Quality of Life monitored before & after 3 months treatment by using WHOQOL BREF scale:

Domains	BTNov 06,2024	ATFeb 10, 2025	F/upMay 20, 2025	F/upJune 10, 2025
Physical	8	11	12	14
Psychological	8	10	11	12
Social	12	12	13	13
Environmental	10	10	10	10

Table 5: Changes in hematological profile of the patient.

Investigations	BT (Nov 06,2024)	AT (Feb 10, 2025)	F/up (May 20, 2025)
Hb (g%)	10.5	11.9	12.3g%
RBC (mill/cumm)	4.16	4.36	5.26
WBC (/cumm)	14500	11730	8780
Platelets (/cumm)	469000	329000	228000
ESR (mm fall in 1st hour)	96	27	14
Random Blood sugar	104	80	89
Urea (mg/dl)	11	17	28
Uric acid (mg/dl)	3.66	4.22	3.36
S. creatinine (mg/dl)	0.77	0.76	0.78
Total Bilirubin (mg/dl)	0.29	0.36	0.48
ALT (U/L)	12	18	33
AST(U/L)	14	28	28
Alkaline phosphatase(U/L)	81	110	98
AFB sputum	2+	CBNAAT- MTB not detected	Sputum culture-Negative

Adverse drug reaction

There were no serious adverse events related to drug observed during the trial. Additionally, the side effects of AKT were reduced during the treatment and follow up period.

Discussion

Isoniazid is primarily hepatotoxic and can cause asymptomatic elevation of transaminases or, less commonly, severe hepatitis. It may also lead to peripheral neuropathy, particularly in malnourished individuals or those with diabetes, HIV, or alcoholism, due to pyridoxine deficiency.**[12]**

Rifampicin is another hepatotoxic agent and can also cause gastrointestinal upset, thrombocytopenia, hemolytic anemia, and flu-like syndrome during intermittent dosing. It induces cytochrome P450 enzymes, leading to significant drug-drug interactions.**[13]**

Pyrazinamide is well-known for hepatotoxicity and can also induce hyperuricemia and arthralgia due to decreased renal uric acid excretion. Gastrointestinal distress is also common.**[14]**

Ethambutol is associated with dose-related optic neuritis, which can present as blurred vision, decreased visual acuity, and red-green color blindness. Regular monitoring of visual function is essential during therapy.**[15]**

Vishama Jwaraghana Vati

The *Vati* is a polyherbal combination having constituents like *Chirayta* (*Swertia chirayita* Roxb.)*, Prishnparni* (*Ureria picta* Jacq.)*, Haridra* (*Curcuma longa* Linn.)*, Haritaki* (*Terminalia chebula* Retz.)*, Shatavari* (*Asparagus racemosus* Willd.)*, Vacha* (*Acorus calamus* Linn.)*, Shunthi* (*Zingiber officinale* Roscoe)*, Nimba (Azadirachta indica A.* Juss.)*, Yashtimadhu (Glycyrrhiza glabra* Linn.) are reported to be effective as antimicrobial herbs. It also contains flavonoids and sterol, which may responsible for antimicrobial and antibacterial activity.**[16]**

Sitopaladi Churna

Sitopaladi Churna consists of *Mishri* (Candy sugar), *Banslochana* (Silicacius concretion extract of *Bambusa bambos* Druce.), *Pippali* (*Piper longum* Linn.), *Ela* (*Elleteria cardemomum* Maton.), *Dalchini* (*Cinnamomum zeylanicum* Breyn.).**[17]** The anti-tussive activity of this medicine is assigned to its ability to affect the central nervous system and suppress a cough (*Kasa*).**[18]**

The juice (~*Swarasa*) of the stem of *Banslochana* is considered antipyretic (~*Jwarahara*), antitussive (~*Kasahara*), expectorant and tranquillizing and has been used for bronchial, catarrhal and cerebral infections. It has been given as a cure for chest and head colds, pharyngitis with action being to encourage the flow of urine and suppression of fever.**[19]**

Drakshavaleha

Drakshavaleha is polyherbal *Rasayana* and act here as an antioxidant. In addition to this, *Draksha* (*Vitis vinifera* Linn.) is *Jwarahara, Trishnahara* (~thirst-quenching)*, Sawashahara* (~anti-asthmatic) and *Shoshara* (~ameliorant) *Pippali* (*Piper longum* Linn.) is a potent rejuvenative herb that has strong anti-viral, anti-bacterial, and anti-fungal properties, along with anti-inflammatory activity. The drug has also been reported to be antagonist in respiratory depression. *Amalaki* (Emblica officinalis Gaertn.) is a potent *Rasayana* that also bears properties like *Jwarahara, Tridoshara,* and *Vrishya* (~aphrodisiac). The combined action of all these drugs may expect to maintain the liver profile normal, easy bio absorption of anti-tubercular drugs, supports immune function and may alleviated treatment-related side effects.

Conclusion

The findings of this case report underscore the potential benefits of integrating Ayurvedic treatments with conventional anti-tubercular therapy for patients with PTB. Further research with larger cohorts and randomized controlled trials is warranted to validate these findings and explore the mechanistic insights of Ayurvedic therapies in tuberculosis management.

Declaration of patient consent

The authors certify that before starting the trial written consent was taken from the patient and also after the completion of the trial patient consent was taken for reporting the case in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal his identity.

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