



Case Report

Clinical Outcomes of Ayurvedic Management in Hunter Syndrome: A Case Report

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ABSTRACT:

Introduction: Hunter Syndrome, otherwise called Mucopolysaccharidosis Type II, is a rare X-linked Lysosomal Storage disorder, occurring due to the deficiency of Iduronate-2-sulfatase enzyme (IDS). This leads to impaired Glycosaminoglycans catabolism (GAGs), resulting in the pathological accumulation of Heparan sulfate and Dermatan sulfate in multiple tissues and organs. It manifests as a progressive, multisystemic, genetic metabolic disorder. In Ayurveda, Hunter Syndrome is correlated with *Sahaja Vyadhi* (genetic disease) arising due to genetic defects, manifesting with persistent, impaired metabolism, coarse facies, hirsutism, multiple joint contractures, short stature, hyperactivity, and subnormal cognitive development. **Methods:** A single case study of a 4-year-old boy with Hunter syndrome was evaluated to analyze the efficacy of ayurvedic therapies on the quality of life. The child was managed with symptomatic treatment and rejuvenation therapy. Oral medicines were targeted for *Deepana* (appetite stimulant), and *Pachana* (digestive) to rectify metabolism and to improve cognitive abilities. Procedure-based therapies were targeted to treat physical impairments. **Results:** After five months of exclusive oral medications and one course of external therapies, the child showed improvement in metabolic activity, cognitive abilities and joint mobility, marking overall well-being and enhanced quality of life. **Conclusion:** Hunter syndrome is an early onset, progressive disorder, with high morbidity and poor life expectancy, making it a *Sahaja Vata Pradhana Tridoshaja Vyadhi*. Early diagnosis, genetic counseling, and an integrative approach combining contemporary and traditional therapeutic strategies may reduce mortality and improve long-term health outcomes in affected children.

KEYWORDS: *Agnidushti*, Ayurveda, Case Report, Hunter Syndrome, Metabolic Disorder, Mucopolysaccharidosis Type II, *Sahaja Vyadhi*, *Rasayana*..

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1. INTRODUCTION

Mucopolysaccharidosis is a group of rare genetic disorders that occur due to defective catabolism of Glycosaminoglycans. Hunter Syndrome or Mucopolysaccharidosis Type II is a Genetic Metabolic disorder caused by the deficiency of Iduronate-2-Sulfatase enzyme leading to the accumulation of partially degraded Heparan sulfate and Dermatan sulfate in multiple tissues and organs. This syndrome manifests with intellectual disability, coarse facies, cloudy cornea, dysostosis multiplex and organomegaly, affecting main organs such as the brain, skeleton, and the viscera. [1] In Ayurveda, the features of Hunter syndrome can be interpreted as *Kubjata* (short stature), *Buddhi Vibhrama* (impaired intellect), *Netra Vikara* (eye disorders), and severe *Agnimandya* (weak digestive fire) leading to other metabolic disturbances. Being a *Sahaja Vyadhi* (genetic disorder), it can be correlated to the *Eka Desha Vikruti* (specific derangements) in the *Beeja Bhaga Avayava* (gene), leading to *Vikruta Garbha* (fetal anomalies) or *Puti Praja* (diseased offspring). [2] Though there are no treatments mentioned for such *Anupakrama Vyadhi* (incurable diseases), repeated *Deepana* (appetite stimulant), *Pachana* (digestive), *Srotoshodhana* (cleansing the body channels), and *Rasayana Chikitsa* (rejuvenation therapy) as per *Lakshana* (symptoms) and *Avastha* (stage) can be incorporated to manage the affected. This write-up is about the Ayurvedic management of a single case of Hunter syndrome in a child, aiming at improved quality of life.

2. CASE REPORT:

A 4-year-old boy presented with persistent coarse facies, delayed speech development, hyperactivity, multiple joint contractures, poor appetite, and irregular bowel habits since infancy. Other complaints included recurrent upper respiratory tract infections, progressive blackish discoloration and thickening of the skin.

Birth History: He is the only child of healthy, non-consanguineous parents. The antenatal period was

uneventful. The child was born full term through normal vaginal delivery, with a birth weight of 2.42 kg. He cried immediately after birth, exclusively breastfed for six months, gradually complimentary feeds were introduced with continued breastfeeding till one year.

Developmental History: Gross and fine motor developmental milestones were attained near the expected timeline, although mild restrictions in range of motion in the limbs were observed. There was an isolated delay in speech and language development, characterized by limited and slurred speech, with repetitive use of 2- 4 words. Difficulty in reading and writing, secondary to astigmatism, was noted. Social and adaptive milestones were also below expected levels for the age, with features like social disinhibition, hyperactivity, and restlessness.

Family History: No history of genetic, neuromuscular, or neurocognitive disorders.

Immunization History: Vaccinated appropriate to age.

Medical and Treatment History: Enzyme analysis and molecular testing confirmed a diagnosis of Hunter syndrome at 3 years of age. The child was advised behavioral and speech therapy to support developmental progress. At school, the child was observed to be markedly restless, easily distractable with poor sitting tolerance, preferred solitary play, and showed minimal compliance with verbal commands. The child was prescribed Atomoxetine 10 mg (Selective Norepinephrine Reuptake Inhibitors for ADHD) once daily for 1 year; however, owing to insignificant clinical improvement, it was withdrawn. [Figure 1]

Personal History:

Diet: Mixed; Appetite: Reduced; Thirst: Increased

Bowel: Constipated, alternate days hard stools

Micturition: 5- 6 times per day; Sleep: Fragmented

Clinical Examination Findings:

The child exhibited characteristic features of Hunter Syndrome. [Table 1] Vitals were within normal limits. Systemic assessment revealed recurrent upper respiratory

tract infections with noisy breathing, hepatomegaly and other neurocognitive features like developmental delay, restlessness, and aggression. On interaction, the child displayed poor social communication skills, avoiding reciprocal eye contact with unclear speech. Growth parameters indicated short stature, growth retardation, overweight (as per WHO chart), and delayed skeletal maturation. [3] [Table 2]

Dashavidha Pariksha

Prakruti (Constitution): *Vata-Kapha*

Vikruti (Pathology): *Tridoshaja*

Sara (Quality of tissue): *Avara*

Samhanana (Structural integrity): *Avara*

Pramana (Anthropometry): *Avara*

Satmya (Adaptability): *Ekarasa Satmya*

Satva (Mental status): *Avara*

Vaya (Stage of life): *Balya*

Aahara Shakti (Digestive capacity): *Manda*

Vyayama Shakti (Exercise tolerance capacity): *Madhyama*

Ashtasthana Pariksha

Nadi (Pulse): *Vata-Kapha*

Mutra (Micturition): *Prakrita*

Mala (Defecation): *Vibandha*

Jihwa (Tongue): *Lipta, Saama*

Shabda (Voice): *Avara, Manda*

Sparsha (Touch): *Sheeta, Ruksha*

Drik (Vision): *Vikruta*

Aakriti (Body structure): *Sthula*

Diagnostic Challenges: The major challenge in diagnosing this case was due to the multi-system presentation. The rarity of Hunter Syndrome overlapping other storage disorders was also difficult to differentiate. Initially, radiographic studies demonstrated skeletal changes consistent with dysostosis multiplex, supporting a Mucopolysaccharidosis Spectrum Disorder. MRI Brain showed periventricular leukomalacia, correlating with developmental delay. USG of the abdomen and pelvis revealed hepatomegaly, indicating metabolic derangements. Confirmative evaluation with Whole Exome Sequencing detected a “Hemizygous deletion in the IDS gene (Exon 8)”, thereby confirming the diagnosis of Hunter Syndrome or Mucopolysaccharidosis Type II.

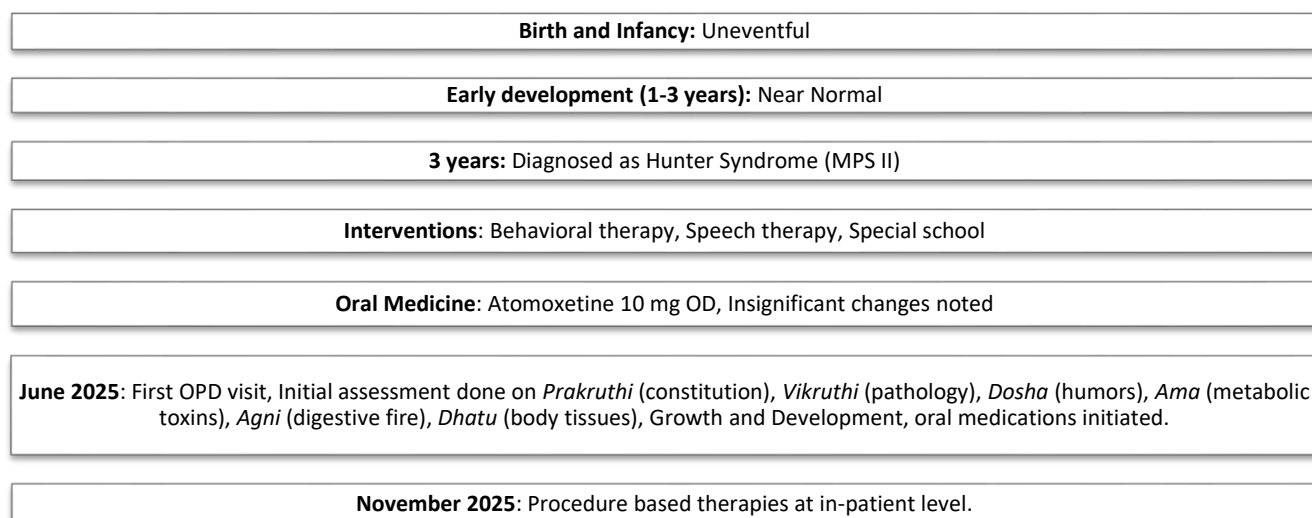


Figure: 1 Patient Timeline

Table 1: Clinical Features

Clinical Features	Ayurvedic Interpretation	Dosha Involvement
Coarse facial features, depressed nasal bridge, thick lips	<i>Vikruta Anana</i>	<i>Kapha Vriddhi</i>
Macrocephaly, frontal bossing	<i>Mastishka Chaya</i>	<i>Kapha Vriddhi</i>
Macroglossia, gingival hypertrophy	<i>Sthula Jihwa</i>	<i>Kapha Vriddhi</i>
Coarse and thickened skin, pebbly lesions, hypertrichosis	<i>Atiloma</i>	<i>Kapha Vriddhi</i>
Hepatomegaly	<i>Yakrut Vriddhi</i>	<i>Kapha- Pitta Vriddhi</i>
Protuberant abdomen	<i>Adhmana</i>	<i>Vata Vriddhi</i>
Recurrent respiratory infections	<i>Pranavaha Srotodushti</i>	<i>Kapha- Vata Vriddhi</i>
Noisy breathing / Airway obstruction	<i>Nasaanaha</i>	<i>Kapha Vriddhi</i>
Joint stiffness	<i>Sandhi Stambha</i>	<i>Vata- Kapha Vriddhi</i>
Multiple Joint contractures, restricted mobility	<i>Sankuchita Anga</i>	<i>Vata- Kapha Vriddhi</i>
Kyphosis, skeletal deformities	<i>Kubjata</i>	<i>Vata Vriddhi</i>
Short stature, short- broad neck, barrel shaped thorax, growth retardation	<i>Vamanatva, Atihrsvata</i>	<i>Vata Vriddhi</i>
Delayed skeletal maturation, claw-hand deformity, short broad fingers	<i>Asthi Kshaya</i>	<i>Vata Vriddhi</i>
Developmental delay	<i>Samvardhana Vikara</i>	<i>Vata Vriddhi, Pitta Kshaya</i>
Cognitive impairment	<i>Mandhabuddhita, Anavasthita</i> <i>Chittatva</i>	<i>Vata Vriddhi, Pitta Kshaya</i>
Behavioral disturbances, hyperactivity	<i>Atyutsaha</i>	<i>Vata Vriddhi</i>
Speech delay	<i>Mookatva</i>	<i>Vata Vriddhi</i>
Recurrent Otitis media	<i>Ashruthi</i>	<i>Vata Vriddhi</i>
Recurrent infections / Inflammation	<i>Vyadhita Sharira</i>	<i>Pitta Kshaya, Kapha Vriddhi</i>
6/9 Visual acuity, retinal changes, astigmatism	<i>Vikrutaksha</i>	<i>Pitta Kshaya, Vata Vriddhi</i>
Sleep disturbances	<i>Aswapna</i>	<i>Vata Vriddhi</i>
Reduced appetite	<i>Mandagni</i>	<i>Kapha Vriddhi, Ama- Pitta Kshaya</i>
Fatigue	<i>Aalasya</i>	<i>Vata Vriddhi, Kapha Kshaya</i>

Table 2: Anthropometric Measurements

Data	Measurements	WHO Standard Interpretation
Height	102.3 cm	103- 104 cm Near normal ≈50th percentile
Weight	18.9 kg	16- 17 kg ↑ ≈75- 85th percentile
BMI	18.1 kg/m ²	15- 16 kg/m ² ↑ Overweight range for age
Head Circumference	50 cm	49- 50 cm ↑ Upper Normal Limit- Borderline macrocephaly
Chest Circumference	58 cm	52- 54 cm ↑
Mid Arm Circumference	19 cm	16- 17 cm ↑
Abdominal Circumference	62 cm	50- 54 cm ↑
Arm Length	95 cm	Disproportion Suspected
Upper Segment: Lower Segment	53 cm: 55 cm	Reduced ratio suggestive of Skeletal Disproportion

Dosha-Lakshana Sambandha: Analyzing clinical features of Hunter Syndrome based on *Dosha* yielded its similarity with that of *Jadatva* (intellectual disability). Recurrent respiratory infections represented the imbalance of the *Pranavaha Srotas* (respiratory channel) by *Kapha*, *Vata* and *Ama* in the *Uras Sthana* (thorax). Persistent *Ama* and derangement in *Pachaka Pitta* and *Kledaka Kapha* in the *Ama-Pakvashaya* (gastrointestinal organs) are presented as sluggish metabolism leading to metabolite accumulation, abnormal tissue enlargement, and ultimately hepatomegaly. *Vata Dosha* predominance is reflected as *Asthi* and *Sandhi Vikara* (diseases of the bones and joints), presenting as joint stiffness, contractures, restricted mobility, and kyphosis. Vitiation of *Prana Vata* and *Sadhaka Pitta* led to impairment in *Bala* (strength), *Varna* (complexion), *Ushma* (thermoregulation), *Prayatna* (effort), *Urja* (energy), *Indriya-*

Indriyartha Sannikarsha (sensory perception), thus affecting the normal perception including that of *Dhee* (comprehension), *Dhriti* (restraint), *Smruti* (recall). All these features can be attributed to *Vata- Kapha Prakopa* and *Pitta Kshaya*. Thus, involvement of *Tridosha* is evident.

Dhatu Analysis: Overall analysis of involvement of *dhatu* yielded multiple *dhatu* and system involved based on different features exhibited in the case. However, following symptoms can be considered as core symptoms based on the pathophysiology of the disease. The features of coarse facies, macrocephaly, cloudy cornea, macroglossia, barrel shaped chest, protuberant abdomen, pebbly lesions in skin, claw hand deformity, short stature, delayed skeletal maturation, intellectual disability, and developmental delays are the core features of Mucopolysaccharidosis Type II, as enlisted in [Table 3](#). [4]

Table 3: Dhatu- Lakshana Sambandha

S. No.	Dhatu	Lakshana	Correlation
1.	Rasa	Krishnangata (hyperpigmentation), Rukshata (dryness), Guruta (heaviness), Agnimandya	↓ Nourishment and metabolism
2.	Rakta	Rukshata, Vaivarnya (discoloration), Twak Roukshya- Parushya (dry, coarse skin), Pipasa (thirst), Sweda (perspiration)	Hypertrichosis, thickened skin, irregular pigmentation in the skin
3.	Mamsa	Sphik-Ganda-Ostha-Upastha-Uru-Baahu-Janghaa-Vridhhi (hypertrophied buttock, cheek, lip, genitals, thigh, arm, calf), Adhimamsa (muscle hypertrophy)	↑ Muscle bulk, Hepatomegaly
4.	Meda	Atihrsva (short stature), Atiloma (hypertrichosis), Atikrishna (hyperpigmentation), Udara Vridhhi (abdominal distension), Atisthula (overweight), Yakrut Vridhhi (hepatomegaly), Kasa (cough), Swasa (respiratory disorders)	Contractures, poor skeletal growth
5.	Asthi	Rukshata, Vaivarnya, Sandhi Sthambha (joint stiffness), Sankuchitanga (contractures)	Growth lag presenting as short stature
6.	Majja	Parvasu Sthoola Mulaani (joints swelling), Netraabhisya (ocular inflammation), Sarvaanga Gourava (body heaviness)	↓ Musculo-skeletal activity, cognition, speech delay
7.	Shukra	Dourbalya (weakness), Mukhasosha (mouth dryness), Sadana (debility), Shrama (fatigue)	↓ Immunity and overall fatigue

Samprapthi Ghataka (Elements of pathogenesis)

Based on primary analysis of condition the concept of *Dosha*, *Dhatu*, *Sthana*, *Lakshana* and nature of the disease the *Samprapthi Ghataka* could be as follows:

Vyadhi: Sahaja Vyadhi / Avarana Janya Vata Vyadhi

Dosha: Tridosha- Vata↑↑ Kapha↑ Pitta↓

Dushya: Saptadhatu

Srotas: Pranavaha, Annavaha, Manovaha, Saptadhatuvaha

Srotodushti: Sanga (obstruction), Vimarga Gamana (functional disturbance)

Agni: Jataragni, Dhatvagni, Bhutagni

Ama: Jataragni Mandya Janya Ama

Udbhava Sthana: Ama- Pakvashaya

Adhishtana: Sarva Sharira (Multi- systemic involvement) and Indriya (sense organs)

Roga Marga: Trividha

Vyadhi Svabhava: Chirakari (chronic)

Sadhyasadyata: Anupakrama/ Asadhya (incurable)

Diagnosis: The symptoms can be invariably concluded as Sahaja Vata Pradhana Tridoshaja Vyadhi (congenital disorder) which is Anupakrama in nature.

Prognosis:

Based on its genetic etiology, Hunter Syndrome may be considered a Sahaja Vata Pradhana Tridoshaja Vyadhi with Sarvanga Adhishtana. The mutation in the IDS gene represents an Eka-dosha Vikruti, identifying it as a single-gene disorder. A child born with such congenital abnormalities may be described as Puti Praja or Mriyamana Suta (diseased offspring). The involvement of multiple Doshas, Dhatus,

Srotas, and Rogamarga indicates a Bahu-Dosha and Gambhira-Dhatu Avastha (severe and chronic), making it a Purana, Anupakrama/ Asadhya Vyadhi. Nevertheless, adherence to Pathyahara-Vihara (diet and lifestyle) and repeated Deepana, Pachana, and Srotoshodhana may help reduce the Gambhira Dhatugata Amavastha, improving disease management and quality of life.

Therapeutic Interventions: This comprehensive and individualized ayurvedic protocol of oral medicines and external therapies was formulated to address the multisystem involvement of Hunter syndrome. [Tables 4 and 5] Owing to the chronicity and the lack of standard treatment methods, Yukti Vyapashraya Lakshanika Chikitsa (symptomatic management) which included Deepana, Pachana, and Pratata Shodhana (repeated detoxification) were adopted to improve metabolism. Rasayana was added subsequently to enhance cognitive, emotional, and behavioral functioning. [5]

Table 4: Oral Medicines

Observations	Intervention	Targeted action	Duration
21.06.2025 Irregular appetite, excessive drooling, joint stiffness, restlessness	<i>Pachanamrita Kashaya:</i> 10ml BD with honey AF [Vaidyaratnam Ayurveda Pharmacy, B. No. 25B0237] <i>Hingvashtaka Churna:</i> ¼ tsp BD with Buttermilk BF [SDM Pharmacy, B. No. HIP036] <i>Sukumara Rasa:</i> 1 OD BF [SDM Ayurveda Hospital, MFG. June 2025] Rhukot Oil: Massage Before bath [Kottakkal Arya Vaidya Sala- B. No. 751122]	<i>Pachana, Agnivardhaka</i> (digestive stimulant) <i>Jataragni Vardhaka</i> (appetite enhancer), <i>Amapachana</i> <i>Medhya Rasayana</i> (cognitive enhancer) <i>Vatahara, Sandhi Mardavakara</i> (Relieves joint stiffness)	30 Days
19.07.2025 Rashes over bilateral elbows and lower back, H/O fever, Mild reduction in joint stiffness	<i>Hareetaki Khanda:</i> 1 tsp HS [Anchan Ayurvedic Industries, B. No. 359] Other same medicines continued.	<i>Mrudu Anulomana</i> (mild laxative), <i>Agnivardhaka</i>	30 days
23.08.2025 Mild Joint stiffness persists, Improved appetite and bowel patterns, hyperactivity and restlessness persist	<i>Triphala Churna:</i> ¼ tsp HS with ghee and honey [SDM Pharmacy, B. No. TRP079] <i>Hareetaki Khanda:</i> 1 tsp HS [Kottakkal Arya Vaidya Sala- B. No. 751122] <i>Sukumara Rasa:</i> 1 OD BF [SDM Ayurveda Hospital, MFG. August 2025] Rhukot Oil: Massage Before bath	<i>Chakshushya</i> (vision promoting), <i>Deepana</i> <i>Mrudu Anulomana, Agnivardhaka</i> <i>Medhya Rasayana</i> <i>Vatahara, Sandhi Mardavakara</i>	30 days

	[Kottakkal Arya Vaidya Sala- B. No. 751122]		
06.10.2025	<i>Triphala Ghrita</i> : ½ tsp with warm milk and honey HS [SDM Pharmacy, B. No. TPG017]	<i>Rasayana, Medhya, Chakshushya, Srotoshodhaka</i>	30 days
C/O of Cold and Cough for 15 days, increased weight gain, hyperactivity and restlessness persist, improved joint mobility	<i>Sukumara Rasa</i> : 1 OD BF [SDM Ayurveda Hospital, MFG. October 2025]	<i>Medhya Rasayana</i>	
	<i>Shunti Churna</i> : 30 gm; [SDM Pharmacy, B. No. SNP042]	<i>Deepana, Rochaka</i> (appetizing),	
	<i>Loha Bhasma</i> : 5 gm; [Shree Dhootpapeshwar Ltd., B. No. P241000215]	<i>Rakta Prasadaka</i> (blood purifier),	
	<i>Pravala Bhasma</i> - 3 gm; [Shree Dhootpapeshwar Ltd., B. No. P250500115]	<i>Kasa- Swasahara</i> (Antitussive and respiratory-supportive), <i>Balya</i> (strength promoting), <i>Twak</i>	
	<i>Hareetaki Churna</i> - 10 gm; [SDM Pharmacy, B. No. HRP020]	<i>Prasadakara</i> (skin nourishing),	
	¼ tsp with honey BD BF	<i>Mrudu Anulomana, Agnivardhaka</i>	
15.11.2025	Same medicines were continued.		20 days
Reduction in hyperactivity. Improvement in concentration. Regular Appetite			
22.11.2025	<i>Jeerakarishtha</i> : 2.5 ml BD with 2.5 ml of water AF [Vaidyaratnam Ayurveda Pharmacy, B. No. 25B0720]	<i>Agnivardhaka</i>	8 days
Improvements in concentration and reduced hyperactivity. Advised for admission.	<i>Sukumara Rasa</i> : 1 OD BF [SDM Ayurveda Hospital, MFG. October 2025]	<i>Medhya Rasayana</i>	
29.11.2025	<i>Bringarajaasava</i> : 2.5 ml BD with 5 ml of water AF [Vaidyaratnam Ayurveda Pharmacy, B. No. 25B0676]	<i>Rasayana, Yakrut Uttejakara</i>	30 days
Review medicines on discharge	<i>Sukumara Rasa</i> : 1 OD BF [SDM Ayurveda Hospital, MFG. October 2025]	<i>Medhya Rasayana</i>	
	<i>Dhanyaka Jala</i> : 30 ml per day	<i>Deepana, Pachana, Pittahara</i>	
	<i>Triphala Ghrita</i> : ½ tsp HS with warm milk and honey [SDM Pharmacy, B. No. TPG017]	<i>Rasayana, Medhya, Chakshushya, Srotoshodhaka</i>	
	<i>Shunti Churna</i> - 30 gm; [SDM Pharmacy, B. No. SNP042]	<i>Agnideepaka, Amapachaka</i>	
	<i>Loha Bhasma</i> - 5 gm; [Shree Dhootpapeshwar Ltd., B. No. P241000215]	<i>Raktaprasadaka</i>	
	<i>Pravala Bhasma</i> - 3 gm; [Shree Dhootpapeshwar Ltd., B. No. P250500115]	<i>Kasa- Swasahara, Balya, Twak Prasadakara</i>	
	<i>Hareetaki Churna</i> - 10 gm; [SDM Pharmacy, B. No. HRP020]	<i>Anulomana, Tridosha Shamaka, Rasayana</i>	
	<i>Yashti Churna</i> - 5 gm; [SDM Pharmacy, B. No. MYP059]	<i>Medhya, Vrisya, Rasayana</i>	
	¼ tsp BD with honey BF		

Table 5: External Therapies

Day	Procedure	Intervention	Action
Days 1- 5	<i>Udgharsana</i>	<i>Kolakulathadi Churna</i> [SDM Pharmacy, MFG. November 2025], processed in <i>Dashamula Kashaya</i>	<i>Pravara Rukshana</i> (reduces <i>Kapha</i> , clears obstruction), <i>Sroto Mukha Vishodhana</i>
	<i>Parisheka</i>	<i>Dashamula Kashaya</i> and <i>Dhanyamla</i>	<i>Vatahara</i> , <i>Sandhi Stambhagna</i> , <i>Srotoshodhana</i> , reduces stiffness and inflammation
Days 6- 8	<i>Utsadana</i>	<i>Kolakulathadi Churna</i> [SDM Pharmacy, MFG. November 2025] processed in milk	<i>Brimhana</i> (nourishment) with <i>Mrudu Rukshana</i> , improves flexibility, <i>Twak- Mamsa Prasadana</i>
	<i>Nadi Sweda</i>	Local steam therapy	<i>Swedana</i> , <i>Stambhahara</i> , Reduces joint stiffness, improves mobility
Days 1- 8	<i>Shirodhara</i>	<i>Brahmi Taila</i> [Athreya Ayurveda Pharma, B. No. AUS803]	<i>Medhya</i> , <i>Nidrajanana</i> , <i>Vatahara</i> , Enhances cerebral circulation, CNS support
	<i>Shirotalam</i>	<i>Amalaki Churna</i> [SDM Pharmacy, B. No. ALP063], <i>Vacha Churna</i> [SDM Pharmacy, B. No. VCP030] and <i>Brahmi Taila</i> [Athreya Ayurveda Pharma, B. No. AUS803]	<i>Medhya</i> , <i>Mastishka Balya</i> , Neurostimulation, calming effect
	<i>Yoga Basti-Anuvasana</i>	<i>Sarasvata Ghrita</i> [SDM Pharmacy, MFG. October 2026] and <i>Triphala Taila</i> [SDM Ayurveda Pharmacy, B. No. TR0012]	<i>Vata Shamana</i> , <i>Brimhana</i> , <i>Rasayana</i> (nourishment)
	<i>Yoga Basti-Niruha</i>	<i>Triphala Kashaya</i> and <i>Dhanyamla</i>	Detoxification, <i>Srotoshodhana</i> , <i>Lekhana</i> , <i>Amapachana</i> , <i>Medhohara</i> , <i>Agnideepana</i>
	Speech Stimulation	<i>Sarasvata Ghrita</i> [SDM Pharmacy, MFG. October 2026] and <i>Vacha Churna</i> [SDM Pharmacy, B. No. VCP030]	<i>Vaak- Medha- Smruti- Agni Vardhaka</i> , Improves speech and cognitive function

Initially, *Pachanamrita Kashaya* and *Hingvastaka Churna* were prescribed to correct *Agnimandya*, improve metabolism, and facilitate *Mridu Shodhana*. [6] *Sukumara Rasa* was administered as a *Medhya* and *Yogavahi* formulation to support cognition, neuroprotection, and rejuvenation. Daily *Abhyanga* with Rhukot oil was advised for *Vata Shamana* and improved joint mobility. *Haritaki Khanda*, *Triphala Churna*, and *Haritaki Churna* were used for bowel regulation through *Anulomana* and *Srotoshodhana*. *Loha Bhasma* and *Pravala Bhasma* were added to support hematological, nutritional, and skeletal health. Overall, treatment focused on restoring *Agni*, reducing *Srotorodha*, enhancing tissue metabolism, and improving neurocognitive and musculoskeletal functions. After five months of oral therapy, metabolic parameters improved, following which the child underwent eight days of inpatient treatment. The first five days included *Udgharsana* with *Kolakulathadi Churna* in *Dashamula Kashaya* for

Rukshana, followed by *Parisheka* with *Dashamula Kashaya* and *Dhanyamla*, which is *Teekshna* and *Srotoshodana*, for *Vata Shamana*. During the next three days, *Utsadana* with medicated *Kolakulathadi Churna* and *Nadi Sweda* were administered to reduce joint stiffness. *Kolakulathadi Churna*, by virtue of its *Vatahara* action and *Dashamula Kashaya* with *Vata* and *Shothahara* action, brings in *Vatanulomana* and eases stiffness. *Shirodhara* with *Brahmi Taila* and *Shirotalam* using *Amalaki Churna*, *Vacha Churna*, and *Brahmi Taila* were given for eight days to improve neurocognition. [7] *Yoga Basti* was administered throughout the admission, using *Sarasvata Ghrita* and *Triphala Taila* for *Anuvasana Basti*, and *Triphala Kashaya* with *Dhanyamla* for *Niruha Basti*. *Sarasvata Ghrita* was selected for enhancing *Vaak*, *Medha*, and *Agni*, while *Triphala Taila* provided *Lekhana* action. Together, they functioned as *Yamaka Sneha*, beneficial in neurocognitive disorders. *Triphaladi Niruha Basti* served as a mild *Lekhana*,

Rasayana, and Vatahara therapy. Asya Pratisarana (gentle oral massage) with Sarasvata Ghrita and Vacha Churna, along with regular speech and occupational therapy, was also advised.

Follow up and Outcome:

Owing to the lack of standardized tools for assessing the multisystem involvement of Hunter syndrome, treatment outcomes were evaluated through clinical examination and quality-of-life measures. A limitation of this case report is the lack of post-treatment objective assessments; hence, outcomes were evaluated mainly through clinical and functional parameters. Post-treatment, the child showed reduced limb stiffness and joint contractures, with improved joint mobility. Abdominal protuberance decreased, and appetite and digestion improved. The frequency of respiratory infections was reduced during follow-up.

Improvements were also noted in energy levels, muscle tone, activity, sleep, and behavior. Speech assessment demonstrated clearer articulation of 2-4-word phrases, indicating progress in expressive language. The prescribed medicines and treatment were well tolerated by the child and the adherence and compliance were satisfactory. No adverse events were noted during the treatment and follow-up period. [Table 6 and 7].

Table 6: Goniometric measurements

Joint	Movement	Before (°)	After (°)	Improvement (°)
Shoulder	Flexion	120°	145°	↑ ROM
Elbow	Flexion	110°	130°	↓ Contracture
Wrist	Flexion	50°	65°	↑ ROM
Hip	Flexion	90°	105°	↑ ROM
Knee	Flexion	100°	120°	↓ Contracture
Ankle	Dorsiflexion	5°	10°	↑ ROM

Table 7: Kiddy Kindl Parental Quality of Life questionnaire for children aged 3- 6 years

Domain	Before Treatment	After Treatment	Interpretation
Physical Well-being	Low	Moderate	Decreased fatigue, Increased energy
Emotional Well-being	Low	Moderate	Improved mood, Decreased irritability
Self-esteem	Low	Moderate	Better engagement
Family Interaction	Moderate	Good	Improved behavior at home
Social Contacts	Low	Moderate	Slight improved interaction
School / Activity	Low	Moderate	Better participation
General Well-being	Low	Moderate	Overall improvement

3. DISCUSSION:

Hunter syndrome, caused by mutation of the Iduronate-2-Sulfatase (IDS) gene, leads to progressive accumulation of glycosaminoglycans (GAGs) in multiple tissues, resulting in a complex lysosomal storage pathology with multisystem involvement.[8] From an Ayurvedic perspective, the features noted in this child were predominantly Kapha-Vatanubandha, affecting the normal functioning of Jataragni, resulting in Pitta Dushti. Due to Ama- Sanchaya and Prakupita Dhatu Poshana, there is an abnormal accumulation of metabolites in the tissues leading to overall Mamsa- Meda Pravrudhi. Due to

the chronicity and Bahu Dosha Avastha, features impacting the age-appropriate development and cognitive functioning, such as Buddhimandhyam are also noted. Owing to its genetic origin and extensive systemic manifestations, the condition may be interpreted as a Sahaja Vata Pradhana Tridoshaja Vyadhi involving Sarvashareera. The proposed Samprapti (Etiopathological understanding) of Hunter syndrome is summarized to aid treatment planning. [Figure 2] Although considered an Anupakrama Asadhya Vyadhi based on the principles of Sadhyasadhya, the management primarily aims at symptomatic relief, functional improvement, and

enhancement of quality of life. [9] In the present case, therapeutic interventions emphasizing *Deepana*, *Pachana*, and sustained *Srotoshodhana* were adopted to address the deeper pathology of *Dhatugata Ama*. *Pachanamrita Kashaya*, *Hingvashtaka Churna* act as *Deepana* and *Pachana* by virtue of the ingredients and are considered as *Amahara*, *Jwarahara* (anti-pyretic), and *Srotorodhahara* (relieving obstruction). [10-11] *Haritaki Khanda*, *Triphala Churna*, *Jeerakarishtha*, *Bhringarajasava* and *Shunti Churna* act as *Anulomana*, *Pachana*, and *Rasayana*. *Loha Bhasma*, *Triphala Rasayana* are *Dhatu Vardhana*, *Lekhana Rasayana* and *Chakshushya*. [12] *Yashtimadhu Churna*, *Sukumara Rasa* and *Sarasvata Ghrita* and *Vacha Churna* are *Pachana* and *Medhya Rasayana*. Thus, these medications aid in overall correction of *Agni*, removal of obstruction and providing nutrition to the *Dhatu*. [13] Procedures like *Udgharshana*, *Parisheka*, *Utsadana*, *Nadi Sweda* are *Ruksha*, and aid in *Kapha*, *Medoharatva*, removal of obstruction and restore normal movement of *Vata*. *Yoga Basti* aids in *Srotoshodhana*, *Medohara*, *Amahara*, *Vatahara* and as a *Rasayana*. Additionally, *Lekhana Basti* and *Rasayana Chikitsa* demonstrated beneficial outcomes in this case. Various classical Ayurvedic texts also highlight the importance of *Agni*, the role of *Bijadosha* in congenital disorders, and the significance of early Pediatric intervention. [14] There are no definitive treatments readily available in most developing countries, hence the supportive management is mainstay. This includes physiotherapy to mobilize the joints, providing nutritional management, prevention and treatment of infections, and managing respiratory complications. [15] Early recognition of developmental and metabolic derangements facilitates timely *Avasthika Chikitsa*, thereby improving symptomatic control and overall quality of life. This integrative interpretation illustrates that the complex pathophysiology of Hunter syndrome can be effectively contextualized within the Ayurvedic framework, supporting individualized and metabolism-centered therapeutic strategies for functional improvement and holistic care. [16]

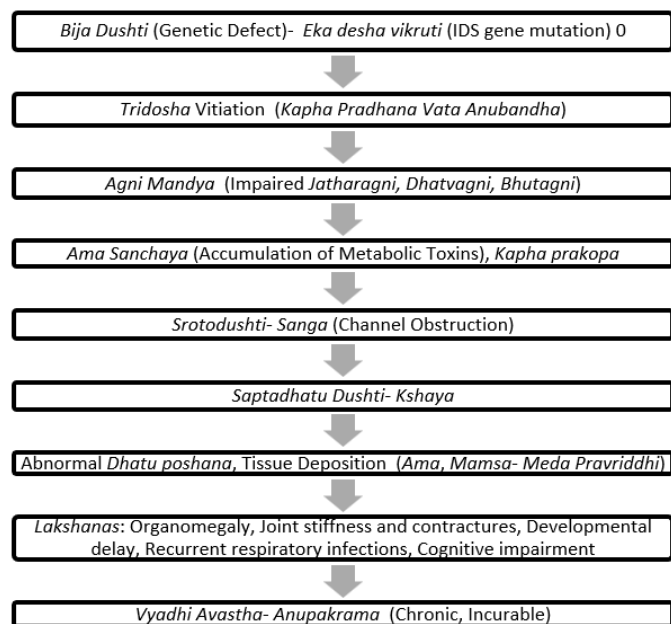


Figure 2: Samprapti

4. CONCLUSION:

The disease may exhibit a recurrent and progressive course due to its *Gambhiravastha*; therefore, continuous, or periodic intervention is necessary as a part of *Yapana Chikitsa*. In this single case study, the therapeutic approach was aimed at providing symptomatic relief and improving overall quality of life. Clinical improvements were observed in metabolic function, sleep pattern, behavior, and anthropometric parameters. Further interdisciplinary research focusing on *Rasayana* therapy and metabolic modulation may help bridge Ayurvedic concepts with contemporary molecular understanding in rare pediatric disorders. Although the evidence from this study is limited to a solitary case, the observed outcomes suggest that this treatment protocol may be further explored in similar cases for the development of a structured management approach.

Abbreviations:

- I2S: Iduronate-2-Sulfatase Enzyme
- GAGs: Glycosaminoglycans
- ADHD: Attention Deficit Hyperactive Disorder
- MPS II: Mucopolysaccharidosis Type II
- OD: *omni die*
- OPD: Outpatient Department
- WHO: World Health Organization

MRI: Magnetic Resonance Imaging

USG: Ultrasonography

IDS: Iduronate-2-Sulfatase Gene

BD: *bis in die*

AF: After Food

Declaration of Patient Consent – The authors confirm that they have acquired a patient consent form, in which the patient or caregiver has granted permission for the publication of the case, including accompanying images and other clinical details, in the journal. The patient or caregiver acknowledges that their name and initials will not be disclosed, and sincere attempts will be undertaken to safeguard their identity. However, complete anonymity cannot be assured.

Patient's Perspective: The child's mother reported concerns about the genetic nature of the disorder and incurability of the disease. Initial concerns were raised on the age-appropriate growth and development, and metabolism of the child. After the first course of oral medications, the mother observed improvements in appetite, sleep, and behavior, and was willing to continue with other external therapies to provide a better quality and independence in life. Overall, the parents were satisfied with the treatment response of the child.

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B. No.: Batch Number

BF: Before Food

HS: *hora somni*

MFG: Manufacturing Date

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