



CASE REPORT

Ayurvedic Management of Neurogenic Bladder in a Child with Caudal Regression Syndrome: A Case Report

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Abstract

Introduction: Caudal Regression Syndrome (CRS) is a rare congenital anomaly of the caudal spine often associated with neurogenic bladder, increasing the risk of urinary tract infections and renal dysfunction. In Ayurveda, such congenital conditions are considered *Adibala Pravritta Vyadhi*, with *Apana Vata* dysfunction leading to *Vataja Mutrakrichra*, manifesting as impaired bladder control.

Case Presentation: A 6-year-old boy with Caudal Regression Syndrome presented with persistent urinary dribbling, continuous diaper dependence, and reduced bladder capacity. A comprehensive Ayurvedic regimen, including *Adhonabhi Pichu*, *Kati Vasti*, *Abhyanga*, *Matravasti*, *Snehapana*, *Virechana*, and *Karma Vasti*, along with internal medications, was administered to restore *Apana Vata* balance and improve neuromuscular coordination

Outcome: Post-treatment, bladder capacity improved with preserved renal function. The child achieved continence, discontinued diaper use, and attained independent voluntary voiding.

Conclusion: Early recognition and integrative management of neurogenic bladder in CRS can preserve renal function and improve quality of life. Ayurvedic interventions targeting *Apana Vata* may serve as an effective complementary approach, as demonstrated by the functional improvement in this case.

Introduction

Caudal Regression Syndrome (CRS) is a rare congenital anomaly characterized by abnormal development of the caudal spine, ranging from partial sacroccygeal agenesis to complete absence of the lumbosacral spine, with an estimated incidence of 1-2.5 per 100,000 live births¹. It presents as a spectrum of spinal, gastrointestinal, genitourinary, and lower limb anomalies. Neurogenic bladder is a common and challenging complication that, if untreated, may lead to recurrent urinary tract infections, vesicoureteral reflux, and progressive renal dysfunction². The severity of neurological and urological impairment correlates with the level

and extent of spinal involvement. Caudal Regression Syndrome is strongly associated with maternal diabetes and arises from abnormal development of the caudal mesoderm before the 7th week of gestation ³.

Ayurveda emphasizes several principles and guidelines for ensuring healthy progeny and the birth of a normal child. Vitiation of *Beeja* and *Beejabhaga* is considered a key cause of such anatomical defects. Among these, the six determinants known as *Shadgarbhakara Bhavas* play a pivotal role in shaping the health and well-being of the offspring. Any deficiency or impairment in factors such as *Matrija*, *Pitrija*, *Atmaja*, *Rasaja*, *Satmyaja*, and *Sattvaja* may result in congenital anomalies or structural abnormalities.⁴⁻⁷

From an Ayurvedic perspective, Neurogenic bladder can be conceptualized as an *Adibala Pravritta Vyadhi* (congenital disorder) with *Vata Dosha* predominance, particularly *Apana Vata*, which governs pelvic functions, lower limb movements, and voluntary control of micturition and defecation. Dysfunction of *Apana Vata* may manifest as *Vataja Mutrakrichra*, presenting clinically as impaired bladder control. Targeted Ayurvedic interventions aim to restore *Apana Vata* balance, improve neuromuscular coordination, and support tissue regeneration.

The uniqueness of this case lies in the demonstration of functional recovery of neurogenic bladder in a pediatric Caudal regression syndrome patient through Ayurvedic management, which is rarely reported. Objective improvements were documented, including an increase in bladder capacity from 80 ml to 203 ml, preservation of renal function, attainment of independent voluntary voiding, and discontinuation of diaper use. This integrative approach, combining modern urological evaluation with Ayurvedic therapy, highlights a novel, complementary strategy in managing a complex congenital

disorder and underscores the potential role of traditional interventions in improving quality of life.

Patient Information

A 6-year-old male child, firstborn of a 22-year-old primigravida mother, was delivered at term via normal vaginal delivery with a birth weight of 2.4 kg. The mother had no history of gestational diabetes, and all prenatal scans were normal. Since birth, the child had persistent urinary dribbling with continuous diaper dependence and experienced alternating constipation and diarrhea during infancy, while developmental milestones were appropriate. Symptoms became more evident after the birth of a healthy younger sibling, who had a normal urination pattern. Leakage increased with physical exertion, sneezing, or coughing. At 6 years, evaluation with ultrasonography and CT scan confirmed Caudal Regression Syndrome with neurogenic bladder, with pre-treatment bladder capacity of 80 ml and significant post-void residual urine. The child also experienced recurrent urinary tract infections. There was no family history of similar congenital anomalies. He attended school with age-appropriate social and developmental progress, though remained dependent on diapers.

Clinical Findings

- Persistent urinary dribbling since birth with continuous diaper dependence.
- Alternating constipation and diarrhea during infancy. The bowel pattern is currently normal.
- Leakage worsens with physical exertion, sneezing, or coughing.
- Developmental milestones appropriate for age; attends school with age-appropriate social and developmental progress.
- Recurrent urinary tract infections.
- No family history of congenital anomalies.

Timeline

Time / Age	Clinical Findings	Interventions	Outcome
Birth	Term vaginal delivery; Birth Weight- 2.4kg. Persistant wetting of diaper.	Routine newborn assessment& prenatal scans -normal	
Infancy (0-1 yr)	Persistent urinary dribbling. Normal developmental milestones		Diaper dependence; normal developmental milestones
Age 2–5 yrs	Alternating constipation and diarrhea & recurrent UTI episodes	Ultrasound kidneys	Symptomatic treatment
Age 6 yrs	Persistent involuntary urine dribbling which increased on laughing, running and jumping. Diaper dependence	Ultrasound, CT & MRI Urodynamic assessment	Confirms Caudal regression syndrome with Neurogenic Bladder. Functional assessment documented; bladder capacity 80 ml
Age 6yrs and 6 months Started Ayurvedic treatment Completed ayurvedic treatment. Duration of treatment-2months Follow up after 2 months		<i>Sodhana, Samana& Rasayana</i> Treatments	Bladder capacity improved to 203 ml with voluntary voiding, discontinuation of diaper use and preserved renal function Sustained bladder control and enhanced overall quality of life.

Diagnostic Assessment-

Abdominal Ultrasonography: Distended bladder with mild diffuse irregular circumferential bladder wall thickening, suggestive of cystitis.

Urodynamic Study: Markedly reduced bladder capacity (80 ml), frequent passage of small urine volumes, significant post-void residual urine (56 ml), maximum voided volume 24 ml, low flow rates (Qmax 3.7 ml/s, average 2.4 ml/s), prolonged voiding time.

Micturating Cystourethrogram (MCUG): Small capacity bladder with irregular thickened wall.

Computed Tomography (CT) Scan: Confirmed Caudal Regression Syndrome.

Magnetic Resonance Imaging (MRI): Confirmed Type I Caudal Regression Syndrome.

Therapeutic Intervention

Sodhana chikitsa-

Treatment	Medicine	Dosage
Deepana & Pachana For 2days	<i>Gandharva hastadi phanta kashaya</i>	60 ml bd with <i>guda</i> and <i>induppu</i>
	<i>Hinguvachadi Churna</i>	5gm with kanji
	<i>Vaiswanara churna</i>	3gm with ghee
		20ml-20ml
Avapeedaka Snehapana 7days	<i>Sukumara Ghrita</i>	20ml-20ml
		30ml-30ml
		30ml-40ml
		40ml-50ml
		50ml-50ml
Abhyanga 3days	<i>Dhanwantharam Thaila</i>	
Avagaha 3 days	<i>Chittamrit+dhanyamla+ induppu avagaha</i>	
Mridu Virechana	<i>Avipathi churna +honey</i>	5gm
<i>Samsarjana krama</i> 3days		
Adhonabhi pichu 10days	<i>Dhanwantharam thaila+Murivenna</i>	
<i>Dhara</i> 7days	<i>Dhanyamla Dhara</i>	
<i>Kateevasthi</i> 7days	<i>Dhanwantharam Taila</i>	
<i>Kizhi</i> 7days	<i>Manjal Kizhi</i>	
<i>Matravasti</i> 5days	<i>Dhanwantharam Mezhukupakam</i>	50ml
<i>Karma vasti</i> 30 days	<i>Mustadi yapana Vasti & Dhanwantharam Mezhuku pakam as Snehavasti</i>	Sneha vasti dosage - 60ml
<i>Rasayana</i> For 30 days	<i>Vasthyamayantha ghritam</i>	10gm twice daily

Medicineds for Mustadi Yapana vasti

Mustadi Ksheera Kwatha-145 ml

Meat soup-35 ml

Honey-70ml

Kalka-5gm

Salt-3gm

Vasthyamayantha Ghritam-70ml

Medicine for Kwatha-

Musta

Ushira

Bala

Aragwada

Rasna

Manjishtha

Katurohini

Trayamana

Punarnava

Vibheetaka

Guduchi

Stiradi panchamula

Madanaphala

Ksheera

Medicines For Kalka

Yashtimadhu

Shatapushpa

Priyangu

Kutaja beeja

Rasanjana

Shamana Chikitsa- *Vyaghri Aghoradi kwath* 60 ml bd before food

Rasayana Chikitsa- *Vasthyamayantha ghrita* 10gm twice daily before food with hotwater

Follow-up and Outcomes

Although no structural changes were observed, functional improvements significantly enhanced the child's quality of life. After completing the course of *Matravasti*, a marked improvement was noted in bladder control. Urinary dribbling was significantly reduced, and when the child voided at regular intervals, his shorts remained completely dry. Following *Karma Vasti*, bladder capacity improved substantially from 80 ml to 203 ml, voluntary voiding was achieved, diaper use was

discontinued, and renal function was preserved. At the 3-month follow-up, the condition remained stable with sustained improvement in bladder control and overall quality of life.

Discussion

This case highlights the potential of Ayurvedic therapies in managing neurogenic bladder associated with Caudal Regression Syndrome (CRS). While CRS is structurally incurable, functional improvements in bladder control can significantly enhance quality of life.

From an *Ayurvedic perspective*, CRS may be conceptualized as an *Adibala Pravritta Vyadhi*, a congenital condition arising from *Beejadosha* (genetic factors), with predominance of *Vata Dosha*, particularly *Apana Vata*, which governs pelvic functions, lower limb movements, and voluntary control over micturition and defecation⁹⁻¹⁰. Involuntary urine dribbling in this child can be correlated with *Vataja Mutrakrichra*, a type of *Mutraghata* caused by *Apana Vata* dysfunction¹¹.

Structural anomalies in Caudal Regression Syndrome may further manifest as:

Srotodushti: Affecting *Asthivaha*, *Majjavaha*, and *Mutravaha srotas*

Dhatu Dushti: Improper formation of *Mamsa*, *Asthi*, and *Majja dhatus*, resulting in defective musculoskeletal and nervous structures

Dhatu Kshaya: Leading to *Balakshaya*, manifesting as inability to control bladder and anal functions

The stepwise Ayurvedic management employed was comprehensive and integrative. Therapy commenced with *Deepana-Pachana* using *Gandharvahastadi Phanta kashaya*, *Hinguvachadi Churna*, and *Vaishwanara Churna* to correct *Agni* dysfunction and eliminate *Ama*, preparing the patient for subsequent *Snehapana* and *Shodhana*.

Sukumara Ghrita can be administered even in delicate individuals without strict dietary restrictions, making it especially suitable for conditions associated with *Apana Vata* dysfunction. In this case, *Avapeedaka Snehapana* with *Sukumara Ghrita* was administered incrementally over seven days, following classical *Snehapana* principles to induce systemic oleation and maintain *Anulomana*. The formulation, containing *Dashamoola* and *Eranda Taila*, plays a pivotal role in *Apana Vata* regulation by facilitating clearance of obstructions, pacifying *Vata* and *Kapha*, and supporting normal pelvic function, thereby contributing to improved neuromuscular coordination and elimination processes.

Vyaghri Aghoradi kwath is a special formulation indicated for *mutraghata*. It is an *anubhuta yoga*. The contents of this yoga are *Kantakari*, *Akhori* (Forest pepper), *Triphala*, Root of *Areca palm/Betal nut palm*, Root of *Tulsi* and Sacred fig. It is employed in *Mutraghata*, predominantly on the basis of its *mutrala* and *sothahara* action.

The formulation is designed to relieve *saṅga* and *spasm* in the *mutravaha srotas* by combining *kantakari* group drugs with *teekshṇa*, *uṣhṇa*, *Deepana*, *paachana* and diuretic *dravyas*, thereby addressing both functional obstruction and inflammatory components of urinary retention. *Vyaghri* acts as the chief *mutrala* drug, relieving dysuria. *Akhori* enhances diuresis and *srotoshodhana* through *vata-kapha-hara* and *teekshṇa guṇa*. *Triphala* supports *apana vayu anulomana*, reduces *aama* and *sotha*, and facilitates normal micturition. *Areca* root contributes to bladder tone and sphincter support, while *Tulasi* root provides additional *mutrala*, and anti-inflammatory effects. *Asvattha* aids in reducing local edema and maintaining tissue integrity of the urinary tract.

Avagaha was performed following *Abhyanga* with *Dhanvantaram Taila*. *Chittamrit* was finely crushed and incorporated into *Dhanyamla* with the addition of a small quantity of water. The mixture was then gently boiled, after which *Induppu* was added. The prepared medicated liquid was subsequently transferred to a suitable vessel and administered as *Avagaha*, maintaining an appropriately warm temperature.

Mridu Virechana with *Avipathi Churna* facilitated elimination of *Pitta* and *Ama*, followed by *Samsarjana Krama* to restore digestive function.

Targeted therapies including *Adhonabhi Pichu*, *Dhanyamla Dhara*, *Avagaha*, *Katee Vasti*, and *Manjal Kizhi* addressed stiffness, and inflammation, consistent with classical recommendations for *Vata vyadhi*.

Matravasti with *Dhanwantharam Mezhupakam*, a polyherbal oil with *Vata*-pacifying, neuroprotective, and nervine tonic properties, supported musculoskeletal strength, neuromuscular coordination, and pelvic muscle function, contributing to improved bladder control.

Karma Vasti with *Mustadi Yapana Vasti* and *Dhanwantharam mezhuku pakam* as *snehavasti* provided long-term tissue nourishment and *rasayana* effects preventing recurrence. In *Karma Vasti*, a total of 30 *vastis* are administered, comprising 18 *Anuvāsana* and 12 *Nirūha*. The regimen begins with an *Anuvāsana Vasti* on the first day, followed by alternating administration of 12 *Nirūha* and 12 *Anuvāsana*. The course concludes with five consecutive *Anuvāsana Vastis*. Thus, the schedule consists of 18 *Snehana* (*Anuvāsana*) and 12 *Nirūha*, making up 30 in total.¹²

The comprehensive regimen including external therapies (*Abhyanga, Pichu, Kati Vasti*), internal therapies (*Matravasti, Snehapana*), and purificatory procedures (*Virechana*) may have contributed to functional improvement through multiple mechanisms:

- Strengthening pelvic and abdominal musculature
- Enhancing neuromuscular coordination and bladder control
- Improving digestion and reducing *Ama*
- Supporting tissue regeneration

The child achieved voluntary bladder control, discontinued diaper use, and attained independent voiding. These outcomes suggest that Ayurvedic management may serve as a valuable complementary approach for neurogenic bladder associated with Caudal Regression Syndrome.

Patient Perspective

The parents reported that prior to treatment, persistent urinary dribbling and diaper dependence caused distress for the child and family. Following Ayurvedic therapy, they observed marked improvement in bladder control, discontinuation of diapers, and enhanced confidence in daily activities.

Informed Consent

Written informed consent was obtained from the patient's parents for publication of this case and any accompanying clinical details.

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