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Case Study

MANAGEMENT OF AUTISM SPECTRUM DISORDER WITH *ABHAYAGHRITA* AND *PANCHA BHAUTIKA TAILANASYA*- A CASE REPORT

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ABSTRACT

Autism Spectrum Disorder (ASD) is a lifelong neurodevelopmental condition with its onset before the age of three years. It is characterized by abnormalities in communication, impaired social function, repetitive behaviours and restricted interests. There is no effective treatment currently available for ASD and there is a growing need of an alternative treatment modality. A three year six month old male patient, diagnosed with ASD was brought to the OPD for Ayurvedic treatment of ASD. There is no mention of ASD in Ayurveda classics and hence, considered an *Anukta Vyadhi*. ASD involves vitiation of all the three *Doshas* mainly *Vata Dosha* in the lead. The management was primarily based on the associated *Doshas* and Ayurvedic formulations i.e. *Abhaya Ghrita* orally for three months and *Marsha Nasya* with *Panchabhautika Taila* for forty five days were used. Changes in the clinical features were assessed using Aberrant Behaviour Checklist (ABC) and changes in the severity of disease after treatment was done using Clinical Global Impression scale (CGI). The patient showed significant improvement in the core features of ASD after the treatment duration.

KEYWORDS: Autism Spectrum Disorder, *Abhaya Ghrita*, *Panchabhautika Taila*, *Nasya.*

INTRODUCTION

Autism spectrum disorder (ASD) is a group of heterogeneous childhood onset neurodevelopmental conditions characterized by social communication deficits, restricted interests and repetitive behaviors.[1] Autism spectrum disorder (ASD) is the term adopted by the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) released in May, 2013 by the American Psychiatric Association (APA) to encompass the previous diagnoses of autism, Asperger syndrome, pervasive developmental disorder not otherwise specified (PDD-NOS), and childhood disintegrative disorder. The clinical features of ASD fall into two categories: Social Interaction and Communication problems and Restricted and repetitive patterns of behaviors, interests or activities. The commonest sign and symptoms of ASD include absent or inconsistent eye contact, not responding to his/her name on being called, lack of social smile and social babbling, not playing with peers or children of same age, prefer to stay alone, unable to stay still for any length of time, flapping of hands and excess sensitivity to touch and sound.

The exact cause of ASD is still under research. However, results from twin and family studies provide evidence for a strong genetic contribution, with multiple loci potentially involved.[2] Investigations of non-heritable factors suggest that environmental influences may also be etiologically important, and neuro-pathologic and biomarker studies provide compelling evidence for a prenatal origin.[3,4] Linkage studies have implicated a polygenic basis for autistic disorder.[5] The risk of ASD increases with advanced maternal and paternal age.[6] Moreover, although some studies suggest that autistic characteristics are due to central nervous system(CNS) dysfunction, there is evidence of autism-related abnormalities that are not related to the CNS, at least in some individuals. Hence, the metabolic system, immune system dysregulation and oxidative stress have also been implicated in the etiology.[7] The global prevalence of ASD has increased manifold in the past two decades owing to increased parental awareness, screening of high risk infants and improved diagnostic criteria. According to Centers for Disease Control and Prevention (CDC), about 1 in 59 children have been identified with Autism Spectrum Disorder (ASD) in United States in 2014 as compared to 1 in 69 in 2012. Males were four times more likely than females to be identified with ASD.[8] There is currently no definite cure for ASD, various behavioral therapies and use of

pharmacological agents is currently used to manage the core features of ASD. However, their effectiveness, cost and safety are of prime concern among parents of ASD children.[9]

Though there are numerous references of psychological disorders in Ayurveda classics, there is no description of exact clinical condition mimicking ASD. Hence, ASD can be classified as an *Anukta Vyadhi* as per Ayurveda principles and upon understanding its pathophysiology, management is made based upon involvement of *Doshas*, *Dushya*, *Dhatu*, *Mala*, *Agni*, *Srotas*, *Adhishthana*, *Nidana Panchaka*, *Doshaja Prakriti*, *Rogi Pareeksha*, *Roga Pareeksha*, and *Manasa Prakriti*. The clinical features of ASD also found resemblance with the disease entity *Unmada* mentioned in all the major Ayurveda classics. Upon keen consideration of etiopathogenesis involved in ASD, there is a need of medications and *Panchakarma* procedures which can target the higher centers of brain in order to manage the core features of ASD. Ayurveda systems of medicine possess wealth of single herbs, formulations and *Panchakarma* procedures that can efficiently address the ever increasing prevalence of ASD.

Case Report

A three year six months old male child was brought by his parents to the Kaumarabhritya OPD, All India Institute of Ayurveda with a diagnosis of Autism Spectrum Disorder (ASD). He was diagnosed with ASD at a Govt. Hospital, Delhi at the age of 32 months. His chief complaints were delayed speech, poor eye contact, repetitive hand movements, increased irritability and abnormal behaviour.

History: The patient was born at term through normal vaginal delivery with a birth weight of 3.4 kg. There was no history of fetal distress and neonatal jaundice or seizures. He was vaccinated as per the schedule. There was no history of maternal infections, chronic illness, fever, rashes, and use of medications during the pregnancy. Mother's age at the time of conception was 21 year while paternal age was 26 year. Patient's mother reported that as an infant and toddler, he was healthy and his motor development was within normal range for the major milestones of sitting, standing and walking. He was able to make sounds and speak few monosyllable words by the end of 15 months, however there was significant delay in communication development. At the age of 14 months, the mother noticed that the child is not paying attention to her verbal or non-verbal commands and was having inconsistent or poor eye contact with parents or family members. There was difficulty in responding to when being called by name. By the end of 24 months the parents started observing odd behaviour as the patient started making repetitive hand movements, playing or staying alone, not interacting with children of same age, hyperactivity and irritability. Despite the odd behavioral presentations, delayed speech was the major concern for which he was taken to the hospital at the age of 32 months. There he was diagnosed with ASD. He had average intellect. The patient took occupational and speech therapy, twice weekly for a period of 6 months at a Government Hospital, Delhi. Mild improvement in speech and behaviour was noticed by the parents, but therapy was discontinued citing economical and very slow improvements in the features of the patient. In need of an alternative, safe and economical treatment, they brought the child to the Kaumarabhritya OPD of All India Institute of Ayurveda with complaints of impaired understanding, impaired social interaction, lack of attention and concentration, increased hyperactivity and repetitive hand movements.

Clinical Assessment

During the clinical assessment, the patient was constantly restless, appeared disinterested and was easily distracted. Upon calling his name he did not responded. He kept making sounds and touching things in the examination room. He resisted physical touch and didn't make eye contact while responding to the questions asked. He was repeating certain words indicating echolalia. He was able to point out his things of interest using verbal or non-verbal means. Speech was clear but was not able to speak full sentences. There was lack of gestures like hello, bye, etc., but only used them when told by his parents and that too was done with least interest or looking at the person. On neurological examination, higher mental functions were found impaired, while motor functions were intact. There was no sensory deficit seen. Other systemic examination was within normal functioning state. Personal history revealed poor eating habits with irregular bowel evacuation. The patient was found to be having *Vata-Kaphaja Prakriti* with *Madhyama Sara*, *Satva*, *Samhanana* and *Satmya*. His mental constitution was of *Rajasika* type. The presenting disease condition indicated vitiation of all the three *Doshas* predominantly *Vata Dosha* with involvement of *Manovaha Srotas*. The site of pathogenesis is *Shirah* (brain).

Methods: The child was assessed again for the diagnosis of ASD using INCLEN diagnostic tool for Autism Spectrum Disorder (INDT-ASD).[10] The child fulfilled the criteria for the diagnosis of Autism. The severity of the disease condition was assessed using Clinical Global Impression (CGI) scale[11] before treatment and after treatment. The clinical features of ASD were evaluated using Aberrant Behaviour Checklist – Community[12] before and after treatment.

Management: The management of the disease condition was purely based on the *Doshika* principles of Ayurveda.

Table 1: The treatment procedure adopted is shown in the table below

S.No	Name of the formulation	Dose	Frequency	Route of Administration	Duration
1.	*Abhaya Ghrita*[13]	4gm	Twice daily	Orally before meals	90 days
2.	*Panchabhautika Taila*[14]	6 drops	Once daily	Intranasal	45 days

Table 2: *Abhaya Ghrita* Composition

S.No	Ingredients	Latin name	Part
1.	*Brahmi*	*Bacopamonnieri* (Linn.) Penn.	1 part
2.	*Siddarthak*	*Brassica campestris*Linn.var.rapa(Linn) Hartm	1 part
3.	*Kushta*	*Saussurealappa* C.B. Clarke	1 part
4.	*Sariva*	*Hemidesmusindicus* R.Br	1 part
5.	*Vacha*	*Acoruscalamus* Linn	1 part
6.	*Pippali*	*Piper longum* Linn	1 part
7.	*Saindhav*	Rock Salt	1 part
8.	*Goghrita*	Cow's Ghee	4 part

Table 3: *Panchabhautika Taila* Composition

S.No	Ingredients	Latin name	Part
1	*Jivaka*	*Microstylis muscifera* (Lindl.) Ridl.	1
2	*Rishbaka*	*Microstylis Wallichii* Lindl	1
3.	*Draksa*	*Vitis vinifera* Linn	1
4.	*MadhuYasti*	*Glycyrrhiza glabra* Linn	1
5.	*Pippali*	*Piper longum* Linn	1
6	*Bala*	*Sida cordifolia* Linn	1
7.	*Pundarika*	*Nelumbo nucifera* Gaertn	1
8.	*Brihati*	*Solanum indicum* Linn	1
9.	*Manjistha*	*Rubia cordifolia* Linn	1
10	*Twak*	*Cinnamomum zeylanicum*	1
11	*Punarnava*	*Boerhavia diffusa* Linn	1
12	*Ansumati*	*Desmodium gangeticum*	1
13	*Meda**	*Polygonatum Cirrhifolium* Royle	1
14	*Vidanga*	*Embelia ribes* Burn. F.	1
15	*Nilkamala*	*Nympho eastellate* Willd	1
16	*Goksura*	*Tribulus terrestris* Linn	1
17	*Nidigdhika*	*Solanum xanthocarpum* Schrad & Wall	1
18	*Saidhava*	*Rock salt*	1
19	*Rasna*	*Pluchea lanceolata* Oliver & Hiern	1
20	*Sarkara*	Sugar	1
21	*Jala*	Water	16 part
22	*Tila Taila*	*Sesamum indicum Linn oil*	4 parts
23	*Godugdha*	Cow's Milk	4 parts

Observations and Results: Therapeutic benefits were assessed in terms of changes in the clinical features of the ASD and changes in the severity of the disease at the end of the treatment duration. The patient showed marked improvement in the management of majority of clinical features in the five sub-scales of Aberrant Behaviour Checklist (ABC). The severity of disease was also found to be reduced compared to baseline assessment.

Table showing changes in clinical features BT and AT using Aberrant Behaviour Checklist

Domain	BT	AT
Irritability	12	3
Social Withdrawal	15	3
Stereotypic behavior	14	12
Non-compliance/ hyperactivity	6	5
Inappropriate speech	2	1

BT-Before Treatment, AT-After Treatment

Table showing changes in the severity of disease using Clinical Global Impression Scale:

Severity of Disease	BT	AT
	4 (moderately ill)	3 (mildly ill)

The patient showed minimal improvement upon completion of treatment duration.

DISCUSSION

Autism Spectrum Disorder is an early emerging neurodevelopmental disorder which persist into adulthood with varying degree of deficits in social interaction and communication, and restricted, repetitive behaviour or interest. Multiple etiological factors like genetic, environmental, prenatal, perinatal, and postnatal events, maternal and paternal age, maternal infections, chronic illness and medications during pregnancy have been researched upon as possible risk factors, but definite cause for ASD is still not clear. A deficit in brain development is linked with the impaired social communication and repetitive, restricted behaviours found in ASD according to many studies.[15] Various regions of brain have been suggested to mediate clinical phenotypes of ASD such as the fronto-temporal lobe, frontoparietal cortex, amygdala, hippocampus, basal ganglia, and anterior cingulate cortex (ACC).[16] There is no description of Autism found in the Ayurveda classics. It can be considered as an *Anukta Vyadhi*. Moreover Acharya Charaka stated that it is really difficult and not necessary to name every disease owing to its multifactorial etiology and complex pathogenesis and therefore with clear understanding of vitiated *Doshas*, *Nidana* and *Vyadhi Adhisthana* (site of disease manifestation), a physician is able to successfully initiate the *Chikitsa Karma* (management).[17] Balanced state of *Vata Dosha* is said to be the controller of all the motor and sensory actions in the body. *Vata* controls and coordinate the mental faculties. It enables proper breathing movements and circulation of *Dhatus* all over the body. [18] Due to this, *Vata* is considered to be the controller of nervous system in Ayurveda. The clinical features found in ASD are indicative of impaired higher mental functions due to an unknown cascade of events occurring in the prefrontal executive circuits, reticular activating system, autonomic nervous system, enteric nervous system, limbic system and hypothalamus regions of the brain. Thus treatment principle adopted in the present case report is the *Shamana* of the vitiated *Tridosha* predominantly *Vata* located in the *Shirah* (head) with the oral administration of *Abhaya Ghrita* and *Marsha Nasya* with *Panchabhautika Taila*. *Abhaya Ghrita* is a *Lehana* formulation described in *Kashyapokta Lehadhyaya* consisting of six herbs Viz. *Brahmi* (*Bacopamonnieri* (Linn.) Penn), *Vacha* (*Achorus calamus* Linn), *Siddharthaka* (*Brassica campestris* Linn), *Kushtha* (*Saussurea lappa* C.B.Clarke), *Sariva* (*Hemidesmus indicus* R.Br), and *Pippali* (*Piper longum* Linn). *Brahmi* is well established herb used for memory enhancement[19] and treating various central nervous system disorders. Pharmacological studies have shown *Brahmi* possesses central nervous system effects (memory enhancement, antidepressant, anxiolytic, anticonvulsant and antiparkinsonian), antioxidant, gastrointestinal, endocrine, anti-microbial, anti-inflammatory, analgesic, cardio-vascular and smooth muscle relaxant effects. *Vacha* has neuro-modulatory[20] and anticonvulsant effect.[21] *Kushtha* and *Sariva* possess anti-psychotic, anti-inflammatory and anti-oxidant effects. *Pippali* enhance the bioavailability of the active components along with its anti-oxidant, anti-epileptic and antidepressant effect,[22] anti-inflammatory, immuno-modulation, anti-convulsant, central nervous stimulant, smooth muscle relaxant effects. Oral intake of *Abhaya Ghrita* protect the child from ill effects of *Pishacha*, *Rakshas*, *Yakshas*, and *Matrakas* (Invisible evil entities that can cause physical and psychological suffering to the child).[23] *Abhaya Ghrita* improves speech, vocabulary, language, cognitive functions, memory, intelligence and vision. *Abhaya Ghrita* is

predominantly *Vata Kapha Shamaka* owing largely to its *Ushna Veerya* and *Katu Vipaka*. The ingredients largely have *Tikta*, *Katu*, *Madhura Rasa* which is responsible for *Agnideepana* and *Amapachana* action, thereby maintaining optimal digestion, metabolism and assimilation process in the body and removing the toxins due to *Ama Dosha*. Moreover, being a *Ghrita* based formulation, it provide added therapeutic properties of *Ghrita* like *Medhya*, *Ayu Vardhaka*, *Balavardhaka*, *Ojovardhaka*, *Vayasthapaka*, *Dhatuposhaka*, and *Unmada*, *Apasmara*, *Mada*, *Murcha*, and *Shoshanashaka* properties.[24]

It is important to have an alternate route of drug delivery that may target the nervous system directly and therefore *Nasya* (intranasal therapy) using *Panchabhautika Taila* was adopted in the present case. Intranasal delivery is emerging as a noninvasive option for delivering drugs to the CNS with minimal peripheral exposure. Additionally, this method facilitates the delivery of large and/or charged therapeutics, which fail to effectively cross the blood-brain barrier (BBB). Thus, for a variety of growth factors, hormones, neuropeptides and therapeutics including insulin, oxytocin, orexin, and even stem cells, intranasal delivery is emerging as an efficient method of administration, and represents a promising therapeutic strategy for the treatment of diseases with CNS involvement, such as Alzheimer's disease, Parkinson's disease, Huntington's disease, depression, anxiety, autism spectrum disorders, seizures, drug addiction, eating disorders, and stroke.[25] *Panchabhautika Taila* is described by Acharya Kashyapa in *Shatakalpadhyaya* to be used in the form of nasal instillation (*Nasya*).[26] It contains twenty two ingredients. Considering the pharmacodynamics of the formulation, there is a predominance of *Madhura*, *Tikta*, *Rasa*, *Ushna Veerya*, *Madhura Vipaka* and *Tridosha Shamaka* properties. Acharya Kashyapa stated that use of *Panchabhautika Taila* increases the power of all the five *Indriyas* (sense organs). It is also used in diseases of head, insomnia, delirium, speech disorders, and loss of memory. Continuous use of *Panchabhautika Taila* increases memory, intellect and body strength and sense organs become perspicuous. *Tila Taila* is used as the lipid medium in this formulation. *Tila Taila* is considered as best *Vata Shamaka* and has *Medhavardhaka*,[27] *Balya*, *Brimhna*, *Prinana*, and *Garbhasaya Sodhaka* properties. *Marsha Nasya* (6 drops each nostril) with *Panchabhautika Taila* helps in eliminating the aggravated *Vata-Kapha Doshas* located in the *Shirah Pradesh* (head) due to its *Ushna Veerya* and *Tridosha Shamaka* properties.

After the completion of treatment duration, the patient showed significant improvement in core features of ASD and reduction of disease severity. There was no improvement seen in the repetitive behaviour. The present case report shows the efficacy of Ayurvedic treatment in the management of ASD with satisfactory outcomes. The results are encouraging considering the chronicity and non-availability of definite treatment in the contemporary science.

CONCLUSION

ASD is a chronic condition leading to varying degree of functional incapacity going into adulthood. With no definite cause and management, it is a challenge to check the growing enigma of ASD. Parents of children with ASD are looking for safer and more effective mode of treatment and in this regard Ayurveda system of medicine can be a great alternative in the management of ASD. The basic principle of *Tridosha Shamana* is followed in the present case report and the results obtained are encouraging and supportive of the potential that Ayurveda possess in managing conditions like ASD. Therefore, more research is needed to establish the efficacy of Ayurveda treatment in ASD.

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