

AYURVEDIC MANAGEMENT OF THALASSEMIA MAJOR (*BEEJA DUSHTIJANYA PANDU*) AS AN ADJUVANT THERAPY - A CASE STUDY

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ABSTRACT

Thalassemias' are a group of inherited disorders of haemoglobin synthesis that results from an alteration in the rate of globin chain production and abnormal synthesis of the globin chains of haemoglobin. Children born with Thalassemia major usually develop severe anemia, ineffective erythropoiesis, jaundice and haemosiderosis which results in greenish brown complexion. The modern medical management of Thalassemia is blood transfusion (BT) therapy, the only treatment with haemosiderosis (iron overload) as a complication. Iron chelators used in modern medicine are costly and associated with adverse drug reactions. In Ayurveda disease similar to Thalassemia is not described, but based on conceptual understanding, it may be understood as a *Beejadoshajanya*, *Adibala pravritta* and *Sahaja vyadhi* and nomenclature coined as *Beejadushtijanya Pandu*. It can be understood that *Pitta pradhana Tridosha* affects the functions of *Raktavaha srotasa* and ultimately the process of formation of *Rakta Dhatu* is affected and results in *Raktavikriti*. In *Rasashastra* preparations of *Loha*, the toxic effects, when used in excess, in terms of dose and duration or in wrong way are also mentioned. Internal medicine *Gandhakadi Yoga* is a modified form of the drug suggested for *Loha sevanajanya vikara prashamana* (iron overloading management). A Case study on 7 year old male child who have been diagnosed Thalassemia major. His complaint was that severe anemia he is on regular blood transfusion every 30 days., liver and spleen enlarged and the serum iron and serum ferritin values were above normal limits according to investigation. At the end of three months of therapy, his blood report and the symptoms of the disease showed very promising results.

Keywords: *Beejadushtijanya Pandu*, Thalassemia Major, *Gandhakadi Yoga*

INTRODUCTION

Thalassemias are a heterogeneous group of inherited disorders characterized by abnormal synthesis of hemoglobin that result from an alteration in the rate of globin chain production. A decrease in the rate of production of the globins [mainly alpha (α) and beta (β)] impedes hemoglobin synthesis leading to early excessive destruction of red blood cells. This causes hypochromic, microcytic anemia, one of the characteristic presenting symptoms of thalassemia. The thalassaemias result from inherited defects in the synthesis of the globin chains of hemoglobin. Humans have different hemoglobin at various stages of development. Normal adults have a major hemoglobin (Hb) called HbA, comprising about 90% of the total, and a minor component, HbA₂, which accounts for 2–3%. The main hemoglobin in fetal life is HbF, traces of which are found in normal adults too. There are three embryonic hemoglobins. All these different hemoglobins are tetramers of two pairs of unlike globin chains¹.

Ayurveda texts do not describe any disease similar like to Thalassemia But when the patho-physiology and clinical features of the disease is examined under the lens of physiology and pathology concepts of Ayurveda, it may be understood as a *Beejadoshajanya*, *Adibala pravritta* and a *Sahaja vyadhi*, whose nomenclature may be coined as *Beejadushtijanya Pandu*. It is a *Pitta pradhana tridoshaja* disease, wherein the process of formation of *Rakta dhatu* is affected due to *Sahaja karana*, affecting the functions of *Raktavaha srotasa* and results in *Raktavikriti*. In *Rasashastra*, a subject deals with metals and mineral preparations in Ayurveda, the preparations of *Loha* (iron), the toxic effects of it when used in excess, i.e. in terms of

dose and duration or in wrong way, are also mentioned. *Ayurveda Prakasha*², a text authored by Acharya Madhav, special internal medications for toxic effects of iron are mentioned, one such medication suggested as *Loha sevanajanya vikara prashamana* (i.e. clearing the toxic effects of iron, which may be equated to or appears similar to iron overloading) is modified in to *Gandhakadi Yoga*, the adjuvant drug used in this case study.

The case study of a seven year old male child, suffering with Thalassemia major is presented here. He was on regular blood transfusion every 30 days and had severe anemia, liver and spleen enlarged with serum iron and serum ferritin values above normal limits. Other complaints were general weakness and loss of appetite. Both father and mother were carriers of Thalassemia, i.e., Thalassemia minors. The child was on regular blood transfusion with interval of 30 days along with modern medical management deferriximine (250mg). He was administered with *Gandhakadi Yoga* Tablets, the Ayurveda management for three months as adjuvant therapy.

Gandhakadi Yoga is a modified form of the drug suggested for *Loha sevanajanya vikara prashamana* (iron overloading) in *Ayurveda Prakasha*³, the contents and brief details of manufacturing and posology are given below:

Table 1:

Sr.No.	Drug Name	English / Latin	Part used	Quantity
1	<i>Shuddha Gandhaka</i>	<i>Sulphur (purified)</i>	As whole	1 part
2	<i>Vidanga</i>	<i>Embelia robusta</i> Taxonomist	Dry fruit powder	1 part
3	<i>Agastya</i>	<i>Sesbenia Grandiflora</i> Linn.	Green Leaves	Q.S. for <i>Bhavana</i>
4	<i>Bhringaraja</i>	<i>Eclipta alba</i> (L.) Hassk. (syn. <i>Eclipta prostrate</i> L.)	Green Leaves	Q.S. for <i>Gandhaka Shodhana</i>

Q.S.= Quantity sufficient

Method of preparation of Gandhakadi Yoga tablets:

The *Gandhaka* was purified through *Bhringaraja Swarasa* following the standard method⁴, the purified *Gandhaka* and dry powder of *Vidanga* fruits were triturated in the leaf juice of *Agastya*, and then converted into tablet form, each tablet weighing 250 mg.

Posology: The *Gandhakadi Yoga Vati* was administered along with the modern medical management as an adjuvant drug, in the dose of 250mg per day (dose calculated following Young’s Formula)⁵ in divided doses for 12 weeks; *Ushnodaka* (warm water) was used as vehicle of administration.

Observations and Results:

The child had been administered with *Gandhakadi yoga* tablets along with modern medical management for three month duration. It is observed that the BT interval was increased by 5 - 6 days during the treatment period. In the table no.1 shows improvement in CBC parameter and Table no.2 shows the changes in biochemical parameters before and after treatment in the child. The results showed that decrease in serum ferritin, serum iron and increase TIBC level after the three months of treatment period. Figures 1 to 4 are showing the actual reports of the investigations.

Table 2: CBC investigation Table 2 Biochemistry investigation

Lab. Investigation				Lab. Investigation			
	B.T	A.T.			B.T	A.T.	
Hb%	8.3	9.4	(gm %)	<i>S. Tot. Protein</i>	6.3	6.5	gm/dl
TotalRBC	3.22	3.64	(mil/cumm)	<i>S. Albumin</i>	3.1	3.8	gm/dl
TotalWBC	5,700	5,900	/cumm	<i>S. Globulin</i>	3.2	2.1	gm/dl
PCV	23.5	26.9	%	<i>A/ G Ratio</i>	1.0	1.4	
MCV	73.0	73.9	-	<i>S. G. O. T.</i>	223	33	iu/l
MCH	25.8	25.8	-	<i>S. G. P. T.</i>	303	27	iu/l
MCHC	35.3	34.9	-	<i>S. Alkaline Phosphatase</i>	113	154	iu/l
				<i>S. Bilirubin T</i>	0.6	0.9	mg/dl
				<i>S. Bilirubin D</i>	0.4	0.3	mg/dl
				<i>S. Creatinine</i>	0.4	0.6	mg/dl
				<i>S. Iron</i>	216	141	µg/dl
				<i>S. TIBC</i>	266	289	mcg/dl
				<i>S. Ferritin</i>	2358	806	ng/ml

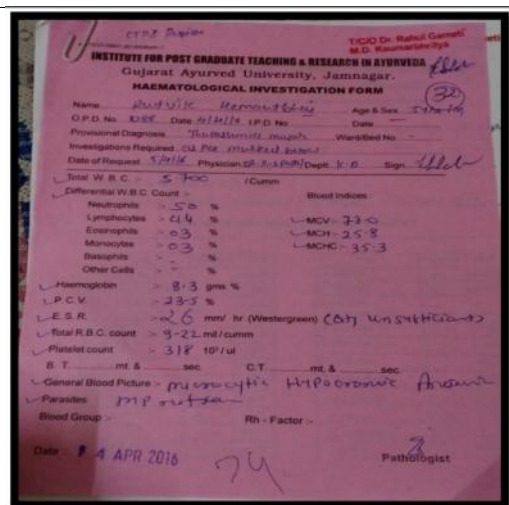


figure no. 1 (before treatment)

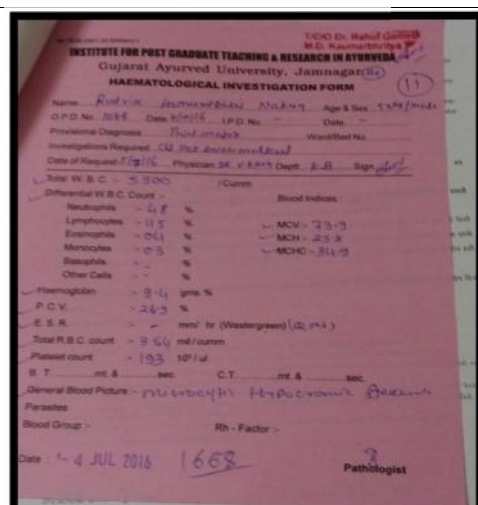


figure no.2(after treatment)

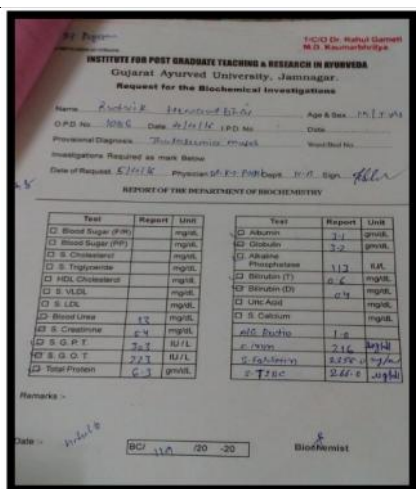


figure no.3(before treatment)

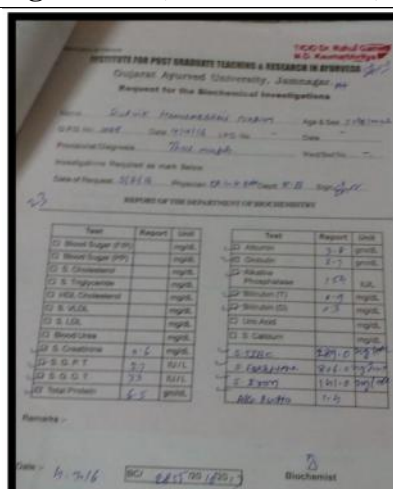


figure no.4(after treatment)

DISCUSSION

Blood Transfusion (BT), the only available management in conventional medicine, the interval of which was increased during the treatment period than earlier. This indicates the reduced pace of destruction of RBC's and breakdown of haemoglobin which leads to repeated BT, and that patient got more benefit by administering ayurvedic medicine as an adjuvant or supportive therapy with the existing manage-

ment. *Rakta shodhana*, *Rakta prasadana*, *Shonita sthaapana*, *Varnya* and *Pandughna* properties of the drug may be responsible for the increase in the BT interval. *Gandhakadi Yoga* tablets showed improvement in almost all the cardinal features as well as in the laboratory parameters. No any adverse drug reactions were noted during the study period.

Agasyapatra swarasa bhaavita Vidanga churna has been mentioned in Ayurveda Praka-

sha in context to *apakva loha sevanajanya vikara Prashamana* (symptoms produced after intake of improperly prepared *loha bhasma* as well as improper digestion of *loha bhasma* (iron overload).⁶ These particular drugs may have chelating effect on iron; thereby their consumption helps to regulate the metabolism of iron and avoid its excess accumulation, thus reducing the chances of possible ADR's if any, thus showing a decrease in S. Iron, S. Ferritin level and increases S. TIBC.

Gandhaka is used as *Lohamaarana dravya* and included in *Lohamaarana gana*⁷. *Maarana* is process by which *Dhatu* (metal) are transformed into absorbable, adaptable and assimilable form⁸.

Bhringaraja swarasa was used for *Gandhaka shodhana*. *Bhringaraja* is proven for its hepatoprotective⁹ and anti-inflammatory¹⁰ activities and also it stabilizes human RBC membrane¹¹. Thus, it helps to reduce the hepatic damage encountered in Thalassemic patients with iron overload. Fragile RBC's are also taken care to a certain extent by the virtue of its property of stabilizing human RBC membrane. Moreover, *Bhringaraja* has *Rasayana* property¹². Recent concept of *Rasayana* equates it with immune modulation and free radical scavenging activities. In a Thalassemic patient excess free iron is unbound to ferritin, a specific protein enzyme and thus acts as free radical. This ionized iron causes tissue damage. Thus, *Rasayana* property of *Bhringaraja* can sustain the free radical damage to a certain extent.

Other ingredients of *Gandhakadi Yoga* include *Vidanga* and *Agastyapatra swarasa*. *Vidanga* contains embelin. Free radical scavenging reactions and antioxidant activity of embelin has been reported. Embelin is found to form

complexes with nearly all metals under suitable pH giving rise to chelated structures. Embelin also showed iron chelating activity in some of the *Loha* preparations like *Vidangadi lauha*, *Saptamrita lauha*¹³ etc.

Agastya was used as *Bhavana dravya*. Protective effect of *Sesbaniagrandi flora* Linn against erythromycin estolate-induced hepatotoxicity has been reported¹⁴. Anxiolytic and anti-convulsive activity of *Sesbaniagrandi flora* Linn leaves in experimental animals has been proved¹⁵. Evaluation of *Sesbaniagrandi flora* Linn for antiurolithiatic and antioxidant properties showed enthusiastic results¹⁶. *Sesbania* leaf is reported to contain Ca (517 mg Ca in 100g leaf protein concentrate-LPC).¹⁷ Calcium antagonizes iron and is proven for its chelation. In short, *Aamapaachana*, *Deepana*, *Pandughna*, *Jwaraghna*, *Vishagna*, and *Rasayana* properties relieve the signs and symptoms of Thalassemia Major. Iron chelation done through *Lohamaarana*, *Lohasevanajanya vikara prashamana* properties of the drug. *Raktashodhana*, *Krimighna*, and *Raktaprasaadana* properties decrease the rapid destruction of RBCs and thus prolonging the Life span of RBCs which increases the BT interval.

Thus, *Gandhakadi Yoga* helps to decrease iron overload from body, normalize iron metabolism, prolong RBCs lifespan, relieve signs and symptoms of the disease, increase BT interval. All these factors increase the expectancy of good life as well as improve quality of life of Thalassemic patients.

In spite of *Ushna Veerya* drugs as major ingredients of *Gandhakadi Yoga* and long duration

(12 weeks) of treatment, there was no any adverse effect was reported by any of the patients during the course of study.

The toxicological study conducted has shown the safety aspect of the drug. This drug *Gandhakadi Yoga* tablet has been evaluated for Iron Sorbitol induced iron overload in albino rats by Pramod Yadav et al (2011)¹⁸.

CONCLUSION

This treatment protocol has been found effective in a single case of thalassemia Major child along with the modern medical management. The medicine used for the management was found effective to increase the blood transfusion interval and to enhance the quality of life and life span of the child. The effect of the treatment protocol should be evaluated on larger scale of the thalassaemic patients.

Acknowledgements:

I, very thankful to Director , I.P.G.T. & R.A., G.A.U., Jamnagar and the Dean, HOD of Pediatric Department, MP Shah Medical College, Jamnagar.also thankful to Staff of the Thalassemia Ward , GG Hospital Jamnagar.

Source of funding: This study is part of PG research work of the corresponding author and the necessary funding is done by IPGT&RA, Jamnagar GAU for the research work.

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Source of Support: Nil

Conflict Of Interest: None Declared

How to cite this URL: Rahul Gameti Et Al: Ayurvedic Management Of Thalassemia Major (Beeja Dushtijanya Pandu) As An Adjuvant Therapy - A Case Study. *International Ayurvedic Medical Journal* {online} 2017 {cited March, 2017} Available from: http://www.iamj.in/posts/images/upload/998_1004.pd