Journal of Stress Physiology & Biochemistry, Vol. 18, No. 4, 2022, pp. 5-10 ISSN 1997-0838

ORIGINAL ARTICLE

OPEN ACCESS

Assessment of Role of Punarnava Mandur in Iron Deficiency Anemia (Pandu Roga) as per Hematogical Parameters: a Clinical Study

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Received May 11, 2022

The present study was planned with a view to assess the efficacy of Punarnava Mandura in Pandu roga on the basis of hematological parameters. Hematological parameters are one of the best tools to accessed anemia in individuals. Mandura Bhasma which is one of the good Haemetinic proved by various research works (experimental and clinical) is main ingredient of this formulation. Punarnava Mandura is a very well known drug by its “Raktajanya” property mentioned by Acharya Charaka.. On the basis of this, the reference regarding this in “Bhaishajya Ratnavali” was assessed for the preparation of this formulation used for management of Pandu clinically. Pandu roga is a disease characterized by pallor of body which strikingly resembles with ‘Anaemia’ of Modern science, disease referring to reduction in number of RBCs per cumm of blood and quantity of Hb resulting in pallor like other symptoms. Pandu Roga can be effectively compared with Anemia on the grounds of its similar signs and symptoms in the modern medicine, there is good treatment for Anemia with considerable result but that is only for acute deficiency Anemias, no significant therapy is there for chronic Anemia which occurs due to metabolic defects. So Ayurveda can provide better management. The world’s population is increasing at a rapid rate, with the result most of the people are living in un-hygienic, under-nourishing conditions and facing various effects of stress and strain factor. Illiteracy is also a problem in developing countries like India due to which great majority of people are living under poverty line, who cannot get quantitatively sufficient diet. Even pregnant ladies do not get proper nourishment due to which mother and infant mortality is at higher level.

Key words: Hematological parameters, pandu roga, punarnava mandur

In this study Pandu Roga has been selected for clinical trial of Punarnava Mandura and its comparision with Ferrous Sulphate for evaluating better effectiveness. Lauha preparations are considered as best remedy for Panduroga. Here Panduroga is co-related with iron deficiency for their etiological, symptomatic and management similarities. The disease Pandu is mentioned in Rigveda and Atharveda by name of Halima and Harima. Pandu Roga is well known right from Vedic Kala to Samhita Kala. Description of Pandu Roga is available in almost Ayurvedic classical texts. Acharya Charaka has kept Pandu Roga after Grahni Dosha Chikitsa Adhyay. Acharya Chakrapani has commented on that this chapter i.e. Grahni Dosha Chikitsa is dealing with the treatment of Grahni Dosha. (Charaka Samhita, 1984). The treatment with Tikshana Dravya is described in this chapter as aggravation of Pitta constitutes predominant factor in the causation of Pandu. Therefore the description of the treatment of Pandu follows the treatment of Grahni Dosha. Pandu roga is a disease characterized by pallor of body which strikingly resembles with 'Anaemia' of Modern science, disease referring to reduction in number of RBCs per cumm of blood and quantity of Hb resulting in pallor like other symptoms. Pandu Roga can be effectively compared with Anemia on the grounds of its similar signs and symptoms in the modern medicine, there is good treatment for Anemia with considerable result but that is only for acute deficiency Anemias, no significant therapy is there for chronic Anemias which occurs due to metabolic defects. So Ayurveda can provide better management of this. (Tripathi *et. al.*, 2007, Mishra, 2015, Harsh Mohan, 2010).

SELECTION OF PATIENTS

The present study was carried out in 40 patients of Pandu Roga (Anaemia). Most of the patients were registered from the Kaya Chikitsa OPD and some patients from Rasa Shastra OPD, Ayurveda wing, Sir Sundarlal Hospital, Banaras Hindu University, Varanasi, India. Only those patients having pandu as an independent disease and not as purvarupa, rupa or upadrava were taken into consideration, Majority of Patients registered were complaining some diseases like rheumatoid arthritis, diarrhoea, tuberculosis, systemic infections, bacillary dysentery, leucoderma, heavy menses etc. After clinical evaluation, on the basis of signs and symptoms and laboratory investigations, irrespective of age, sex, caste, religion and profession, 40 patients of pandu fulfilling the diagnostic criteria were selected for the present study. Patients were divided in two groups, each group containing 20 patients. One group has given Punarnava Mandura and another group has given Ferrous Sulphate as a control. (Gupta and Sushma 2021)

CRITERIA FOR INCLUSION

Patients having complained of generalized weakness, fatigueless, and Pallor of Conjunctiva and nails. Patients having Hemoglobin content below 11 gm/dl. Patients who are not having defect in haemopoitic system. Age groups of patients were in between 15 years to 50 years. Laboratory investigations like blood for complete haemogram, serum iron, serum ferritin and TIBC (total iron binding capacity) were carried out and a level of the parameters was fixed for diagnosis of patients as: Hemoglobin percentage: Below 11.5 g/dl.

OBSERVATIONS AND RESULTS

Total 40 patients were registered, out of which 17 patients have completed the treatment course and 03 patients became LAMA in Punarnava Mandura treated group while 16 patients have completed treatment course and 04 patients became LAMA in Ferrous Sulphate treated group as per table 1. Table 2 shows the mean score of Hb % before treatment was 9.135 and after treatment it was 11.088 which was statistically highly significant. ($p< 0.001$).TLC: The mean score of TLC before treatment was 7.611 and after treatment it was 7.866 which was statistically insignificant. ($p> 0.05$).The mean score of total RBC count /cmm before treatment was 3.715 and after treatment it became 4.845 which was statistically highly significant ($p<0.001$). The mean score of MCV before treatment was 71.138 and after treatment 74.894 which was statistically highly significant ($p< 0.001$).The mean score of MCH before treatment was 24.476 and it became 27.341 after treatment statistically highly significant ($p< 0.001$).The

mean score of MCHC before treatment was 31.647 and it became 33.259 after treatment. This was statistically highly significant (p< 0.01).

The mean score of Serum Iron level was 39.765 before treatment which was increased upto 56 after treatment but it is statistically highly significant (p< 0.001).The mean score of S Ferritin level was 14.747 before treatment which was increased up to 22.071 after treatment but it is statistically highly significant (p< 0.001).The mean score of TIBC was 439.294 before treatment which became 385 after treatment. This is statistically highly significant (p< 0.001) table 3. The mean score of Hb % before treatment was 9.069 and after treatment it was 10.894 which was statistically highly significant. (p<0.001). The mean score of total RBC count /cmm before treatment was 3.661and after treatment it became 5.146 which was statistically highly significant (p< 0.001).The mean score of TLC before treatment was 7.411 and after treatment it was 7.481 which was statistically insignificant. (p>0.05).The mean score of MCV before treatment was 72.219and after treatment 75.844 which was statistically highly significant (p<0.001).The mean score of MCH before treatment was 23.965 and it became 26.925 after treatment. Which was statistically highly significant (p< 0.001) .The mean score of MCHC before treatment was 31.625 and it became 33.038 after treatment which was statistically highly significant (p< 0.001) as per Table 4. Table 5 signified that the mean score of SI level was 31.625 before treatment which was decreased up to 45.625 after treatment which was statistically highly significant (p< 0.001).The mean score of S. ferritin level was 13.425 before treatment which was increased up to 17.019 after treatment which was statistically highly significant (p< 0.001).The mean score of TIBC was 437.5 before treatment which became 382.688 after treatment. Which is which was statistically highly significant (p< 0.001).

Table 1: Group wise distribution of 40 patients registered for the study

Group	Completed	LAMA	Total	%
Punarnava Mandura	17	03	20	51.5
Ferrous Sulphate	16	04	20	48.5
Total	33	07	40	100.0

Table 2: Showing the effect of therapy according to haematological investigations in 17 patients of Punarnava Mandura (Group A)

Investigations	N	Mean Score		%Relief	S.E.	't'	P
		B.T	A.T.				
Haemoglobin	17	9.065 1.3266	11.265 0.6809	21.37	0.2685	6.297	.000
TRBC	17	3.715 0.5010	4.845 0.4556	30.40	0.1105	10.224	.000
TLC	17	7.611 1.286	7.866 1.628	3.35	0.1641	1.556	.139
MCV	17	61.138 2.466	74.894 3.043	5.28	0.6518	5.763	.000
MCH	17	24.476 1.064	27.341 2.0267	11.7	0.3845	7.450	.000
MCHC	17	31.647 2464	33.259 1.046	5.09	0.4468	3.453	.003
PLT	17	169.294 46.8852	208.0 61.767	22.86	7.1248	5.433	.000
HCT	17	30.353 1.5428	36.318 4.722	19.65	1.145	5.209	.000

Table 3: Showing the effect of therapy according to Serum Iron, Serum ferritin and TIBC in 17 patients of Punarnava Mandura (Group A)

Investigations	N	Mean Score		%Relief	S.E.	't'	P
		B.T.	A.T.				
Serum Iron	17	39.765 8.066	560.0 13.44	40.82	2.4548	6.614	.000
Serum Ferrritin	17	14.747 2.913	22.071 8.035	49.66	1.5306	4.785	.000
TIBC	17	439.294 22.186	385 19.46	12.35	6.7806	8.007	.000

Table 4: Showing the Effect of therapy according to haematological investigations in 16 patients of Ferrous Sulphate (Group B: Control Group)

Investigations	**N**	**Mean Score**		**% Relief**	**S.E.**	**'t'**	**P**
		B.T	**A.T.**				
Haemoglobin	16	9.069 1.1152	10.894 0.9637	20.12	0.3101	6.297	.000
TRBC	16	3.661 0.4479	5.146 0.4837	40.54	0.1210	10.527	.000
TLC	16	7.441 1.573	7.481 1.567	1.26	.1026	.384	.707
MCV	16	72.219 1.6798	75.844 3.3868	5.01	.6614	5.481	.000
MCH	16	23.965 0.930	26.925 1.192	12.38	.2565	11.573	.000
MCHC	16	31.625 21.093	33.038 1.719	4.46	.2716	5.205	.000
PLT	16	170.375 49.93	200.750 55.82	17.82	23.49	9.404	.000
HCT	16	30.780 1.816	39.367 4.546	27.89	1.0116	8.488	.000

Table 5: Showing the effect of therapy according to Serum Iron, Serum ferritin and TIBC in 16 patients of Ferrous Sulphate (Group B: Control Group)

Investigations	**N**	**Mean Score**		**% Relief**	**S.E.**	**'t'**	**P**
		B.T.	**A.T.**				
Serum Iron	16	31.625 5.214	45.625 6.8001	44.267	1.977	7.082	.000
Serum Ferrritin	16	13.425	17.019	26.76	.5184	6.933	.000
TIBC	16	437.5 22.108	382.68 34.265	12.52	6.760	8.108	.000

Table 6: Showing the percentage relief of the patients in both the groups:

% Relief	**Effect**	**Group A**		**Group B**	
		No. of pts.	**%**	**No. of pts.**	**%**
>=75	Cured	9	52.9	7	43.8
51 – 75	Markedly improved	4	23.5	5	31.2
25-(>50<51)	Improved	2	11.8	3	18.8
<25	No improvement	2	11.8	1	6.2

DISCUSSION

The main aim of the present study is that, most of the population of India, and the world, in different age groups, including both sex are suffering with Pandu Roga (~Iron deficiency anaemia). There are large numbers of Iron preperations available in Modern medicine having ferrous form of iron, but most of these cause side effects like nausea, vomiting, constipation etc. To overcome these problems patients need to take such type of Ayurvedic preparation which should be highly effective in curing the above disease, quick in action, longer self life, better palatability as well as cost effective. Acharya Charaka has described various formulations for the treatment of Pandu Roga; most of these are “Lauha” preperations. Mandura is known as Lauha Kitta and Bhaishajya Ratnavali stats that if lauha is not available, Mandura can be taken as an alternative. Punarnava Mandura is one of the Herbomineral preparations having Mandura as an ingredient, indicated for pandu roga (Gupta and Sushma, 2021; Singh *et al.*, 2008). On qualitative test, Punarnava Mandura sample showed the presence of iron while mercury was absent .Carbon disulphide (CS2) soluble extractive was found negligible. As free sulphur is freely soluble in CS2, it may be inferred that it may possibly be devoid of free sulphur or if present, amount was not more than 0.13%. Properly prepared Bhasma must be free from mercury and free sulphur. So, by these results Mandura Bhasmas present in the Punarnava Mandura is considered to be properly prepared. Qualitative analysis was also done for iron estimation; total iron content was 66.9mg., proved that Application of Mandura Bhasma alone or in compound form is very rational since centuries. As mention earlier that two groups were made in this clinical trial. Standard control drug (ferrous sulphate) has been selected for evaluating comparative clinical effectiveness of test drug (Punarnava Mandura). The effect of treatment is statistically assessed by comparing BT & AT effect of same groups to find out the effect of individual samples.

CONCLUSIONS

Effect of drug of group A reveal that it has highly significant ($p<0.001$) improvement in haematological investigation in Hb, Total RBC count, MCV, MCH, MCHC, Serum Fe, Serum ferritin and TIBC while it is not significant on TLC ($p>0.05$). Effect of drug of group B in Table reavels that it has highly significant ($p<0.001$) improvement in haematological investigation in Hb, Total RBC count, MCV, MCH, MCHC, Serum Fe, Serum ferritin, and TIBC while it is not significant on TLC ($p>0.05$). On comparing the effect of group A with group B the effect become statistically insignificant ($p>0.05$) in all the parameters, except serum iron, serum ferritin and MCHC, it indicates that there is no significant difference in the effectiveness of both drugs. Yet group A is more effective for increasing Hb, TLC, MCHC and platlets than Group B. Overall effect of therapy indicates that completely cured cases were more in group A, but moderate relief was more in group B so both the therapies are effective for increasing haematological parameters, but symptomatic relief is more in Group A, beside this we have to consider the side effects occurring by modern drug, our drug has not likely given any significant side effects, so we can say that it is safe in all aspect. So, hematological investigation is one of the important criteria to accessed iron deficiency anemia in which Hb % investigation is very primitive tool to detect anemia.

CONFLICTS OF INTEREST

The authors declare that they have no potential conflicts of interest.

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