



ORIGINAL RESEARCH PAPER

Ayurveda

COMPARATIVE STUDY TO IRON DEFICIENCY ANEMIA (IDA) WITH DIFFERENT TYPES OF PANDU ROGA WITH SPECIAL REFERENCE TO SOME COMMON HAEMATOLOGICAL PARAMETERS

KEY WORDS: Pandu Roga, Iron Deficiency Anemia (IDA)

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ABSTRACT Iron Deficiency Anemia (IDA) is a worldwide problem with the highest prevalence in developing countries. Iron Deficiency is the most commonest cause of nutritional anemia. The disease Pandu roga resemble like anaemia when the clinical features are compared. There are five types of Pandu Roga as per Ayurvedic Classics. Keeping in the view the comparison of IDA with the types of Pandu Roga is very essential as specific treatment of different types of Pandu Roga is clearly mentioned in Ayurveda Classics. Thus the present study is comparative study of IDA with different types of Pandu Roga with special reference to some common haematological parameters

INTRODUCTION

Iron Deficiency Anaemia (IDA) is a worldwide problem with the highest prevalence in developing countries. It is found especially among women of childbearing age, young children and during pregnancy & lactation.

Pandu Roga is a disease where the lusture of the skin dimished and colour of the skin become pale which is well described in every Ayurvedic Classics. The disease Pandu Roga resembles like Anaemia when the clinical characteristic are compared. There are five types of Pandu Roga as per Ayurvedic Classic and they are – (i) Vataja Pandu, (ii) Pittaja Pandu, (iii) Kaphaja Pandu, (iv) Sannipataja Pandu, (v) Mridbhakshanjanya Pandu. In conventional medicine, various forms of iron components are commonly prescribed to treat IDA patients, but these therapies have their noted adverse affects. Owing to the gravity of the situation, need is felt for search of safe and effective Ayurvedic treatments for a better alternative. Keeping in a view the comparison of IDA with the types of Pandu Roga is very essential as specific treatment of different types of Pandu Roga is clearly mentioned in Ayurvedic Classics. Thus the present study is a comparative study of IDA with different types of Pandu Roga with Special refrence of some common haematological parameters.

AIM & OBJECTIVE

The aim & objective of the study was-

1. Comparative study of Iron Deficiency Anaemia (IDA) with the types of Pandu Roga.
2. To observe the relation of common haematological parameters viz Hb%, PCV, MCV, MCHC, TIBC, Serum Iron Content, Serum Ferritin, in different types of Pandu Roga.

MATERIALS & METHOD

A clinical study on 1000 patient of IDA was conducted at Govt. Ayurvedic College & Hospital, Guwahati - 14, Assam, India as per necessary formalities under strict protocol to prevent bias and to reduce the error in the study. The full details of screening history, physical examination and necessary laboratory investigation as per the study was done and recorded in a specially designed proforma. Data of subjective & objective parameters was tabulated and analysed using appropriate statistical tools.

HYPOTHESIS OF THE STUDY

Null hypothesis was taken for the study stating that there is no difference in the five types of Pandu Roga.

OBSERVATION AND STATISTICAL ANALYSIS:-

The analysis of data was done using statistical software (SPSS Version 20). The percentage of prevalence of different types of Pandu Roga was statistically evaluated using a pie chart. For the 5 types of pandu we got 10 pairs and analysis on these

pairs was done subsequently. The pairs are- 1) Vataja Pittaja 2) Vataja Kaphaja 3) Vataja Sannipataja 4) Vataja Mridbhakshanjanya 5) Pittaja Kaphaja 6) Pittaja Sannipataja 7) Pittaja Mridbhakshanjanya 8) Kaphaja Sannipataja 9) Kaphaja Mridbhakshanjanya 10) Sannipataja Mridbhakshanjanya

The Pandu Roga subtypes as identified was then assessed against the different laboratory parameters taken for the study using the one way analysis of variance (ANOVA) and than Post Hoc test was used. The p values less than 0.05 has been considered significant. For some statistical works the following digits were taken into consideration for different types of pandu.

- Vataja Pandu-1
- Pittaja Pandu-2
- Kapaja Pandu-3
- Sannipataja Pandu-4
- Mridbhakshanjanya Pandu-5

Prevelence Of Different Types Of Pandu Roga In The Study

Table -1

SN	Types of Pandu	No. of Observation	Percentage
1	Vataja Pandu	30	03%
2	Pittaja Pandu	90	09%
3	Kapaja Pandu	670	67%
4	Sannipataja Pandu	180	18%
5	Mridbhaksanjanya	30	03%

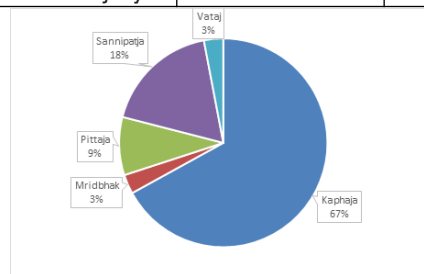


Fig-1 Prevelence of different types of Pandu Roga in the study (n=1000)

Analysis On Different Types Of Pandu Roga Against The Different Laboratory Parameters

One way ANOVA test

One way ANOVA is used in the study to determine if there is any significant difference between the means of different groups. Here the different groups are the different types of Pandu. The Null Hypothesis test is-

HOi: There is no difference between the means value of the

parameters in the different types of Pandu ,against the alternative hypothesis .

H1i: not all the mean values of the parameters are equal.

I= Hb%,PCV,MCV,MCHC, Serum Iron, TIBC, Serum Ferritin

One way ANOVA has been used to test the above hypothesis at 5% level of significance .If the p value of the test exceeds 0.05 then we accept the null hypothesis at 5% level of significance otherwise we reject the Null Hypothesis.

Table-4 Anova (oneWay)

		Sum of Squares	df	Mean Square	F	Sig. (p value)
hb	Between Groups	79.596	4	19.899	8.821	.000
	Within Groups	214.312	95	2.256		
	Total	293.908	99			
pcv	Between Groups	736.379	4	184.095	8.837	.000
	Within Groups	1979.061	95	20.832		
	Total	2715.440	99			
mcv	Between Groups	312.053	4	78.013	4.995	.001
	Within Groups	1483.645	95	15.617		
	Total	1795.698	99			
mchc	Between Groups	259.154	4	64.789	7.510	.000
	Within Groups	819.604	95	8.627		
	Total	1078.758	99			
iron	Between Groups	2879.358	4	719.839	8.507	.000
	Within Groups	8038.700	95	84.618		
	Total	10918.058	99			
tIBC	Between Groups	4190.078	4	1047.520	3.153	.018
	Within Groups	31558.112	95	332.191		
	Total	35748.190	99			
ferri	Between Groups	126.078	4	31.519	5.198	.001
	Within Groups	576.032	95	6.063		
	Total	702.110	99			

(Since the p values for each haematological parameters is <0.05,so we have the reason to reject the Null hypothesis at 5% level of significance.)

Post Hoc Test(Tukey'sTest)

This test was used when we reject our null hypothesis in the one way ANOVA test to determine the significance of means of different treatment pair wise. The null hypothesis is to tested here is

H_{0ijk}: There is no difference between the means of the ith & jth pair of Pandu types for parameters k, against the alternative hypothesis

H_{Bijk}: the pair of Pandu (i,j) for the parameters k are different i≠j, i,j = 1,2,3,4,5 and k = Hb% ,PC ,MCH, MCV ,MCHC, Sr.Iron, Sr.Ferritin

Table -5 Post Hoc tests (Tukey's test) for one way ANOVA Tukey HSD

Dependent Variable	(I) VAR0015	(j) VAR00015	Mean Difference (i-j)	Std. Error	Sig. (p value)	95% Confidence Interval	
						Lower Bound	Upper Bound
Hb%	1	2	3.6222*	1.0013	.004	.838	6.407
		3	2.7254*	.8864	.023	.261	5.190
		4	.9389	.9366	.854	-1.666	3.544
		5	3.4667*	1.2264	.044	.056	6.877
		2	1	-3.6222*	1.0013	.004	-6.407
	2	3	-.8968	.5332	.450	-2.380	.586
		4	-2.6833*	.6132	.000	-4.388	-.978
		5	-.1556	1.0013	1.000	-2.940	2.629

PCV	3	1	-2.7254*	.8864	.023	-5.190	-.261	
		2	.8968	.5332	.450	-.586	2.380	
		4	-1.7865*	.3987	.000	-2.895	-.678	
		5	.7413	.8864	.919	-1.724	3.206	
	4	1	-.9389	.9366	.854	-3.544	1.666	
		2	2.6833*	.6132	.000	.978	4.388	
		3	1.7865*	.3987	.000	.678	2.895	
		5	2.5278	.9366	.062	-.077	5.132	
	5	1	-3.4667*	1.2264	.044	-6.877	-.056	
		2	.1556	1.0013	1.000	-2.629	2.940	
		3	-.7413	.8864	.919	-3.206	1.724	
		4	-2.5278	.9366	.062	-5.132	.077	
MCV	1	2	9.8889*	3.0428	.014	1.427	18.351	
		3	6.6269	2.6935	.109	-.863	14.117	
		4	1.1667	2.8463	.994	-6.749	9.082	
		5	10.0000	3.7267	.064	-.363	20.363	
		2	1	-9.8889*	3.0428	.014	-18.351	-1.427
	2	3	-3.2620	1.6204	.268	-7.768	1.244	
		4	-8.7222*	1.8633	.000	-13.904	-3.541	
		5	.1111	3.0428	1.000	-8.351	8.573	
		3	1	-6.6269	2.6935	.109	-14.117	.863
		2	3.2620	1.6204	.268	-1.244	7.768	
	3	4	-5.4602*	1.2117	.000	-8.830	-2.091	
		5	3.3731	2.6935	.721	-4.117	10.863	
		4	1	-1.1667	2.8463	.994	-9.082	6.749
		2	8.7222*	1.8633	.000	3.541	13.904	
		3	5.4602*	1.2117	.000	2.091	8.830	
	4	5	8.8333*	2.8463	.021	.918	16.749	
		1	-10.0000	3.7267	.064	-20.363	.363	
		2	-.1111	3.0428	1.000	-8.573	8.351	
		3	-3.3731	2.6935	.721	-10.863	4.117	
		4	-8.8333*	2.8463	.021	-16.749	-.918	
MCHC	1	2	6.6778	2.6346	.092	-.649	14.004	
		3	4.1871	2.3321	.382	-2.298	10.672	
		4	.7944	2.4644	.998	-6.059	7.648	
		5	6.5000	3.2267	.267	-2.473	15.473	
		2	1	-6.6778	2.6346	.092	-14.004	.649
	2	3	-2.4907	1.4030	.394	-6.392	1.411	
		4	-5.8833*	1.6133	.004	-10.370	-1.397	
		5	-.1778	2.6346	1.000	-7.504	7.149	
		3	1	-4.1871	2.3321	.382	-10.672	2.298
		2	2.4907	1.4030	.394	-1.411	6.392	
	3	4	-3.3926*	1.0492	.014	-6.310	-.475	
		5	2.3129	2.3321	.858	-4.172	8.798	
		4	1	-.7944	2.4644	.998	-7.648	6.059
		2	5.8833*	1.6133	.004	1.397	10.370	
		3	3.3926*	1.0492	.014	.475	6.310	
	4	5	5.7056	2.4644	.149	-1.148	12.559	
		1	-6.5000	3.2267	.267	-15.473	2.473	
		2	-.1778	2.6346	1.000	-7.149	7.504	
		3	-2.3129	2.3321	.858	-8.798	4.172	
		4	-5.7056	2.4644	.149	-12.559	1.148	
MCHC	1	2	5.9000*	1.9582	.027	.455	11.345	
		3	4.2363	1.7334	.113	-.584	9.057	
		4	1.3111	1.8317	.952	-3.783	6.405	
		5	7.9667*	2.3983	.011	1.297	14.636	
		2	1	-5.9000*	1.9582	.027	-11.345	-.455
	2	3	-1.6637	1.0428	.504	-4.563	1.236	
		4	-4.5889*	1.1991	.002	-7.923	-1.254	
		5	2.0667	1.9582	.829	-3.379	7.512	
		3	1	-4.2363	1.7334	.113	-9.057	.584
		2	1.6637	1.0428	.504	-1.236	4.563	
	3	4	-2.9252*	.7798	.003	-5.094	-.757	
		5	3.7303	1.7334	.207	-1.090	8.551	
		4	1	-1.3111	1.8317	.952	-6.405	3.783
		2	4.5889*	1.1991	.002	1.254	7.923	
		3	2.9252*	.7798	.003	.757	5.094	
	4	5	6.6556*	1.8317	.004	1.562	11.749	

	5	1	-7.9667*	2.3983	.011	-14.636	-1.297
		2	-2.0667	1.9582	.829	-7.512	3.379
		3	-3.7303	1.7334	.207	-8.551	1.090
		4	-6.6556*	1.8317	.004	-11.749	-1.562
Iron	1	2	15.7778	6.1325	.084	-1.276	32.832
		3	17.2871*	5.4285	.016	2.191	32.383
		4	5.2778	5.7365	.889	-10.675	21.230
		5	22.3333*	7.5108	.030	1.447	43.220
	2	1	-15.7778	6.1325	.084	-32.832	1.276
		3	1.5093	3.2657	.990	-7.572	10.591
		4	-10.5000*	3.7554	.048	-20.943	-.057
		5	6.5556	6.1325	.822	-10.498	23.609
	3	1	-17.2871*	5.4285	.016	-32.383	-2.191
		2	-1.5093	3.2657	.990	-10.591	7.572
		4	-12.0093*	2.4421	.000	-18.800	-5.218
		5	5.0463	5.4285	.885	-10.050	20.142
	4	1	-5.2778	5.7365	.889	-21.230	10.675
		2	10.5000*	3.7554	.048	.057	20.943
		3	12.0093*	2.4421	.000	5.218	18.800
		5	17.0556*	5.7365	.030	1.103	33.008
	5	1	-22.3333*	7.5108	.030	-43.220	-1.447
		2	-6.5556	6.1325	.822	-23.609	10.498
		3	-5.0463	5.4285	.885	-20.142	10.050
		4	-17.0556*	5.7365	.030	-33.008	-1.103
TIBC	1	2	-11.6667	12.1507	.872	-45.456	22.123
		3	-6.2836	10.7558	.977	-36.194	23.627
		4	8.8333	11.3660	.937	-22.774	40.441
		5	-14.0000	14.8815	.880	-55.384	27.384
	2	1	11.6667	12.1507	.872	-22.123	45.456
		3	5.3831	6.4706	.920	-12.611	23.377
		4	20.5000	7.4408	.053	-.192	41.192
		5	-2.3333	12.1507	1.000	-36.123	31.456
	3	1	6.2836	10.7558	.977	-23.627	36.194
		2	-5.3831	6.4706	.920	-23.377	12.611
		4	15.1169*	4.8387	.020	1.661	28.573
		5	-7.7164	10.7558	.952	-37.627	22.194
	4	1	-8.8333	11.3660	.937	-40.441	22.774
		2	-20.5000	7.4408	.053	-41.192	.192
		3	-15.1169*	4.8387	.020	-28.573	-1.661
		5	-22.8333	11.3660	.270	-54.441	8.774
	5	1	14.0000	14.8815	.880	-27.384	55.384
		2	2.3333	12.1507	1.000	-31.456	36.123
		3	7.7164	10.7558	.952	-22.194	37.627
		4	22.8333	11.3660	.270	-8.774	54.441
Ferritin	1	2	4.1111	1.6416	.098	-.454	8.676
		3	3.0448	1.4532	.231	-.996	7.086
		4	.7222	1.5356	.990	-3.548	4.992
		5	4.3333	2.0106	.206	-1.258	9.924
	2	1	-4.1111	1.6416	.098	-8.676	.454
		3	-1.0663	.8742	.740	-3.497	1.365
		4	-3.3889*	1.0053	.009	-6.184	-.593
		5	.2222	1.6416	1.000	-4.343	4.787
	3	1	-3.0448	1.4532	.231	-7.086	.996
		2	1.0663	.8742	.740	-1.365	3.497
		4	-2.3226*	.6537	.005	-4.140	-.505
		5	1.2886	1.4532	.901	-2.752	5.330
	4	1	-.7222	1.5356	.990	-4.992	3.548
		2	3.3889*	1.0053	.009	.593	6.184
		3	2.3226*	.6537	.005	.505	4.140
		5	3.6111	1.5356	.138	-.659	7.881
	5	1	-4.3333	2.0106	.206	-9.924	1.258
		2	-.2222	1.6416	1.000	-4.787	4.343
		3	-1.2886	1.4532	.901	-5.330	2.752
		4	-3.6111	1.5356	.138	-7.881	.659

*. The mean difference is significant at the 0.05 level.

(The p values of some of the pair of Pandu in IDA patient are significant while for some others they are not.)

DISCUSSION

1. Discussion on prevalence of different types of Pandu Roga

Among the 1000 number of IDA patient Kaphaja Pandu shows its maximum prevalence of 67%, followed by Sannipataja 18%, Pittaja 09%, Vataja 03%, and Mridbhaksanjanya Pandu 03%, in the study .It can be because maximum number of symptoms of Kaphaja Pandu are similar to the sign & symptoms of IDA . Specially clinical features like shuklanayana, sada, klama, swasa, tandra, alasya, gaurava, shukla twak, shuklanakhatwa which are found in Kaphaja Pandu resemble with weakness, fatigue, pallor of skin & mucous membrane as found in IDA. The prevalence of maximum number of Kaphaja Pandu (67%)among the IDA patient both in absolute and relative to other types reflects that IDA can be compared with Kaphaja Pandu in the study.

2. Discussion on different types of Pandu Roga against the different laboratory parameters:-

In the one way ANOVA test, the p value for each of the null hypothesis (for different parameters) was found to be significant at 5% level of significance. Hence we have reasons to reject our null hypothesis and conclude that the different types of pandu are significantly different from each other on an average when taken all at the same time . Upon rejection of our null hypothesis in one way ANOVA test ,it is necessary to perform a Post H_{0c} test (Tukeys Test) to examine the significance of the different pairs of pandu which was found to significantly different for different parameters.

In other words the difference in the mean of pair of Pandu types was found to dependent on the parameters that was taken under consideration .Of all the pairs it was found that (Vataja, Sannipataja), (Pittaja, Kaphaja), (Pittaja, Mridbhakshanjanya), (Kaphaja, Mridbhaksanjanya) are the pairs that are not found to be significantly different for any parameters as their p values are >0.05.It can be concluded that there is no difference between these pairs of Pandu types. So the seven parameters under consideration does not have any relation for a differential diagnosis of the above mentioned pairs

The pair (Vataja,Pittaja) is found to be significantly different in Hb%, PCV, MCHC as their p values are <0.05.It indicates that the value of Hb%,PCV, MCHC are different for Vataja and Pittaja type of Pandu Roga.So in the differential diagnosis between Vataja and Pittaja Pandu Roga the parameters like Hb%,PCV,MCHC may have some relation.

Similarly the pair (Vataja, Kaphaja) is found to be significantly difference in Hb%, and Serum Iron. This indicate that for differential diagnosis of the pair (Vataja, Kaphaja) the parameters like Hb% and serum Iron may have some relation. Likewise the pair (Vataja, Mridbhakshanjanya), is significantly difference in Hb%, MCHC, Serum Iron .This also indicate that for their differential diagnosis the parameters may have some relation.

The pair (Sannipataja, Mridbhakshanjanya) is significantly differ in PCV, MCH, Sr. Iron. This also can be understood like above having their relationship.

The pair (Pittaja, Sannipataja) is significantly different in all the parameters except TIBC. It also indicates the same, that for the differential diagnosis of (Pittaja, Sannipataja) all parameters except TIBC may have some relation.

From the study it is found that the pair (Kaphaja, Sannipataja) is the only pair that is significantly different in all the parameters. So it is the only pair where we found that for their differential diagnosis all the parameters taken into

consideration may have some relationship.

It can be concluded that the pair (Pittaja, Sannipataja) always has different impact on all the parameters except TIBC. Also the pair (Kaphaja, Sannipataja) will always have different impact on all the parameters considered in the study.

CONCLUSION:-

The following conclusion can be drawn from the study.

1. Kaphaja Pandu can be compared with Iron Deficiency Anaemia (IDA)
2. The common haematological parameters taken under consideration for the study (Hb%,PCV, MCH, MCHC, TIBC, Serum Iron, & Serum Ferritin) does not have any relationship between the four pairs viz (Vataja, Sannipataja, (Pittaja, Kaphaja), (Pittaja, Mridbhakshanjanya), & (Kaphaja, Mridbhakshanjanya) of Pandu Roga types. Again for the pair (Vataja, Pittaja) the parameters like Hb%, PCV, MCHC, showed some relationship. Similarly the pair (Vataja, Kaphaja) may have some relationships with the parameters Hb% & Serum Iron. Likewise for the pair (Vataja, Mridbhakshanjanya) the parameters Hb%, MCHC, Serum Iron showed some relationship. Similarly the pair (Sannipataja, Mridbhakshanjanya) showed relationship with PCV, MCH, & Serum Iron. Moreover the pair (Pittaja, Sannipataja) showed relationship with all the parameters except TIBC and lastly the pair (Kaphaja, Sannipataja) showed relationship with all the parameters taken in the study.

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