A comparative study on the assessment of clinical features of *Pandu roga* and its subtypes *vis a vis* various types of anemia

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‘*Pandu roga*’ is a disease entity described in Ayurveda which bears great resemblance to the clinical picture of anemia and also has a lot of iron and other non iron containing preparations described for its management. Today *pandu roga* is equated with iron deficiency anemia and only iron preparations described in the texts are being used, leaving aside the other principles. So, in this study we aimed to explore for any correlation between the subtypes of *pandu roga* and different types of anemia by studying their clinical picture as presented in the patients; so that a background may be prepared for treatment application by future researches.

Diagnosed cases of various anemia (excluding anemia due to systemic diseases, drug induced anemia, etc.) of all age and sex were included and were then assessed to categorise the *pandu roga* subtype and data was checked statistically. A definite correlation was obtained between the various groups of anemia included in the study and *pandu roga* subtypes. Pre-dominantly *paittika pandu* features were observed in Haemolytic anemia patients, while *vatika pandu* features were observed in all deficiency anemia, especially the iron deficiency group and *kaphaja pandu* features were seen more in the Megaloblastic anemia patients.

**Keywords:** Anemia, *Pandu roga*, *Vatika pandu*, *Paittika pandu*, *Kaphaja pandu*, *Tridoshaja*

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The struggle between diseases and man is immortal and dates back to the time of *Vedas*, i.e., about 5000 BC. This is the reason we find innumerable references in the *Vedas* regarding various diseases, germs, treatments, etc. One of such diseases, the references of which are found since the time of *vedic* period is *pandu roga*.

*Pandu roga* has been described as a *pitta* predominant disease in which along with other features, there is development of whitish yellow discoloration in the body which has been described as *pandu varna* in Ayurveda. Sir Monier Williams who has deciphered the meaning of numerous Sanskrit terminologies has described *pandu varna* meaning as pallor and this pallor is the characteristic feature of various anemia.

There is a great amount of resemblance in the features of *pandu roga* and anemia. In this background, it was decided to study the patients of various anemia (not suffering from any other disease) on the basis of their clinical features with respect to the clinical features of the five subtypes of *pandu roga*¹ and explore whether the various *pandu roga* subtypes as described in Ayurveda have any possible correlate to a particular type of anemia. This can facilitate the use of other drugs and treatment modules described for *pandu roga*, in the management of other types of anemia also.

**Review of literature for finding the criteria’s for the identification of the predominant *pandu roga* subtype**

*Pandu roga* has been subdivided into 5 sub types² on the basis of *doshika* predominance and aetiology as *vatika pandu* (*vata* predominant), *paittika pandu* (*pitta* predominant), *kaphaja pandu* (*kapha* predominant), *tridoshaja pandu* (all the three doshas dominant) and *mrittika bhakshan janya pandu* (due to mud consumption). Specific clinical features of each³ have been described in great detail (Table 1). Ayurveda explains that the diseases have to be categorised for the purpose of treatment on the basis of features of *doshika* predominance (*dosholavanata*)⁴. The same principle of finding the
doshika predominance by observing the clinical features in the patients was followed here for the identification of the predominant pandu roga subtype as per criteria stated below and in Table 1.

**Mrittika bhakshana janya pandu (pandu due to eating of mud)**

- **Shuna ganda, akshikuta, bhru** (Swelling in the cheeks, eyelids and eye brows)
- **Shuna pannabhimehanah** (Swelling in the feet, umbilical region and genitals)
- **Krimikoshtha** (Worm infestation)
- **Atisara** (Loose motions)
- **Saarsruk kaphanvita** (Stool being associated with blood and mucus)

**Tridoshaja pandu**

Signs and symptoms of vitiation of all the three doshas will be seen in the patients.

**Materials and methods**

Diagnosed cases of anemia, of all age and sex were included in the study. The study protocol was approved by the institutional Ethics Committee. Thorough history, clinical examination and investigations were carried out after obtaining the due written informed consent of the patient. The standard procedures were followed to carry out the investigations. The cases of anemia due to other diseases, inflammatory processes, therapeutic induced anemia, anemia in leukemia, etc. were excluded from the study to avoid erroneous results due to mixing up
of the presentations of these diseases with that of pandu roga. The cases of anemia included in the study included the deficiency anemia, the hemolytic anemia and anemia due to bone marrow failure.

First of all these patients were put to subjective assessment and a screening proforma, which included the general features (samanya lakshana) of pandu roga\(^2\). The patients of anemia who showed the presence of general features were then further subjected to the questionnaire to categorise the pandu roga subtype as described above. 100 such patients were subjected to this study and final assessment was made.

**Hypothesis of the study**

Null hypothesis was taken for the study stating that there is no difference in the vatika, paittika and kaphaja pandu cumulative scores in the patients of various groups of anemia.

**Recording of data related to clinical features of pandu roga**

The presence of doshika pandu features was given 1 score and absence as 0 score, and the total number of observations of a particular doshika pandu feature were added up to find the total cumulative score for each. Then this score was treated as quantitative data and put to statistical tests.

**Criteria for identification of pandu roga subtypes**

Criteria adopted for the identification of the type of pandu was on the basis of cumulative score of clinical features as described below:

- Features of only one kind of pandu when present, was considered as that particular type.
- In case where features of two types coexisted - the one with features amounting to 60 % or more of total features present in the patient was taken as that kind of pandu
- If the features of the three doshas were present and ranged between 30-39 % each, it was graded as tridoshaja pandu.
- If the features of the three doshas were present and the feature of any one dosha amounted to 40 % or more of the total features present, that particular doshika predominance was considered for designating the type of pandu.

For grading as mrittika bhakshana janya pandu the history of eating mud or materials contaminated by it was considered a must.

**Statistical analysis**

The analysis of data was done using statistical software SPSS version 16.0. The pandu roga subtypes as identified by the above methodology was then assessed against the five subgroups of anemia as described above using the chi-square tests and one way analysis of variance (ANOVA) involving Bonferroni test for post-hoc comparisons. \(p\) value less than 0.05 has been considered significant.

**Results**

A. **Cumulative scores for the presence of Dosha Pandu Roga Lakshanas in the patients of the various anemia groups**

On observing the various groups of anemia in view of the doshika predominance, it was found that the paittika pandu features were observed predominantly in haemolytic anemia group while vatika pandu features were found in the deficiency anemia group, i.e., the iron deficiency anemia and the megaloblastic anemia predominantly. The anemia due to marrow failure group again showed the predominance of paittika pandu features (Table 2).

<table>
<thead>
<tr>
<th>Types of Pandu</th>
<th>Gr. 1 (HA) (n = 32)</th>
<th>Gr. 2 (DDA) (n = 8)</th>
<th>Gr. 3(MA) (n = 21)</th>
<th>Gr. 4(IDA) (n = 27)</th>
<th>Gr. 5 (ABMF) (n = 12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vatika</td>
<td>0</td>
<td>3</td>
<td>13</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>Paittika</td>
<td>32</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Kaphaja</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Vata Pittolavana</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Vata Kapholavana</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Pitta Kapholavana</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tridoshaja</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Abreviations : HA - Haemolytic Anemias, DDA - Dual Deficiency Anemia (Iron and vit B\(_{12}\)/Folic acid deficiency), MA - Megaloblastic Anemia (B\(_{12}\) and Folic acid deficiency), IDA - Iron Deficiency Anemia and ABMF - Anemia due to Bone marrow failure.
B. Comparison of mean value of the cumulative score of pandu roga features in different groups of anemia

On comparing the mean value of the cumulative score of Pandu roga features recorded in each group (Table 3) it was found that the IDA Group patients had the maximum mean value of vatika pandu features cumulative score (5.667), while HA group patients were found to have the least mean (0.8125). HA group patients were found to have the maximum mean value of paittika pandu features (5.9375) and the minimum mean was observed in IDA group (3.8148). The maximum mean value of kaphaja pandu cumulative score was found in MA group (4.4762), with the lowest mean value in HA group (1.3438). The inter group differences for the mean values of doshika pandu roga mean values were found to be statistically highly significant (p < 0.001). As the features of tridoshaja pandu was found only in two patients of a group, statistical values cannot be computed for them. The maximum number of mrittikabhakshana janya pandu features was found in IDA group (0.4231), which was found to be statistically significant (p < 0.05) as compared to values in the other groups.

Finally, these results reject the null hypothesis taken for the study and prove that highly significant differences are present in the doshika pandu cumulative scores amongst the different groups of anemia.

<table>
<thead>
<tr>
<th>Group of anemia</th>
<th>Vatika Pandu</th>
<th>Paittika Pandu</th>
<th>Kaphaja Pandu</th>
<th>Mrittika bhakshana</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Group 1 (HA) (n=32)</td>
<td>0.8125 ±1.4013</td>
<td>5.9375 ±1.8997</td>
<td>1.3438 ±0.7874</td>
<td>0 ±0.0</td>
</tr>
<tr>
<td>Group 2 (DDA) (n=8)</td>
<td>4.0000 ±2.0000</td>
<td>5.1250 ±1.5526</td>
<td>3.2500 ±1.4880</td>
<td>0.125 ±0.3535</td>
</tr>
<tr>
<td>Group 3 (MA) (n=21)</td>
<td>5.3333 ±1.8529</td>
<td>4.0476 ±2.3553</td>
<td>4.4762 ±2.2499</td>
<td>0.0476 ±0.2182</td>
</tr>
<tr>
<td>Group 4 (IDA) (n=27)</td>
<td>5.6667 ±2.1839</td>
<td>3.8148 ±2.3211</td>
<td>3.0741 ±1.2987</td>
<td>0.4231 ±0.9454</td>
</tr>
<tr>
<td>Group 5 (ABMF) (n=12)</td>
<td>4.5833 ±2.5390</td>
<td>5.2500 ±1.4847</td>
<td>3.7500 ±1.7645</td>
<td>0.0833 ±0.2886</td>
</tr>
</tbody>
</table>

Discussion

The features of vatika pandu were found present predominantly in the patients of the deficiency anemia. Rukshanga (ununctuousness/dryness of skin), krishna nakha (blackish nails), krishna mala (blackish stools/melena), varcha shoshha (dryness of stools/constipation), anga marga (bodyache), ruja (pain), shiro ruja (headache) and bala kshaya (weakness) were found mainly in the patients of ida group; asya vairasya (distaste of mouth), bhrama (giddiness) and kampa (tremors) was found mainly in ma group; and anaha (abdominal distension due to retention of flatus and stool) was found equally in the both the groups. The pathology of these could be the principle of Ayurveda which states that deficiency of a substance in the body leads to aggravation of vata dosha.

Most of the features of paittika pandu were found present in the patients of HA followed by MA group, like - peeto (yellowish discoloration of the skin), peeta netra (yellowish eyes/ bulb conjuctiva), peeta anana (yellowish face), peeta mutra (yellow urine), peeta shakrit (yellow stools), bhinna varcha (loose stools) jvara/mandoshmat (fever), swedanah (profuse sweating), sheeta kama (longing for cold) and ushna anupashaya (dislike for hot). Interestingly, the features of vidaha (burning sensation in the stomach) and amlodgara (sour eructations) were found in the patients of IDA group.

The yellowish discoloration in the various body parts is due to the increased l...emolysis of RBCs in
the above stated groups and thus the increased bilirubin turnover, which leads to the development of other features described in paittika pandu group.

Amongst the kaphaja pandu features shwasa (dyspnoea) and saada (prostration) were the two features found in the majority of the patients. Rests of the features were found in lesser number of patients. Mritikabhakshana (eating of mud/ articles contaminated with mud) was found principally in the IDA group. The lesser incidence of mritikabhakshana found in the study could be due to the increased awareness about hygiene today in the society. Blood with stools/ blood streaked stools was also found in the IDA group. Studies have also reported the additional association of folate and B12 vitamin deficiencies along with that of iron in women with PICA.

The comparison of cumulative score means of the doshika pandu features reveals that the inter group differences in the features of vatika pandu, paittika pandu and kaphaja pandu in all the groups of anemia were statistically highly significant (p < 0.001); showing that all the groups showed considerable differences in their scores for the doshika pandu features. Statistically significant result (p < 0.05) was also found in the inter group differences for the score of mritikabhakshana janya pandu lakshanas though they were found in quite a few numbers of patients. All these data indicate that there is variation in the relative scores of the three doshas in the different anemia groups.

The haemolytic anemia group had the preponderance of the features of paittika pandu in all the patients (Table 2), while the vatika and kaphaja pandu features were found lesser in score in those patients, even totally absent in some. A study conducted on thalassemia in Jodhpur has stated that there is vata pitta predominance in thalassemia, correlating it to halimaka, which seems to contradict our study. But, there are other findings reported in the study, which have to be kept in mind. That study has also quoted that the children were poor and hence could not always afford the costly chelation therapy and were thus maintained by transfusions only. But, the children included in this study were taking regular chelation therapy, transfusions and folic acid as advised to them by the doctors. Hence, the features of iron overload and folic acid deficiency were not visualized in these patients. If those features would have developed in these patients also then the features of other doshika pandu predominance in the presentation, as that of vatika pandu would also have been observed in the patients, and the overall picture as depicted above would have been different.

It is noticeable that haemolysis occurring in the body, whether intravascular or extravascular will result in paittika pandu features due to the increased bilirubin turnover from the destructed RBCs. This can be coupled with other doshika pandu roga features in the patients according to their condition. For e.g. a patient of intravascular haemolysis presents with cola coloured urine (krishna mutra) when plasma haemoglobin exceeds the haptoglobin binding capacity, which is the feature of vatika pandu. Similarly if folic acid deficiency develops in a patient with haemolytic anemia, some resemblance to vatika pandu features as tremors, hyperpigmentation, constipation, etc. will develop, which will again variate the doshika presentation of the case.

Likewise, deficiency anemia was found having a higher proportion of vatika pandu features, (along with other paittika and kaphaja pandu features). This finding could have been so, because as per Ayurveda the deficiency of a substance results in the aggravation of vata dosha.

This presentation of deficiency anemia as described above in the study may also variate according to the status of the aetiological factor or the pathology of the deficiency state; and in that case other doshika pandu features may also be found. This can be understood with the example of the following case - haemolysis occurring in a patient of megaloblastic anemia also presents with the features of paittika pandu simultaneously along with vataja ones. At any other stage of the disease some other pandu roga feature may also be seen in the same patient as per the specific aetiology and pathogenesis.

This study also showed that the features of paittika pandu roga were found in all the patients of the above stated groups constantly (n = 100, though in various proportions), while some of the patients did not present with any of the features of vatika and kaphaja pandu roga, thus proving Ayurvedic pathology, that pandu roga is a pitta pradhana (predominant) vyadhi.

**Conclusion**

As the different groups of anemia show statistically significant difference for the values of the doshika pandu roga lakshana (feature) cumulative scores so the null hypothesis taken for the study (that there is no
difference in the presentation of different \textit{doshika pandu roga lakshanas} in the patients of different groups of anemia) is rejected. This study also shows that the different anemia show different \textit{dosha} dominance, as haemolytic anemia patients showed \textit{paittika pandu} features predominantly while all deficiency anemia (in general) had the predominance of \textit{vatika pandu} features. Iron deficiency group showed the predominance of \textit{vatika pandu} features and megaloblastic anemia demonstrated more \textit{kaphaja pandu lakshanas} than any other group.

All the anemic patients showed the presence of \textit{paittika pandu} features while \textit{kaphaja} and \textit{vatika pandu} features were found absent in some patients. Still, the features of all the three \textit{doshas} were found present in the maximum number of patients. Both of these findings support the description of Ayurvedic pathology regarding the disease \textit{pandu} that it is a \textit{pitta} predominant \textit{tridoshaja} disease.

This study shows that on the basis of similarities shown, the line of treatment for \textit{paittika pandu} may be applied in haemolytic anemia and that of \textit{vatika pandu} to the deficiency anemia along with the due consideration to the \textit{doshika} status of the individual. Still, it is essential, as quoted in the Ayurvedic treatment methodology, to asses every patient individually for his \textit{doshika} status of \textit{pandu roga} and plan the treatment accordingly.

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References