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ANALYSIS OF TYPES OF PANDU WITH RESPECT TO PERIPHERAL BLOOD SMEAR

Krishna Namdeo Kadam[1]* and Viraj V. Jadhav

[1]Assistant Prof. Dept of Rog Nidan Vikruti Vigyan, Government Ayurved College, Nanded.

[2]Prof, Dept of Rachna Sharir, Principal, SAHMC, Gharuan, Mohali.

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***Corresponding Author**
Dr. Krishna Namdeo Kadam
Assistant Prof. Dept of Rog Nidan Vikruti Vigyan, Government Ayurved College, Nanded.

ABSTRACT

A blood smear or film is a specimen for microscopic examination prepared by spreading a drop across a glass slide followed by staining with one of the Romanowsky's stain. Peripheral blood smear is very important diagnostic tool in various haematological disorders. It is a Laboratory work-up that involves cytology of peripheral blood cells smeared on slide. It is helpful in suggesting the causes of anaemia or thrombocytopenia, identifying and typing of leukaemia and diagnosing hemiparasites infections like malaria, filaria and trypanosomiasis. It is used to provide direction for further investigation that will help in detection correct diagnosis. By observing blood smear slide we can monitor various treatment or therapies are whether going on there way or not, as like the effect of chemotherapy and radio therapy on bone marrow. Likewise PBS plays has its important role in the differential diagnosis of various types of Pandu defined in Texts of Ayurveda. It signifies its role as diagnostic, prognostic in differential diagnosis of Pandu vyadhi (anemia). In this way with the help of peripheral blood smear we can make differential diagnosis which sets good line of treatment. Evidence based Ayurvedic practice helps to ensurethat right treatment in right person. According to the type of anaemia detected by the blood smear we can corelate and confirm the type of Pandu in practice.

KEYWORDS: Pandu, Peripheral blood smear, Preparation, Examination, Interpretation, Reporting, Blood cells etc.

INTRODUCTION

In patient care, diagnostic formulations rest on a tripod, consisting of clinical history, physical examination and laboratory investigations. The literature reveals that as much as 70% of

clinical decisions and diagnosis are supported by laboratory medicine. Peripheral blood smear is a basic and a highly informative tool at the clinician's disposal in screening, diagnosis and monitoring of disease progression and therapeutic response. Despite advances in hematology automation and application of molecular techniques, PBS has remained a very important diagnostic test to the hematologist. The PBS exposes the morphology of peripheral blood cells, which ensures its place in the morphologic diagnosis of various primary and secondary blood and blood related diseases.

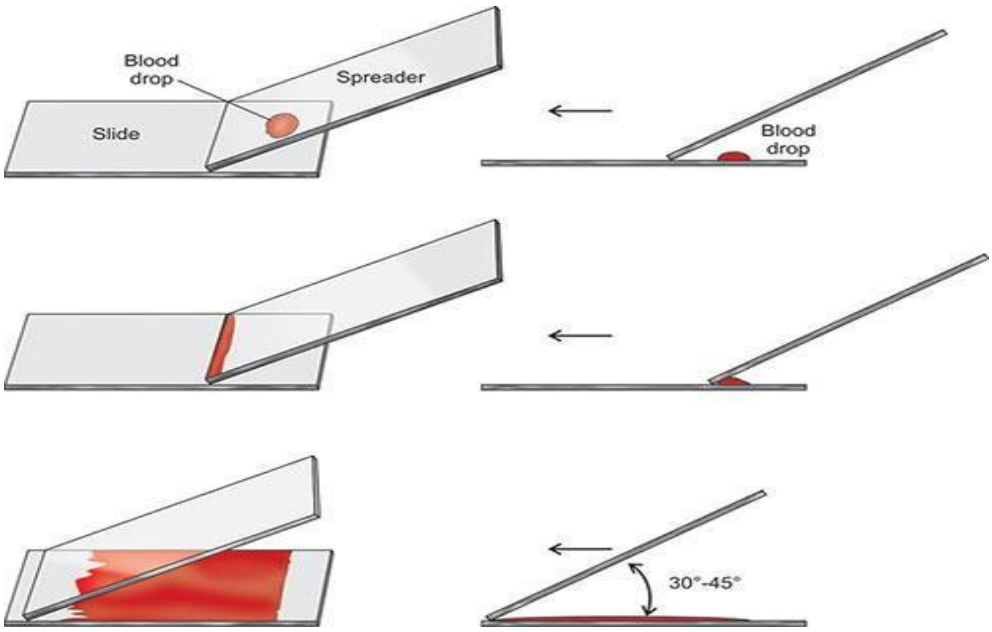
In Ayurveda, *Panduroga* (anemia) has been described in almost all classical texts in detail, but the spectrum of *Panduroga* is not just limited to anemia. The etiology, pathogenesis, clinical features, prognosis, complications and management of *Pandu* in relation to anemia hold grounds till date. For this purpose, the present paper attempts to summarize the preparation and reporting of peripheral blood film, its clinical interpretations and the common pbs diagnosis in case of types of Pandu.

AIMS AND OBJECTIVES

1. To study the diagnostic approach of Pandu vyadhi with the help of peripheral blood smear of blood.
2. To study types of Pandu vyadhi with respect to peripheral blood smear.

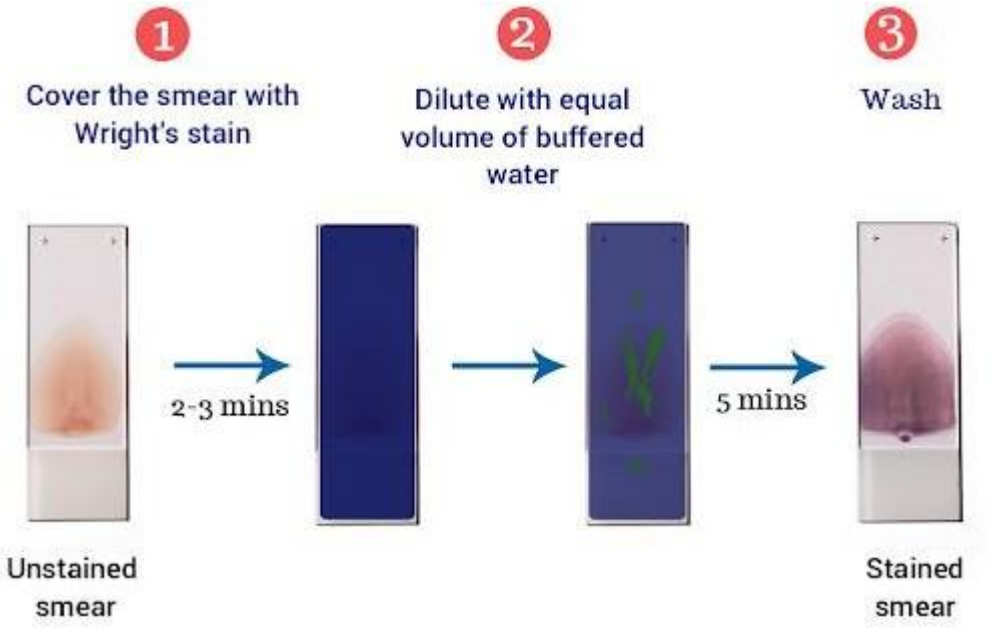
METHODOLOGY

For preparation of Peripheral Blood Smear, making slide is done by trained personnel preferably a medical laboratory technologist, who can ensure quality slides for microscopy. For this one require slides, pipette, capillary tube and blood spreader to make PBF smear. The Push (wedge) or cover-slip method is used. The former is more commonly used. In the wedge method, a drop of well mixed blood is placed on the base of a slide close to one end (about 1cm from the edge) with a capillary tube. A spreader slide with chipped edges is placed on the base slide in front of the blood and moved backwords to touch the drop of blood which makes the blood spread along the base side width. The spreader slide should have a smooth end to prevent the tail end of the smear from being irregular. Then, a smear is made with the spreader inclined at an angle of about 30-45 degrees to the smearing. This can lead to slide breaks and lab accidents. Smear artifacts may be caused by dirty slides, fat droplets or poor quality slides. The smear should cover two thirds of the base slide length and should have an oval feathered end.



For instance, steeper and faster smear may be adapted for anaemic samples. The smear is properly air dried. Label the slide with pencil or crayon on the frosted end of the slide or the head end. The dried smear is fixed with absolute methanol or ethyl alcohol and stained with a Romanowsky stain. A properly air dried smear should be fixed within 4 hours of preparation but preferably within one hour. Good fixation requires about 10-20 minutes. Improper fixation causes artefactual burr cells ie crenated red cells with refractile borders.

Romanowsky stains are mixtures of acidic dye and basic dyes that give a differential staining of the different cellular components.



The smear is floored with stain for about 5-10 min, then double diluted with buffered water and allowed for another 5-10 min for the cells to pick the stain. After this, the slide is properly rinsed under running water. Attempts should be made to wipe the underside of the slide with cotton wool to remove excess stain. Finally the slide is placed on a rack with the feathered end sloping upwards to dry. Two or more slides should be made per specimen and the quality of the slide should be assessed immediately. Quality of the film produced depends on a proper smearing technique and quality of the staining process.

Interpretation of PBS

The hemato-morphologist may be a trained laboratory technologist but preferably a laboratory physician especially for slides with significant pathology. The slide is viewed at the body of the smear, usually beginning about one millimetre away from the tail. The head of the smear should be avoided as the cell destiny is twice that seen at the tail. The head portion of the blood film might be of interest when investigating for presence of malaria parasites or microfilaria. The feathered end may be examined for platelet clumps and large cells like monocytes and blasts.

Microscopy requires a skilled systematic approach. A quick assessment of a smear can be made within 3 minutes but an abnormal film would require longer time for wider view and differential cell counts. Morphology of the blood cells on a PBS is best discussed in line with each hemopoietic cell lineage. The distribution, size, shape, colour, cellular inclusions of the red blood cell and morphology of the other major lines should be carefully assessed. Results of other routine laboratory work ups including full body count, erythrocyte sedimentation rate, red cell indices should be part of the interpreting framework for reporting a peripheral blood smear.

Anemia and Red cell morphology

The normal red cell is biconcave disc shaped, measures about 7-8 micro m in diameter, has central pallor and lacks intracytoplasmic inclusions. Red cells are pink in colour when stained with Romanowsky dye because the haemoglobin contents of the red cell pics up eosin, the acidophilic components of the dye. Abnormal variations in cell size, shape, colour, presence of intracellular inclusions and pathologic arrangement of the cells suggests a host of abnormalities. On microscopy, a normal sized red cell is comparable to the size of the nucleus of a small lymphocyte. Normally red cells exhibit narrow variations in size as reflected by normal red cell distribution width, RDW of 11-15%. A wide variation in cell size

is described as anisocytosis. Abnormalities of cell size can be microcytic or macrocytic. Anisocytosis correlates with mean cell volume MCV except in combined deficiency states. The normal MCV range is <76fl suggests microcytosis while MCV >96fl suggests macrocytosis. Oval macrocytosis is associated with Megaloblastic anemia, round macrocytosis is found in liver disease and alcoholism.

Pandu roga

Panduroga is pitta Pradhan vyadhi. Pittadosha is responsible for colour of Raktadhatu as Ranjakapitta has function of Ranjana. If it get vitiated the colour of the skin is disturbed with etiopathogenesis in raktadhatu. Due to ashraya-ashrayi bhava of pitta and rakta, thus loss of complexion or panduta occur. It develops due to depletion of rasadhatu which in turn becomes ineffective the production of raktadhatu.

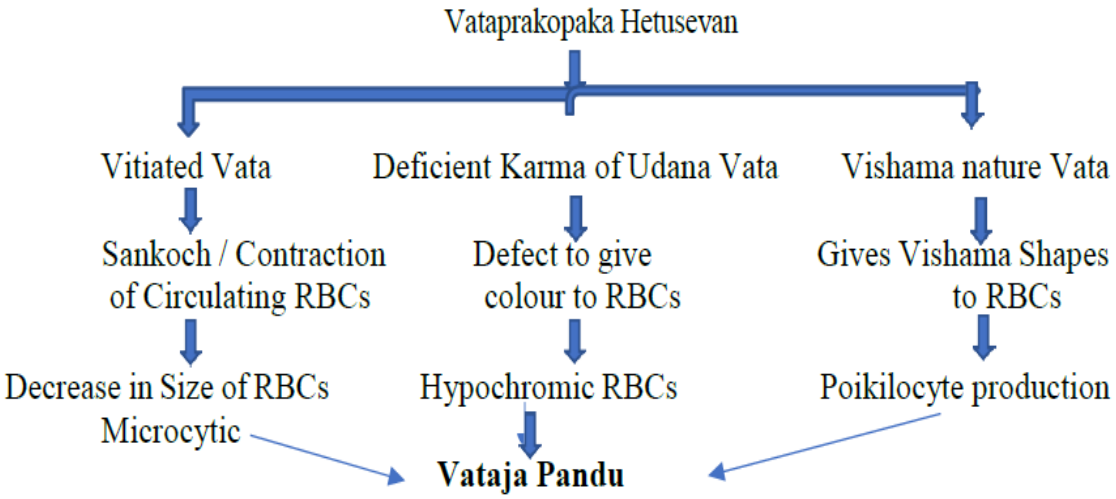
It is disease, described by the changes in the skin colour to Shweta(white), pita, harita(greenish) etc. and is typically charactrised by the presence of ketaki dhulininibhyachhaya.

DISCUSSION

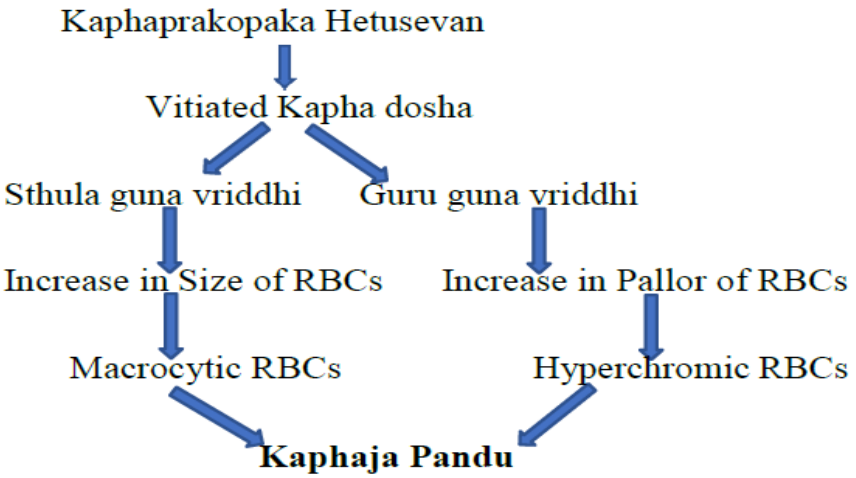
The Pandu roga is included under the heading of Varnopalakshita roga that is varna pradhanya vyadhi. Pitta is responsible for the normal colour of the body but when it gets vitiated, there will be loss of complexion or Panduta occurs. Pandu roga is referred as Vilohita, Harita and halima in Vedas and Sushruta named it as Panaki. Samanya Lakshanas or general signs and symptoms which are present in the patient and Vishishta lakshanas or specific signs and symptoms will depict the particular doshainvolvement in the disease.

Differentiation in size and shape of red blood cells that is microcytic and hypochromic size with variations in shape that is target cells, ovalocytes, elliptocyte, stomatocyte, howel jolly body, acanthocyte, echinocyte, sphorocyte, sickle shape etc variety of red cells rather than the normal size and shapes are results of Vata dosha dushti, occurring in Vataja Pandu. Sankoch is karma of vatadosha, so it decreases sizeof RBC, resulting in Microcytic size. Varna ishte, is the karma of Udan vayu. When this karma gets vikrut, varna vikruti occurs as in Hypochromic RBC. That it is unable to give proper varna to RBC leading Hypochromic RBC. Hence Microcytic, reduction in cell size and Hypochromic, varna vikruti is there in Vataja Pandu roga. Along with these, increase in variation in shape of cells ie pencil cells, target cells, elliptocytes etcdue to vishama vikruti of vata which is responsible for Vishama or

irregular shapes of RBCs. These series of events like microcytic, hypochromic, anisocytosis and poikilocytosis occurs in case of Vataja Pandu.

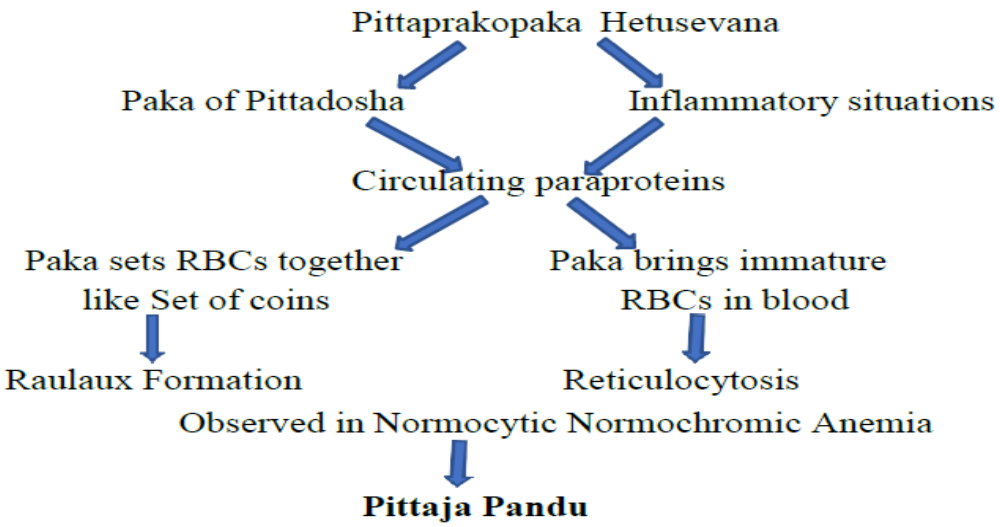


Macrocytic cells that is significant increase in size of red blood cells rather than normal size. Increase in size means one can say sthula guna and guru guna of vitiated Kapha brings the cells to increase in size of the red blood cells and also increase in chromatin part of RBCs giving rise to Hyperchromic cells. These are the gunas of vitiated Kapha. So macrocytic and Hyperchromic cells can be seen in Kaphaja Pandu patients.



Rouleaux formation means red blood cells are in aggregation, arranged like set of coins, also there is appearance of immature RBCs ie reticulocytes in the peripheral blood as well there are hemolytic cells in the peripheral blood smear. This mostly seen in inflammatory condition.

Inflammation means paka in Ayurveda. Without pitta, paka is not possible. In this inflammatory situation circulatory paraproteins sets the RBCs inaggregation and arrange like set of coins giving the appearance of rouleaux formation. Hence these type of cells can be seen more in Pittaja Pandu.



Vata causes decrease in size of RBCs (Microcytic) and also decrease in colour (Hypochromic state) indication towards Vataja Pandu. Kapha is responsible for Guruta (heaviness) and enlargement of the cells as well diminishes the agni (digestive capacity) hence macrocytic and hypochromic state of RBCs indicates Kaphaja Pandu.

Thus Intermixing of Microcytic Hypochromic RBCs (Vataja Pandu) and Macrocytic Hyperchromic RBCs (Kaphaja Pandu) in peripheral Blood smear indicates Vata-Kaphaja Pandu.

CONCLUSION

Microcytic, Hypochromic and variation in shape of red blood cells, this picturein peripheral blood smear is preferably found in Vataja Pandu type.

Macrocytic hyperchromic picture of RBC is found in Kaphaja Pandu.

Hemolytic cells, Reticulocytes and Rouleaux formation of red blood cells in peripheral blood smear significantly observe in case of Pittaja Pandu.

Microcytic hypochromic and Macrocytic hyperchromic both type of mixed picture that is dimorphic picture found in Vata-Kaphaja type of Pandu.

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