



A Conceptual view on Polycythaemia Vera with special reference to Raktapachaka Drugs

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ABSTRACT

Polycythaemia Vera is also one of the slowly developing and rare blood cancer as present in today's era. It is a malignant change in the genetic material (DNA) within a single cell of the bone marrow (clonal disorder). It begins in the soft centre of the bone marrow where new blood cells grows. In this type, the blood of the sufferers thickens because of an over-production of then red blood cells by the bone-marrow. Specifically, it is caused by mutation in the JAK2 (Janus kinase 2) gene. This causes slowing of blood flow, which may cause blood clots, enlarged spleen, heart attack or a stroke. It affects slightly more men than women. According to Ayurveda, it is "Rakta Dhatu Vrudhi" disease resulting from weak Agni of Rakta (blood). In this disease, involvement of both Pitta and Vatadosh is seen. As Rakta and Pitta both are mutually interdependent on each other, hence it could mostly cause disorders of blood and skin both. In this disease, we can think of the formulation of drugs which is told by Charak in Jwara Chikitsa namely Patola, Sariva, Musta, Patha and Kutki. These drugs will not only increase the Agni of Rakta, it will also pacify the Pitta and Vatadosh in Polycythemia Vera.

Keywords: Polycythaemia Vera, Ayurveda, Rakta Dhatu Vrudhi

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INTRODUCTION

Polycythaemias Vera is one of the rare, slowly developing blood cancer as present in today's era. It is an idiopathic chronic and myeloproliferative disorder (blood cells grow abnormally in the bone marrow) which has a very slow progression. It is mainly an overproduction of the red blood cells from the bone marrow. It may also result in overproduction of other blood cells and platelets resulting in thickening of blood leading to various complications. It affects slightly more in men than women [1].

It is caused due to a malignant change in the human genetic material (DNA) within a single cell of the bone marrow (also called as clonal disorder). It begins in the soft centre of the bone marrow where new blood cells grows. In this type, the blood of the sufferers thickens because of an over-production of then red blood cells by the bone-marrow [2].

The JAK2 gene is responsible for the production of blood cells from bone marrow specifically, it is caused by mutation in the JAK2 (Janus kinase 2) gene and its reason is still not known. Researchers believe that the mutation occurs after conception, means it is not inherited mutation, rather it is an acquired one [3].

Types: [3]

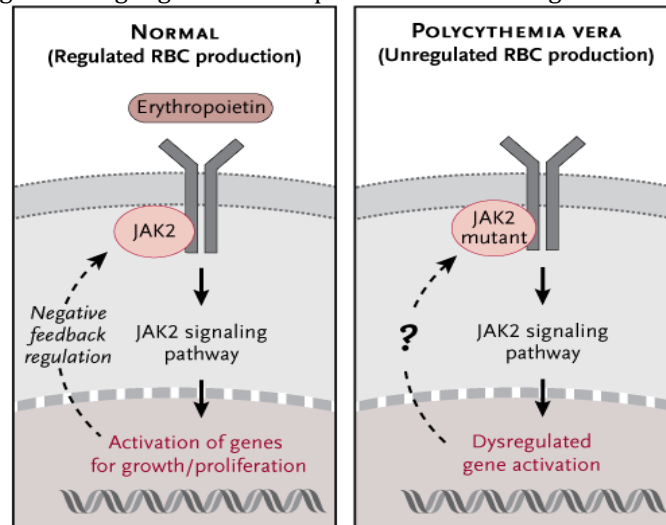
Polycythaemias: It is divided into 2 types.

1) Absolute- In this, the amount of RBCs are increased. This is further divided into:

- Primary- There's a problem in the cells produced by the bone marrow that become red blood cells; the most common type is known as polycythaemia Vera (PV).

- Secondary - Too many red blood cells are produced as the result of an underlying condition.

2) Relative- It is the result mainly due to dehydration or hypovolemia (it causes reduced in blood plasma). In this an apparent rise of erythrocyte level in the blood.

Figure No 1:Image showing regulated RBCs production and unregulated RBCs production: [2]**Symptoms: [4]**

Symptoms can be classified into 3 wide groups:

1) Cytokine symptom cluster:

- Tiredness
- Itching
- Muscle ache
- Night sweats
- sweating while awake.

2) Hyperviscosity symptom cluster:

- Headache
- Concentration problem.
- Dizziness
- Skin redness
- Vision problems.
- Ringing in ears.
- Numbness/ Tingling in hands/feet

3) Splenomegaly symptoms clusters:

- Abdominal discomfort.
- Fullness / early satiety.

Diagnosis:

The below parameters are assessed in modern science:

- Complete blood count (CBC) –raised RBCs.
- Blood smear test.
- EPO level test (Erythropoietin) - Very low level
- Bone marrow biopsy.
- Hematocrit measurement- Raised percentage of RBCs that make up total blood volume.
- Haemoglobin test-raised Hb.
- Level of oxygen-low level.

Treatment: [5]

The following medicine are given in modern science for the treatment of the polycythaemiaVera.

- Phlebotomy or bloodletting. (Reduce the hematocrit to the range of <45 %.)
- Anagrelide inhibits megakaryocyte maturation, thereby decreasing platelet counts.
- JAK1/JAK2 inhibitor: ruxolitinib.
- Hydroxyurea & Interferon alfa.

MATERIAL AND METHODS

According to *Ayurveda*, polycythemia Vera could be considered as “*Rakta dhatu vrudhi*” disease resulting from weak *agni* of *Rakta* (blood). Due to weak *Raktagni*, formation of *Vikrut Rakta Dhatu* takes place. In this disease, involvement of both *Pitta* and *VataDosha* is seen. As *Rakta* and *Pitta* both are mutually interdependent on each other, hence it could mostly cause disorders of blood and skin both. In this

disease, we can think of the formulation of drugs which is told by *Charak* in *Jwarchikitsa* namely *Patola*, *Sariva*, *Musta*, *Patha* and *Kutki*. [6]

Table No 1: [7]

Dravya	Botanical Name	Family	Sholk No. /Page No.	Rasa	Vipaka	Virya	Guna	Doshaghnata
Patola	Trichosanthes dioica Roxb	Cucurbitaceae	B.p.n 69/ 686	Tikta	Madhura	Ushna	Laghu, Snigdha	Tridoshashamaka
Sariva	Hemidesmus indicus R.Br	Asclepiadaceae	B.p.n 238/427	Madhura Tikta	Madhura	Shita	Guru, Snigdha	Tridoshashamaka
Musta	Cyperus rotandus Linn	Cyperaceae	B.p.n 93/243	Tikta, Katu, Kashaya	Katu	Shita	Laghu, Ruksha	Tridoshashamaka
Patha	Cissampelos paeira Linn.	Menispermaceae	B.p.n 193/ 395	Tikta, Katu	Katu	Ushna	Laghu, Tikshna	Vata-Kaphahara
Kutki	Picrorhiza kurroa Rouleex	Scrophuloraceae	B.p.n 152/70-71	Tikta	Katu	Shita	Laghu, Ruksha	Kapha-Pittaghna

DISCUSSION

Mode of Action on Rakta dhatu:

All the drugs in *Raktapachaka* are of *TiktaRas*. *TiktaRasa* consist of *Vayu* and *AkashaMahabhuta* which have *Ruksha* and *VyavayiGuna*. Due to *VyavayiGuna* in *AkashaMahabhuta*, it will enters in minute channels of *RaktaVahaStrotas*. With the help of *Vishad* and *RukshaGuna* in *Vayu* and *AkashMahabhuta*, *Shalan*, *Shoshan* and *Kledachushana* of *RaktavahaStrotas* occurs. Hence both the *Mahabhuta* will cause *Strotoshodhan* and *RaktaDhatuShaya*.

Mode of action on Majja Dhatu:

According to modern science, *Majja Dhatu* could be correlated to bone marrow. And as this disease is also related with the formation of RBCs in bone marrow. With the help of *VishadGuna* in *Vayu* and *AkashMahabhuta*, *Shalan* of *MajjavahaStrotas* occurs. *Tikta ras* will also increase the *Dhatvagni* of *Majja Dhatu* as it gradually increases the *Dhatvagni* from *Rasa Dhatu* to *Shukra Dhatu* thereby formation of *PrakrutMajjaDhatu* will take place.

CONCLUSION

As *PolycythaemiasVera* could be compared to *Rakta Dhatu Vruddhi*. In modern science there is no cure for it, treatment only focus on reducing risk of complications. Both in polycythemia Vera and *Rakta Dhatu Vruddhi* there is increase in blood cells, but polycythemia Vera is myeloproliferative disorder while *Rakta Dhatu Vruddhi* is caused due to incompatible diet, lifestyle and viation of *PittaDhatu*. In polycythemia Vera and *Rakta Dhatu Vruddhi*, clotting of blood occurs. But according to *Archarya Charaka*, treatment of *Rakta Dhatu Vruddhi* is *Shaman*, *Virechan*, *Upvas* and *Raktmokshan*. As *Raktapachaka* drugs in polycythemia Vera would help in *Shalan* and *Kledachushana* of increased *RaktaDhatu*. *Sariva* in *Raktapachaka* drugs would also help in *Poshan* of all the *Dhatu*s including *Rakta* and *MajjaDhatu*. These drugs will not only increase the *Agni* of *Rakta*, it will also pacify the *Pitta* and *RaktaDosh* in polycythemia Vera.

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