

STUDY OF VARIATION OF PRIMARY HAEMOSTATIC RESPONSE IN VARIOUS
PRAKRITI IN AYURVEDAVartika Kashyap*¹ and M. B. Gaur²¹P.G. Scholar, Kriya Sharir, Ch. Brahm Prakash Ayurved Charak Sansthan, New Delhi, India.²Head of Department, Kriya Sharir, Ch. Brahm Prakash Ayurved Charak Sansthan, New Delhi, India.

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ABSTRACT

The concept of *prakriti* in ayurveda exhibits its characteristic features in physical, physiological and psychological attributes. There are some studies done in past related to physiological parameter and *prakriti* (ayurvedic constitution). The present study is focused upon in vivo response of individual to vascular injury by primary hemostasis in various *prakriti*. Primary hemostasis is an indicative of platelet functions and their immediate metabolic response as well as vascular response towards an injury. The hemostatic parameter used for this study will be bleeding time which is an in vivo hemostatic test of platelet functions. The study was conducted over 150 self declared apparently healthy volunteers in age group 20-40 years irrespective of gender. Every character in body is determined by the dominance of *dosha* in the *prakriti*. This forms the basis of correlation of *prakriti* and hematological functions. At the end of study, we are able to appreciate the effect of *prakriti* on one of the physiological functions i.e. hemostasis by assessing bleeding time.

KEYWORDS: *Prakriti*, Primary Hemostatic Response, *Rakta Dhatu*, Bleeding Time.

INTRODUCTION

Ayurveda describes a unique concept, *prakriti* for every individual determined at the time of union of sperm and ovum inside the womb. It is genetically determined constitution that categorizes individuals into differentiating characteristics. These *prakriti* exhibit their characteristics in physical, physiological and psychological attributes. So it becomes essential to have a methodical analysis of these features in relation to *prakriti*.

The present study is focused upon in vivo response of individual to vascular injury by primary hemostasis in various *prakriti*. Primary hemostasis is an indicative of platelet functions and their immediate metabolic response as well as vascular response towards an injury.^[1] The hemostatic parameter used for this study will be bleeding time which is an in vivo hemostatic test of platelet functions.^[2] It will be interesting to study the response that various *prakriti* exhibit towards vascular injury through functional status of platelets and blood vessels.

The platelet is an active structure. For smaller vessels, as in skin prick, the platelets are responsible for much of the vasoconstriction by release of thromboxane A₂. They secrete ADP and their enzymes form thromboxane A₂ which in turn act on nearby platelets to activate them as

well. This attracts more and more number of platelets towards damaged vascular wall, thus forming a platelet plug.^[3]

Bleeding time (BT) is one of the tests for hemostasis. The normal range of BT by Ivy's method is upto 9 minutes.^[4] It is the time interval between skin puncture and spontaneous, unassisted stoppage of bleeding. It is an in vivo test of platelet function. The significant difference of the range observed in this study ratifies to the necessity of defining normal range of BT with more individualized approach in different geographical area having different ecological conditions. Bleeding time test is used for estimation of platelet function in human body.

In the present study, it is expected that variability of bleeding time will correspond to different *prakriti* considering the impact of dominant *doshas* of *prakriti* on haematological functions. As Acharyas have mentioned regarding properties of *rakta* that *vata* and *pitta* dominant *rakta* is *askandi* (slowly clotting) while *kapha* dominant *rakta* is said to be *skandi* (fast clotting). In present study we aspire to establish a relation between the two. It is hypothesized that *prakriti* is a differentiating factor in primary hemostatic response towards injury in different individuals.

The study was conducted over 150 self declared apparently healthy volunteers in age group 20-40 years irrespective of gender, and their *prakriti* is analyzed by using the standard *prakriti* assessment proforma. After *prakriti* Analysis, the bleeding time is analysed by using Ivy's Bleeding Time method.

The characteristic features of all the *prakriti* are different from each other and each individual is an outcome of permutation and combination of these characteristics in different ratio. Each and every character is governed and determined by the dominance *dosha* in the *prakriti* and hence the characters are also affected. This forms the basis of correlation of *prakriti* and hematological functions.

AIM

To assess the difference in primary hemostatic response to vascular injury in relation to *prakriti*.

OBJECTIVES

1. To evaluate relation between bleeding time and *prakriti* (constitution type)
2. To evaluate effect of *doshas* on *rakta*.

MATERIAL AND METHOD

The proposed study has been planned in two steps: Literary study and Observational study.

Literary source: Literary source for the present study was obtained from *Vedic scriptures*, classical texts of *Ayurveda*, sanskrit dictionaries, books related to modern medicine, articles published in reputed journals and also from various media like internet etc. followed by retrospective study of related research works.

Ethical clearance: The proposed cross-sectional study was presented in the form of a synopsis in front of the Institutional Ethical committee.

Subjects: An observational study was done on 150 self declared apparently healthy individuals by simple random sampling in the age group of 20-40 years in PG Department of Kriya Sharir and IPD of Ch. Brahm Prakash Ayurved Charaka Sansthan, Khera Dabar, Najafgarh, New Delhi-110073 affiliated by Guru Gobind Singh Indraprastha University with prior approval of ethical committee.

Inclusion Criteria

1. Healthy subjects of either sex.
2. Age 20-40 years
3. Individuals whose consent has been taken.

Exclusion Criteria

1. Volunteers suffering from any underlying disease.
2. Previous history of bleeding disorders & liver disease.

3. Taking any medication presently.
4. Addiction to any drug abuse or smoking that may hamper the physiological parameters.
5. Pregnancy.
6. Patient having trouble on seeing blood.

Study Design

It is a cross-sectional observational study. The proposed study has been planned in two steps i.e. literary study and Observational study. The observation was done using *Prakriti* assessment questionnaire based proforma and bleeding time assessment using Ivy's method.

Methodology

1. A brief previous history of volunteers regarding any coagulation disorder, or consumption of any medication like aspirin, anti-histamine, indomethacin, phenothiazine was taken and were excluded from study.
2. Healthy individuals of either sex in age group 20-40 years were selected randomly. The enrolled volunteers were informed about the study and their voluntary participation was solicited. A written consent from volunteers was taken.
3. There was a separate observer assigned to assess the *prakriti* of volunteer as that to the observer who was to assess bleeding time.
4. *Prakriti* of the 150 volunteers was determined using *prakriti* assessment questionnaire based proforma.^[5] The haemostatic status of volunteers was assessed using Ivy's method for bleeding time (BT) assessment. Then all this data was statistical analysed and results were explored.

OBSERVATION AND RESULT

The sample size of the study was 150. All 150 volunteer students participated in the study in the particular duration of 18 months. We distributed the individuals into four *prakriti* groups *vata-pittaj*, *pitta-kaphaj*, *kapha-vataj* and *tridoshaj*.

1. *Vata-pitta* (*vataj*, *vata-pittaj*, *pitta-vataj*)
2. *Pitta-kaphaj* (*pittaj*, *pitta-kaphaj*, *kapha-pittaj*)
3. *Kapha-vataj* (*kaphaj*, *kapha-vataj*, *vata-kaphaj*)
4. *Tridoshaj*

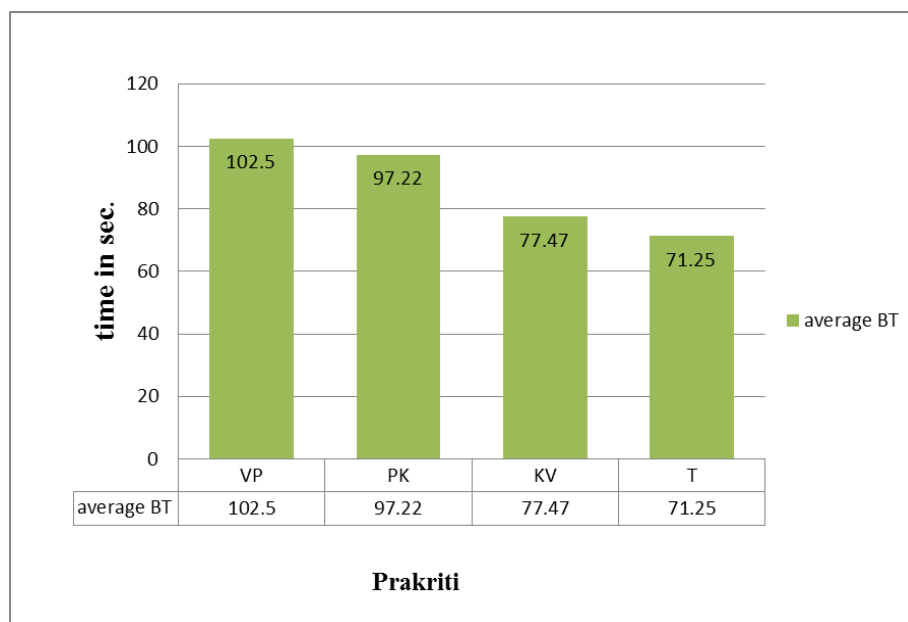
Table showing average bleeding time in four different *prakriti*.

S. No.	Prakriti	Frequency	Average bleeding time (in sec.)	Percentage (%)
1.	Vata-pitta	30	102.5	20
2.	Pitta-kapha	27	97.22	18
3.	Kapha-vata	85	77.47	56.6
4.	Tridoshaja	8	71.25	5.3

Out of 150 subjects, 30 were of *vata-pitta prakriti* making it 20 % of the total, 27 were of *pitta-kapha prakriti* making it 18 % of the total, 85 were of *kapha-vata prakriti* making it 56.6% of the total, and 8 were of *tridoshaj prakriti* making it 5.3% of the total.

Four *prakriti* groups arranged in descending order of average bleeding time (in sec.) is:

Vata-pittaj > Pitta-kaphaj > Kapha-vataj > Tridoshaj
i.e. **102.5 > 97.22 > 77.47 > 71.25**



DISCUSSION

Prakriti is influenced by preponderance of three *doshas*, five *mahabhutas* (basic elements) and three *gunas* (three properties of man) at the time of conception along with internal environment of womb, dietary habits and life style of parentages. So, different individuals have different *prakriti* depending upon dominant circumstances.^[6] There are some studies done in past related to physiological parameter and *prakriti* (ayurvedic constitution) that show striking differences in biochemical and hematological parameters in different *prakriti*, age groups, seasons etc.

In ayurveda, *prakriti* is classified into various categories based on dominant *dosha*. In present study, we have primarily focussed on *chaturvidha prakriti* (*vata-pitta*, *pitta-kapha*, *kapha-vata*, *tridoshaj*)

When platelets come in contact with a damaged vascular structure, esp. collagen fibres, platelets change their characteristics drastically. They become sticky and adhere to collagen in the tissues and to protein called vonWillebrand factor. Hemostasis is prevention of blood loss after blood vessels are punctured, cut, or otherwise damaged. Bleeding time (BT) can be defined as the time

interval between the moment when bleeding starts and the moment when the bleeding stops due to formation of temporary platelet plug. BT is affected by several factors like platelet function and activation as well as interactions between endothelial lining in the artery, aggregation of platelets and coagulation pathways.

AcharyaChakrapani says that the characteristics properties as well as the color of *prakrit* (healthy) *rakta* depends upon *vatadi prakriti* of individual.^[7] Therefore, after *prakriti* assessment and bleeding time assessment, we apply statistical test to the data of four *prakriti* groups.

Statistical test: On applying One-Way ANOVA, we get the following table

<i>Prakriti</i>	Mean bleeding time for group (\bar{X}_g)	Frequency (n_g)	Sample Mean bleeding time (\bar{X})	Sum of squares between $n_g * (\bar{X}_g - \bar{X})^2$	Sum of squares within $\sum (\bar{X}_i - \bar{X}_g)^2$
VP	102.5	30	85.7	8467.20	117937.50
PK	97.22	27	85.7	3583.18	59566.67
KV	77.47	85	85.7	5757.30	104781.18
T	71.25	8	85.7	1670.42	660.94
Total Sum of Squares				19478.10	282946.28

Here, $F(\text{Stat}) > F(3,146)$

We accepted Hypothesis with the given confidence level of 95% and hence based on our findings we can say that **“There is variation in bleeding time and *prakriti* of an individual for at least one of the *prakriti*.”**

The maximum average bleeding time is of *vata-pitta prakriti* i.e. 102.5 seconds, followed by *pitta-kaphajprakriti* i.e. 97.22 seconds, then *kapha-vataj*

prakriti i.e. 77.47 sec. and least bleeding time is of *tridoshaj prakriti* i.e. 71.25 seconds. *Tridoshaj prakriti* have all three *doshas* in balance, therefore equilibrium of all three *doshas* contribute towards the bleeding time.

Probable role of *doshas* on blood coagulation

The varying impact of *doshas* on *rakta dhatu* can be attributed to the *mahabhutas* they are derived from.

Table Showing *mahabhuta* and their respective *doshas*.

S.No.	Predominant <i>Mahabhuta</i>	Representative <i>Dosha</i>
1.	<i>Aakash + Vayu</i>	<i>Vata</i>
2.	<i>Agni</i>	<i>Pitta</i>
3.	<i>Jala + Prithvi</i>	<i>Kapha</i>

The cohesive and adhesive property of *jala* is acquired by *kapha*. *Kapha* bears similarity to *jala* in having *drava*, *snigdha*, *adhoga* and *sheeta* properties. With respect to human body, it means *kapha dosha* bears the functions of adhesion of cells with each other.

The function of platelet aggregation and platelet adhesion at the time of vessel injury can be attributed to dominance of *kapha dosha*. This could be the probable reason for early aggregation and adhesion of platelets and hence lesser bleeding time as compared to other *deha prakriti*.

Pitta is responsible for *paka karma* (chemical change). It is because of *ushna* and *tikshna guna* of *pitta* that it takes longer for platelets to get tranquil and form platelet plug. *Agni* is located in fluidly *dosha* called *pitta*. *Pitta* is *dosha* and *agni* is *guna* of *pitta* in the form of *ushma*, so they are mentioned differently.

Hridya is the seat of *vyana vata*,^[8] and it controls the activities of cardiovascular system normally. The *gati* of the heart which can be compared to conduction system of the heart (rate and rhythm) followed by circulation of blood to entire body is controlled by *vyana vayu*. *Vyana vata* performs the function of *vikshepana karma* i.e. pushing and pumping in appropriate manner to entire body.

Vata possess the quality of *chala* which is responsible for various body mechanisms including flow of blood circulation throughout body. Thus, *vyana vayu* can be considered as autonomic outflow (sympathetic and parasympathetic). Stimulation of *vyana vayu* activate

sympathetic outflow leading to increased sympathetic effect on various aspects of blood circulation. Sympathetic stimulation produces peripheral vasoconstriction, increases peripheral resistance and increases cardiac output while parasympathetic stimulation decreases cardiac output and blood pressure. Thus, the dampening of *vyana vayu* causes increased parasympathetic flow leading to reverse implications.

Thus role of *vata* in circulation of blood (*rasa+rakta*) and sensory stimulation from the site of prick is quite significant. The *chala guna* of *vata* may be responsible for the lesser effect on platelet aggregation than *kapha dosha*.

Rakta vitiated by *vata* becomes frothy, reddish-black, parched and less viscous in appearance. It flows fast and there is delay in clotting. Similarly, *rakta* vitiated by *pitta* becomes bluish yellow or greenish in color, pungent smelling, flies and ants revolting and takes long time to clot. *Kapha* vitiated *rakta* has colour similar to *gairika* (red ochre) like, unctous, cold, more viscous, slimy, sluggish in flow, resembling a muscle probably in colour.^[9] Blood vitiated by combined all three *doshas* has features combined of all vitiated *doshas*.

Whenever *kapha* came in combination with other *doshas*, average bleeding time was lesser in that *prakriti* as compared to when *kapha* dosha was not dominant in considering *prakriti*. *Vata* and *Pitta doshas* prolong bleeding time whereas *kapha dosha* diminish bleeding time.

CONCLUSION

The ample amount of study on physiological aspects especially haematological parameters in different *Prakriti* (constitution) is lacking. We have no reference ranges for these parameters in relation to constitution types. The present study is aimed at establishing a relation between hematological parameter with ayurvedic genomics (*prakriti*). This study will help to further explore the relation of various hemostatic parameters with different constitution types.

Every *prakriti* exhibit different metabolic functions as mentioned in our ancient text and proved otherwise by various studies conducted.

This study deals with an innovative approach towards evaluation of variation in bleeding time in different genetically constituted individuals so that we can assess the functions of dominant *doshas* in physiological function.

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