Relationship between prakriti (physical constitution) and head circumference in infants: (clinical study)

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Abstract

Background: Prakriti is an important tool that explains individuality and it has important role in prevention, diagnosis, treatment of disease and forecast of future disorders. Prakriti is enumeration of body features, internal as well as external. The growth of head circumference is a valuable indicator of mental health and development in infancy.

Material & Methods: 100 infants were registered for Prakriti assessment. Performa for Prakriti assessment in infants was developed by department of Kaumarbhritya/Balroga and department of Kriya Sharira. Head circumference was measured by measuring tape and data were analyzed to get the trends in accordance to individual Prakriti.

Observation & Result: Result of this study shows that maximum head circumference was found in Kapha Prakriti while it was minimum in Vata Prakriti infants. Maximum head circumference growth velocity was found in Pitta Kapha and Kapha Prakriti and minimum in Vata Prakriti as compared to different follow ups. On applying one way ANOVA and Post Hoc Bonferroni tests, significant variations were observed in all the pairs.

Discussion & Conclusion: Vata Prakriti individuals have predominance of Baksha, Lagna and Sukshma guna so it have lowest head circumference. Kapha Prakriti individuals have highest head circumference due to Mahalalata characteristic of Kaphaja Prakriti. Maximum Head Circumference growth velocity was found in Kapha and Pitta Kapha Prakriti and minimum in Vata Prakriti infant. Not any study available for relation between infants Prakriti with head circumference and head circumference growth velocity

Keywords: Prakriti, Infants, head circumference, head circumference growth velocity

Introduction

Every man and women on the earth born with some or other physical and mental peculiarities which will remain with him or her through the life. Such features which required by birth itself are called Prakriti. These specific types of Doshika Prakriti can be identified in growing individuals [1]. The knowledge about the Prakriti is helps in diagnosis of diseases [2], management of disease [3] and forecast of Doshā dependent disorders in future [6]. Knowledge of Prakriti can guide the parents for prevention of expected disorders and deciding career of their wards at a very early age [8].

Formation of Deha Prakriti: Acharya Charaka has described that these factors influencing the Prakriti determination as –

1) Sukra-Shonita Prakriti (Characteristics of sperm and ova)
2) Kala-Garbhasaya Prakriti (Time factor and condition of uterus)
3) Maturaharavivahara Prakriti (Diet and code of conduct of mother)
4) Panchamahabhutavikara Prakriti (Condition of Panchamahabhutavikara).

Sushruta [7] emphasizes only on the genetic factors as –

1) Status and Doshā of sperm
2) Status and Doshā of ovum are responsible for formation of Prakriti (Constitution)

Apart from the above mentioned factors, Charaka [8] describes some other factors for Prakriti determination as -

1) Jati Prasakta (Racial/ Caste)
2) Kula Prasakta (Familial)
3) Deshanupatinee (Country)
4) Vayomupatinee (Natural change according to age)
5) Kalanupatini (Time)
6) Pratayamaniyata (Individual specific character)
Vagbhata9 has added seventh as strength (Bala) in this list.

**Significance of Head circumference**
Measuring head circumference (HC) in infants is a quick, simple, noninvasive, and reliable procedure for determining underlying brain size. This measurement is taken on children between birth to 6 years of age (the period of brain growth) Therefore, in view of above facts present study was carried out to explore a relation between head circumference and head circumference growth rate with Prakriti of infants.

**Material and Methods**
**Selection of Patients:** This Study was completed on Kaumubarhityal/Balroga, O.P.D., Sir Sunderlal Hospital, Institute of medical sciences (I.M.S), Banaras Hindu University (B.H.U) after obtaining approval from the institutional ethics committee. The infants were selected after written informed consent and after offering sufficient explanation about the study and its aims. After proper screening Prakriti assessment was done as per predesigned Performa used in research work.

**Ethical clearance-** The ethical committee clearance number is de/an/2011-12/392-A dated on 12/12/2011.

Longitudinal study was done on total 100 healthy infants on -
1. Registration was done at 10th day of life
2. Follow up 1- at the age of 45 days (1.5 month)
3. Follow up 2- at the age of 90 days (3 month)
4. Follow up 3- at the age of 180 days (6 months)
5. Follow up 4- at the age of 270 days (9 months)
6. Follow up 5 at the age of 365 days (12 months)

Cases were selected on the basis of following inclusion and exclusion criteria –

<table>
<thead>
<tr>
<th>Inclusion Criteria-</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Infants, whose parents have given written informed consent for the participation in the study,</td>
<td></td>
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<tr>
<td>2. Full term and appropriate gestational age [FT (AGA)],</td>
<td>1. Newborn baby, if having any one of the following conditions,</td>
</tr>
<tr>
<td>healthy newborn baby (10th day after birth).</td>
<td>was excluded from the study</td>
</tr>
<tr>
<td>3. Who were delivered by uncomplicated SVD</td>
<td>2. Whose parents were not willing for the participation in study.</td>
</tr>
<tr>
<td>(spontaneous vaginal delivery)</td>
<td>3. Preterm, post term or full term [Small Gestational age (SGA)/ Large gestational age (LGA)] baby.</td>
</tr>
<tr>
<td>4. Elective LSCS (lower segment Cesarean section)</td>
<td>4. Any associated congenital anomalies at registration.</td>
</tr>
<tr>
<td>without showing any sign of fetal distress.</td>
<td>5. Infant who was suffering with any disease at registration or any life-threatening disorder observed on subsequent follow ups.</td>
</tr>
</tbody>
</table>

**Assessment of Prakriti**
For this study, a questionnaire was prepared on the basis of Prakriti characteristic mentioned in different textbooks of Ayurveda viz. Charaka Samhita [10], Sushruta Samhita [11], Ashtanga Samgraha [12], Ashtanga Hridaya [13], Bhava Prakasha [14], Sharangadhar Samhita [15], Harita Samhita [16], Bhela Samhita [17]. In questionnaire, only those Doshika characteristics were taken, which were related to the infants; while the others characteristics related to the adults were not considered. Assessment was made by analyzing obtained data filled by questionnaire and physical examination of subjects. All concerned characteristics were assessed by Darshan (Inspection), Sparshana (Palpation) and Prasana (questionnaire) Pariksha (examination) [18, 19]. Some characteristics were assessed by objective parameters such as skin temperature, skin color, weight, crown heel length, head circumference and chest circumference of baby etc. The proforma was designed in such a way that each trait/character described in texts was converted into corresponding simplified form/questions, yet keeping the original idea intact. Each question was allotted equal marks. It was finally found that Vata is having 17 traits/questions, Pitta is having 20 traits/Questions and Kapha is having 21 traits/questions. Scores of Vata, Pitta and Kapha in an individual was scored by using a 0/1 against V/P/K for each of the questions depending on a no or yes answer respectively and cumulative scores of V, P and K are calculated in each individual through the software [20].

Prakriti was determined on registered healthy infants on 10th day of life after calculation of sharing-percentage of Vata, Pitta and Kapha. After Prakriti assessment, subjects were further distributed as per their Prakriti into various categories, viz. Vata, Pitta, Kapha, Vata-Pitta, Vata-Kapha, Pitta-Kapha and Vata-Pitta-Kapha Prakriti. No subject, having Sama-prakriti or Tridoshaja Prakriti, was observed during the study period.

**Head circumference:** This measurement is most reliable parameter for brain growth of infants. This measurement is taken on children between births to 6 years of age21. Head circumference has great importance in developmental and neurological assessment. Infants, who were suspected on developmental testing of being mentally subnormal, or of having hydrocephalus, were excluded from this study.

**Tool / Equipment for Head Circumference:** It was done by a measuring tape formed of un-shrinkable, non-stretchable and flexible material.

**Procedure**
- The head circumference was measured as the maximum circumference of the head with measuring tape overlying the occiput and supraorbital ridge.
- An infant or child below the age of two years was held on the mother’s lap. The tape was moved up and down over the back of the head to locate the maximal circumference of the head and recorded.
- Three such measurements of the same child were taken and mean of data was considered as final data.

**Fig 1:** Measuring tap
This table showed maximum head circumference at registration and on subsequent follow ups in Kapha Prakriti infants except on fourth follow up it was in Pitta Kapha Prakriti while minimum head circumference was observed at registration and on subsequent follow ups in Vata Prakriti infants. On applying One Way ANOVA test, it was found significant at registration and on all the follow ups. (p < 0.001). When this was compared as per Prakriti on subsequent follow ups by Post Hoc test, significant variation was found as per Prakriti on almost all follow ups in almost all the pairs.

Fig 2: Head circumference assessment

Statistical analysis of data
The obtained data of head circumference were categorized, as per the Prakriti of infants, and statistical analysis was done to get relationship of head circumference and head circumference growth velocity with the obtained Prakriti. The analyzed data has been presented values of mean ± standard error of mean (Minimum – Maximum), One Way ANOVA test, and Post-Hoc pairs (Bonferroni tests) values between different Prakriti. The statistical analysis of data was performed by using (SPSS) statistics software version 22.0.

Observations and results
Total 100 infants, irrespective to sex were registered on 10th day of life from the Kaumarbhritya/Balroga, O.P.D, Sir Sunderlal Hospital, Institute of Medical sciences (IMS), Banaras Hindu University (BHU) on the basis of inclusion and exclusion criteria of study after proper screening as per pre designed proforma. Prakriti of registered infants was assessed and its relation was explored in different follow ups context to head circumference and growth rate of head circumference.

<table>
<thead>
<tr>
<th>Prakriti (n=100)</th>
<th>Head Circumference- HC (Cm)</th>
<th>One Way ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD (Min – Max)</td>
<td>p = 0.000 HS</td>
</tr>
<tr>
<td>Registration</td>
<td>FU1</td>
<td>FU2</td>
</tr>
<tr>
<td>I. Vata (n=5)</td>
<td>34.26 ± 0.81 (33.7, 35.6)</td>
<td>36.48 ± 0.93 (35.1, 37.6)</td>
</tr>
<tr>
<td>II. Pitta (n=19)</td>
<td>34.52 ± 0.41 (33.6, 34.9)</td>
<td>36.04 ± 0.38 (35.3, 36.5)</td>
</tr>
<tr>
<td>III. Kapha (n=22)</td>
<td>35.92 ± 0.46 (34.7, 36.6)</td>
<td>38.44 ± 0.51 (37.2, 38.9)</td>
</tr>
<tr>
<td>IV. Vata-Pitta (n=12)</td>
<td>34.51 ± 0.26 (34.1, 34.9)</td>
<td>36.46 ± 0.34 (35.8, 37.2)</td>
</tr>
<tr>
<td>V. Vata-Kapha (n=11)</td>
<td>35.25 ± 0.8 (33.8, 36.5)</td>
<td>37.55 ± 0.7 (36.4, 37.5)</td>
</tr>
<tr>
<td>VI. Pitta-Kapha (n=31)</td>
<td>35.46 ± 0.48 (34.7, 36.5)</td>
<td>37.9 ± 0.53 (37.8, 38.9)</td>
</tr>
<tr>
<td>One Way ANOVA</td>
<td>F = 29.134 p = 0.000 HS</td>
<td>F = 68.643 p = 0.000 HS</td>
</tr>
</tbody>
</table>

This table showed maximum head circumference at registration and on subsequent follow ups in Kapha Prakriti infants except on fourth follow up it was in Pitta Kapha Prakriti while minimum head circumference was observed at registration and on subsequent follow ups in Vata Prakriti infants. On applying One Way ANOVA test, it was found significant at registration and on all the follow ups. (p < 0.001). When this was compared as per Prakriti on subsequent follow ups by Post Hoc test, significant variation was found as per Prakriti on almost all follow ups in almost all the pairs.

Table 2: Showing Head circumference (HC) growth velocity of infants at registration and on subsequent follow-ups in different Prakriti

<table>
<thead>
<tr>
<th>Prakriti (n=100)</th>
<th>Head circumference growth velocity (cm/day)</th>
<th>One Way ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD (Min – Max)</td>
<td>F = 1.331 p = 0.188</td>
</tr>
<tr>
<td>Registration</td>
<td>FU1 - Reg</td>
<td>FU2 – FU1</td>
</tr>
<tr>
<td>I. Vata (n=5)</td>
<td>0.615 ± 0.045 (0.57, 0.66)</td>
<td>0.638 ± 0.014 (0.62, 0.65)</td>
</tr>
<tr>
<td>II. Pitta (n=19)</td>
<td>0.628 ± 0.043 (0.57, 0.7)</td>
<td>0.644 ± 0.067 (0.53, 0.77)</td>
</tr>
<tr>
<td>III. Kapha (n=22)</td>
<td>0.646 ± 0.057 (0.51, 0.7)</td>
<td>0.652 ± 0.059 (0.53, 0.77)</td>
</tr>
<tr>
<td>IV. Vata-Pitta (n=12)</td>
<td>0.626 ± 0.053 (0.53, 0.69)</td>
<td>0.649 ± 0.057 (0.57, 0.67)</td>
</tr>
<tr>
<td>V. Vata-Kapha (n=11)</td>
<td>0.633 ± 0.044 (0.57, 0.69)</td>
<td>0.647 ± 0.036 (0.59, 0.71)</td>
</tr>
<tr>
<td>VI. Pitta-Kapha (n=31)</td>
<td>0.659 ± 0.057 (0.57, 0.77)</td>
<td>0.672 ± 0.060 (0.51, 0.77)</td>
</tr>
<tr>
<td>One Way ANOVA</td>
<td>F = 2.936 p = 0.017</td>
<td>F = 0.522 p = 0.739</td>
</tr>
<tr>
<td></td>
<td>F = 17.911 p = 0.000 HS</td>
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</tbody>
</table>
This table shows growth velocity of head circumference from registration to different follow ups. When the change of head circumference was compared at different follow up to assess the growth velocity, it was maximum in Kapha Prakriti or Pitta-Kapha Prakriti and Minimum in Vata Prakriti.

**Discussion**

The present study proves the significant relation between Prakriti and head circumference (HC) of infants. Presently, head circumference measurements in children are considered as important tools for the assessment of developmental and neurological status.

In this study, variation in head circumference, of infants, at registration and subsequent follow ups, is found significant (p<0.001) as per their Prakriti revealed by applying ANOVA test. On applying Post Hoc test, variation in these parameters was found significant between different pairs. However head circumference was found minimum among Vata Prakriti and maximum in Kapha Prakriti and Pitta Kapha Prakriti in different follow ups.

In the study of growth velocity Vata Prakriti infant shows minimum weight gain during the subsequent follow up and Pitta Kapha and Kapha Prakriti have shown higher growth velocity during the follow ups. These findings is due to predominance of Vata, having Raksha, Laghu, and Sukshma Guna results in relatively less growth while Kapha Prakriti individuals are Mahalalata (Broad forehead) and Guru, and Saandra Guna of Kapha Prakriti contributed in well development of body parts.

**Conclusion**

Vata Prakriti individuals have lowest head circumference while Kapha Prakriti individuals have highest head circumference. Maximum Head Circumference growth rate was found in Kapha and Pitta Kapha Prakriti and minimum in Vata Prakriti infant.

**Source of support**: Nil

**Conflict of interest**: None Declared

**References**