

## Study of Serum Uric Acid Level in Adolescents Who Were Born Preterm

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### Abstract

**Introduction:** Approximately 11% of all live born infants worldwide are born preterm. Adults born preterm show an enhancement of cardiovascular risk factors. There is growing interest in the role of Uric acid in aetiology of essential hypertension. However limited information is available linking the childhood uric acid level and Blood pressure who were born preterm. With this background, we studied the relationship between serum Uric Acid and Blood pressure in adolescents.

**Objectives:** To compare the serum Uric acid levels and Blood pressure in adolescents born preterm with adolescents born at term.

**Methodology:** 105 subjects were selected randomly from population of Gadag city & nearby places after taking informed consent. They divided into I- preterm born adolescents & II- term born adolescents. Serum Uric acid was estimated by Uricase method.

**Results:** Group I showed mean levels of SBP  $112 \pm 8$  mmHg, DBP  $80 \pm 6$  mmHg & serum uric acid  $6.1 \pm 1.2$  mg/dl. Group II showed mean levels of SBP  $100 \pm 8.4$ , DBP  $74 \pm 5.8$  & serum Uric acid  $4.8 \pm 1.1$  mg/dl. Statistical analysis shows Uric acid & Blood pressure were high in group I compared to group II.

**Conclusion:** Both systolic and diastolic blood pressure were higher in adolescents who born preterm and serum Uric acid was positively correlated with Blood pressure.

## **INTRODUCTION**

Uric acid is a byproduct of purine metabolism produced in blood from endogenous purine (2/3) substances or from diet (1/3)<sup>1</sup>. Hyperuricemia is frequently associated with lifestyle-related diseases. Approximately 25–40% of untreated hypertensive patients have high serum uric acid. There is an association between increased serum uric acid and hypertension described in adults in several large epidemiological studies. High uric acid may be an independent risk factor for cardiovascular event, metabolic syndrome, gout and renal failure.<sup>2</sup>

About 11% of infants are born preterm (before 37 weeks of gestation) worldwide. Adults born preterm with very low birth weight show enhancement of cardiometabolic risk factors such as elevated blood pressure and impaired glucose regulation compared with their peers born at term. Not all the cardiometabolic risk factors related to preterm birth are known, or whether they apply to those born less preterm, although about 80% of premature infants are born late preterm.<sup>3</sup>

Preliminary studies have also reported an association between hyperuricemia and nonsustained hypertension and, recently, a relationship between changes in serum

Uric acid over time and blood pressure from childhood to adulthood has been reported. These findings have sparked growing interest in the relationship between uric acid and blood pressure in children that may lead to pathophysiological insights and greater knowledge on the cause-effect relationship between these factors.<sup>4</sup>

There is growing interest in the role of uric acid in etiology of essential hypertension. However limited information is available linking the childhood uric acid level and blood pressure who were born preterm. With this background, we studied the relationship between serum uric acid and blood pressure in adolescents.

## **METHODOLOGY**

Total 105 Subjects were screened between the age 12 to 17 years from population of Gadag city & nearby places. Informed written consent was taken from all subjects.

Exclusion criteria

- Subjects taking medications which are related to uric acid levels, antihypertensive etc
- Recent intake non-vegetarian food.

All subjects are divided into two groups

- Group I: Preterm born adolescents (below 37 weeks)
- Group II: Term born adolescents

Venous blood was drawn with all aseptic measures and serum was separated. Serum Uric acid was estimated by Uricase method. Blood pressure was measured in all subjects.

**RESULTS****Table 1.** Distribution of characters of both the groups

Characters	Group I	Group II
Male	15	61
Female	9	20
< 34 weeks of gestation	6	-
34 to 37 weeks of gestation	18	-
Cesarean delivery	7	11
Antenatal steroid exposure	1	-

**Table 2.** Comparison of Mean values of SBP, DBP, Serum Uric acid levels of Group I & II

Parameters		N	Mean± SD	p value
SBP mmHg	Group I	24	112±8	<b>0.003*</b>
	Group II	81	100±8.4	
DBP mmHg	Group I	24	80±6	<b>0.044*</b>
	Group II	81	74 ±5.8	
Sr UA mg/dl	Group I	24	6.19±1.2	<b>0.0127*</b>
	Group II	81	4.8±1.1	

\* P&lt;0.05 statistical significance

**Table 3.** Comparison between male and female

Parameters	Sex	N	Mean± SD	p value
SBP mmHg Parameters	Male	76	115.40±6.29	0.622
	Female	24	112.29±7.71	
P DBP mmHg Parameters	Male	76	78.26±7.23	0.556
	Female	24	77.24±7.01	
Pa UA mg/dl Parameters	Male	76	5.38±1.37	0.845
	Female	24	4.71±1.24	

**DISCUSSION**

Now days uric acid levels almost doubled with increase in purine rich foods. In animal models elevation of uric acid increases blood pressure through a stimulation of the Renin angiotensin system & decreased endothelial nitric oxide which is reversible

with uric acid reduction or blockade of RAS.<sup>1,2,10,11</sup> Mechanisms for hypertension in born preterm may include a) Decreased nephron number b) Altered renal tubular function c) Altered balance of RAS d) Decreased vascular dilatation to nitric oxide e) Impaired vascular stiffness.<sup>5,6,7</sup>

Clinical studies have linked the uric acid levels to the RAS, vascular stiffness & sympathetic activity. Thus it is plausible that uric acid is involved in the development of programmed hypertension.<sup>8</sup> To support this Feig et al proposed that transplacental passage of maternal UA may impair the fetal nephron formation through endothelial dysfunction.<sup>9</sup> We found that higher serum uric acid, systolic blood pressure & diastolic blood pressure among adolescents who were born preterm than adolescents born at term.

Further works are needed to determine the exact correlation between uric acid and blood pressure. Uric acid may provide a target for the treatment in such population to improve their future cardiovascular health.

### **LIMITATIONS**

BP measured during one visit

Small sample size

### **FUTURE SCOPE**

Take the study by considering confounders like age, sex, w/h ratio, BMI, birth weight, lipid profile, blood sugar, diet history etc

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