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Study of relationship between Anemia and Hypertension

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ABSTRACT

Hypertension in pregnancy is a one of the major complication in pregnancy, which increases maternal mortality rate. Purpose of this study is to study relation between anemia and hypertension for their early detection and preventive measures. Hemoglobin and blood pressure were measured in 80 women in their I, II and III trimester of pregnancy. Patient with infective, metabolic or degenerative disease and patient with hypertensive medication before pregnancy were excluded from study. In non-anemic women blood pressure was within normal range in all trimester, whereas in anemic group systolic blood pressure was found to be raised mostly in 3rd trimester. This study shows anemia can be well co related with systolic hypertension and early detection of anemia can prevent further complications.

Keywords: *Pregnancy, Hypertension, Anemia*

1. INTRODUCTION

Anemia is the most prevalent problem in developing countries having 57.9% in pregnant women and 56.2% in reproductive age[1] and leads to many complication. WHO shows that anemia showed adverse effects to half of all pregnant women 52% in developing countries and 23% in developed countries[2]. This study was done to find out association between anemia and hypertension.

2. MATERIAL & METHOD

80 women in their I, II and III trimester of pregnancy were selected from obstetrics and gynecology antenatal outpatient department. Any infective, metabolic or degenerative disease detected on clinical examination & patient having hypertension before pregnancy was exclusion criteria. Approval of ethical committee of Medical college & informed consent was taken from participants in study .Patients were called at 9:00am with empty stomach. A through clinical examination was done with blood pressure measurement with sphygmomanometer, body weight, height, period of gestation, nutritional status were noted. Venous samples were collected for hemoglobin estimation. Women included were between 18-36 years in age, weight between 40-60 kg, height ranged from 136-159 cm, BSA 1.23-1.67 $m^{2,}$ arm circumference between 22-25.6 cm. Parity was between 1-4. Women were divided into three groups for anemia: Group A – Normal (Hb above 10gm %) Group B- Mild (between 8-10 gm % Group C- severe / moderate (< 8 gm %). Hypertension was classified according to systolic and diastolic pressures: Normal blood pressure - < 140/ 90 mm of Hg) and Hypertension -> or equal to 140/90 mm of Hg[3].

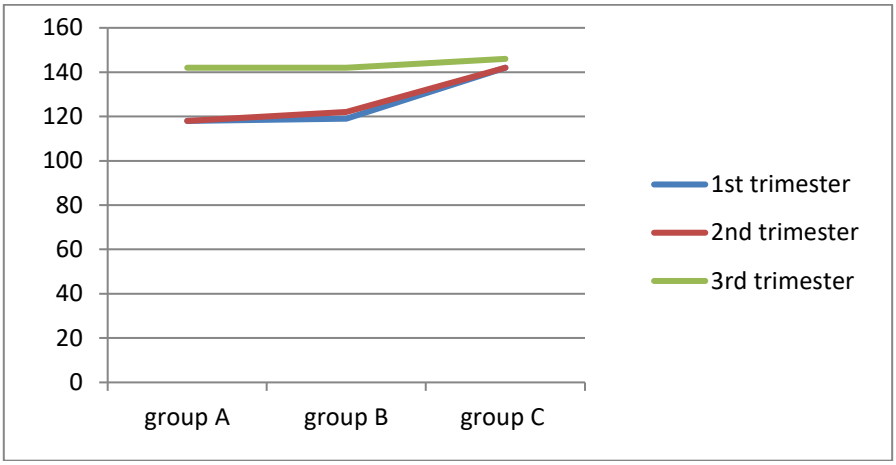
Statistical analysis: Mean with standard deviation of blood pressure was compared with level of hemoglobin in different trimester. Results: From total 80 pregnant women the study sample, 29 pregnant women in 'A' group with normal hemoglobin level 26 women have blood pressure within normal range and 3 women have hypertension. 29 pregnant women in 'B' group with hemoglobin level between 8-10, mild anemia; out of which 17 women had hypertension & 12 have normal blood pressure. 22 pregnant women in 'C' group with hemoglobin level <8 all had high systolic blood pressure.

Table 1: Relation of systolic blood pressure with different group of anemia

Hb in gm%	Systolic blood pressure in mm of Hg mean ± SD		
Trimester	1st	2nd	3rd

> 10 gm %	118 ± 7	118 ± 4	122±4
8-10 gm%	119± 5	129± 2	144±4
< 8 gm%	142± 2	142± 2	146± 3

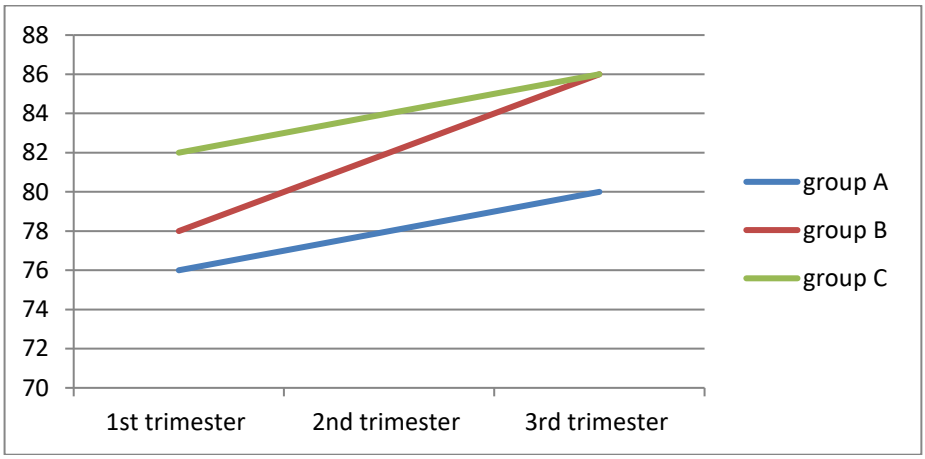
Data shows in group 'B' & 'C' in 3rd trimester systolic blood pressure was higher than 1st and 2nd trimester.



Above chart show clear relation with anemia and hypertension. Systolic blood pressure is more in group B and C in 3rd trimester.

Table 2 : Relation of diastolic blood pressure with different group of anemia

Hb in gm%	Diastolic blood pressure in mm of Hg mean ± SD		
Trimester	1st	2nd	3rd
> 10 gm %	76 ± 4	78 ± 2	80 ± 4
8-10 gm%	78 ± 2	82 ± 2	86 ± 2
< 8 gm%	82 ± 2	84 ± 3	86 ± 6



Above data shows diastolic blood pressure was no higher as systolic blood pressure.

3. DISCUSSION

Hypertension in pregnancy is defined as systolic blood pressure 140 or > and diastolic 90 or >[3] .In current study women with severe anemia had higher systolic blood pressure which may leads to preeclampsia. While diastolic blood pressure was within normal range. Progesterone induced vasodilatation causes 20% decrease in peripheral vascular resistance by term, consequently fall in systolic and diastolic blood pressure. But in last trimester changes in posture may exert significant effects on cardiac output and blood pressure. Cardiac output rises to 50% above the non pregnant level during 3rd trimester, heart rate and stroke volume both rise 25% [4] .Plasma volume in pregnancy increase by 45% while red cell mass increases only 20%. This results in physiological anemia of pregnancy. Further concentration of most coagulation factor (VII, VIII, IX, X and XII are significantly increase leading to hypercoaguble stage. All these physiological changes plus anemia which leads to decrease in oxygen carrying capacity of blood leads to compensatory increase in cardiac output to increase perfusion pressure to supply adequate oxygen[5] . All these changes in pregnancy can lead to systolic hypertension in 3rd trimester. Other causative factors which leads to hypertension may be because of deficiency of micronutrients and antioxidants[6]. It may be associated with significant elevation in peripheral resistance, enhanced responsiveness of angiotensin II and marked reduction in renal blood flow which activate rennin angiotensin mechanism[7] decrease

endothelial derived growth factor & Prostacycin and increase in endothelin & thromboxane may lead to abnormal endothelial function which may be the cause of hypertension[8].

Murphy et al (1986) reported that in primipara, frequency of hypertension ranged from 7% with Hb < 10.5 gm% and 42% with Hb > 14.4 gm % which is contrast from this current study that can be explained by toxic effect of meth- hemoglobin derived from haeme deposition on vascular endothelium[9].

4. CONCLUSION

For increase in systolic blood pressure in anemic women increase in cardiac output with other haemodynamic changes may be the probable reason, along with deficiency of other micronutrients and antioxidants. But diastolic blood pressure remain within normal range in uncomplicated pregnancy and patient having no previous disease. By simply identifying anemic pregnant women we can begin regular blood pressure monitoring which can prevent development of pre- eclamsia and further complications. Early diagnosis of anemia can prevent its consequences by administrating timely haematinics. Also it can prevent unnecessary administration of haematinics by excluding physiological hemodilution which is faulty diagnosed as anemia so oxidative damage by haematinics can be prevented. It is difficult to find subjects as hypertension in pregnancy can lead to emergencies so study in larger group can be done for more accurate conclusion.

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