Pregnancy with pancytopenia: an observational study

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INTRODUCTION

Pancytopenia is the reduction in all three major cellular elements of blood; hence it is the simultaneous presence of anaemia, leukopenia and thrombocytopenia. Pancytopenia is associated with many maternal and foetal complications during pregnancy like maternal sepsis, postpartum haemorrhage, pre-eclampsia and preterm labour, IUGR and intrauterine foetal demise.

METHODS

The incidence of pancytopenia with pregnancy in this study was 3% and all the patients were vegetarian by diet along with vitamin B12 and folic acid deficiency. They were associated with different maternal and foetal complications.

Conclusions: Proper dietary counselling and well-balanced dietary plans even with plant originate food can prevent the micronutrients deficiency and avoid the deleterious consequences like pancytopenia.

Keywords: Micronutrients, Pancytopenia, Pregnancy
**Inclusion criteria**

- All pregnant women diagnosed with pancytopenia at admission.

**Exclusion criteria**

- Twin pregnancies
- Patient on treatment with any drugs which may lead pancytopenia.

The participants enrolled in the study were subjected for further clinical and laboratory evaluation and followed for feto-maternal outcome.

**Statistical analysis**

All characteristics were summarized descriptively. For continuous variables, the summary statistics of mean± standard deviation (SD) were used. For categorical data, the number and percentage were used in the data summaries and diagrammatic presentation. Data were analysed using SPSS software v.23.0 and Microsoft office 2007.

**RESULTS**

In this study the total number of patients admitted to labour room were 1230, of which 38 cases were diagnosed with pancytopenia. The incidence of in this study is 3%. The mean age of the participants was 24.9 years (22-28 years) with SD ±2.2. In this study 26 participants were multigravida (68.4%) and 12 were primigravida (31.6%). Maximum participants were in the age group of 20 to 25 years (55.3%) Table 1.

**Table 1: Age distribution.**

| Age (years) | N | Percentage |
|-------------|---|------------|
| <20         | 2 | 5.3%       |
| 20-25       | 21| 55.3%      |
| 25-30       | 15| 39.5%      |
| Total       | 38| 100.0%     |

Most of the patients presented as term gestation (50%) Table 2. The mean levels of HB, WBC and platelet counts was 5.6 gm%, 3434.7/cumm, and 39236.8/cumm respectively (Table 3). The most common presenting complaint was pregnancy induced hypertension (52.6%) (Table 4). PPH was the most commonly encountered postpartum complication in the participants (39.5%) and others as mentioned in the (Table 5). Out of the 38 babies born early onset sepsis and LBW was seen as most common complication (26.3% each) followed by IUD (Table 6).

**Table 2: Gestational age distribution.**

| GA (weeks) | N | Percentage |
|------------|---|------------|
| 28-32      | 10| 26.3%      |
| 32-36      | 9 | 23.7%      |
| 36-40      | 19| 50.0%      |
| Total      | 38| 100.0%     |

All the participants enrolled in the study were vegetarian in diet and had protein calorie deficiency and on laboratory evaluation had low levels of vitamin B12 (153.3±9.1 pg/dl) and folic acid levels (2.5±0.7 ng/dl).

**Table 3: Haematological parameters.**

| Descriptive statistics of haematological parameters | Range | Mean | SD |
|---------------------------------------------------|-------|------|----|
| Haemoglobin (gm/dl)                               | 2.1-7.1 | 5.6 | 1.5 |
| Platelet count                                    | 20000-60000 | 39236.8 | 13621.2 |
| White blood cell count                            | 2020-4170 | 3434.7 | 746.7 |

**Table 4: Antenatal complications.**

| Complaints at presentation | N | Percentage |
|----------------------------|---|------------|
| Fever                      | 6 | 15.8%      |
| Giddiness                  | 2 | 5.3%       |
| Labour pain                | 2 | 5.3%       |
| Leak PV                    | 2 | 5.3%       |
| PIH                        | 20| 52.6%      |
| PIH with HELLP syndrome    | 6 | 15.8%      |
| Total                      | 38| 100.0%     |

All the 38 patients had peripheral smear study showing pancytopenic picture. Mean vitamin B12 levels of this study patients was 150.5 pg/ml (normal range 195-950 pg/ml). Mean folate levels of this patients was 2.725 ng/ml (normal range 2-20 ng/ml).
Table 6: Foetal complications.

| Neotnal complications | N  | Percentage |
|-----------------------|----|------------|
| Early onset sepsis    | 10 | 26.3%      |
| IUD                   | 4  | 10.5%      |
| LBW                   | 10 | 26.3%      |
| Nil                   | 14 | 36.8%      |
| Total                 | 38 | 100.0%     |

DISCUSSION

Anaemia during pregnancy is a public health problem especially in developing countries and is associated with adverse pregnancy outcomes. Globally 56% of pregnant women in low- and middle-income countries have anaemia. The prevalence of anaemia is highest among pregnant women in Sub-Saharan Africa (57%) followed by pregnant women in South East Asia (48%).

The causes of anaemia are multifactorial in which micronutrient deficiencies like iron and vitamin B12 plays an important role. Anaemia during pregnancy varies due to geographical location, dietary practice and season. Pancytopenia is a clinical phenomenon characterized by the reduction in all three major elements of blood.

Pancytopenia may go undetected initially due to mild impairment in the bone marrow and may become apparent only during times of stress or during increased demand, (e.g. pregnancy, bleeding, infection). Bone marrow failure syndromes and malignancies are important causes for pancytopenia and non-malignant conditions like infections (HIV, EBV, tuberculosis) and nutritional anaemia (severe vitamin B12 and folate deficiency) are also the major causes.

A systematic review and meta-analysis of individual participant data in associations of maternal vitamin B12 concentrations in pregnancy with the risks of preterm birth and low birth weight conducted by Rognen et al observed that vitamin B12 deficiency in pregnancy was associated with higher risk of preterm birth. A study by Pawlak et al, shows that there is a high prevalence of vitamin B12 deficiency among pregnant vegetarians.

Low maternal serum concentration of vitamin B12 during the first trimester is a risk factor for NTD and poor maternal outcomes such as pre-eclampsia and neurological impairment. Govindappagar S et al, reported a case of severe vitamin B12 deficiency in pregnancy mimicking HELLP syndrome and emphasized the importance of screening for vitamin B12 deficiency in pregnancy.

A study done by Koebnick C et al showed that the prevalence of B12 deficiency increased between second and third trimester from 8-35%. Van de Velde N et al concluded that severe pancytopenia caused but ineffective hematopoiesis because of folate and vitamin B12 deficiency. Rajput Y et al, concluded that association of pancytopenia with pregnancy is rare entity with increased risk of poor maternal and fetal outcome.

In this study, the incidence of pancytopenia with pregnancy was very low as stated by other authors (3%) and were associated with maternal complications like PIH, HELLP syndrome, puerperal sepsis, PPH and fetal like neonatal sepsis, low birth weight and intrauterine death. This study showed that diet of all the participants was vegetarian with vitamin B12 and folic acid deficiency. The participants were not subjected to Bone marrow study as the cause of pancytopenia was diagnosed with blood investigations and dietary history.

CONCLUSION

Association of pancytopenia with pregnancy is a rare entity yet it has increased risk of poor maternal and foetal outcome. Early diagnosis and intervention bring favourable maternal and foetal outcome. This study observed that all the participants were vegetarian by diet along with Vit-B12 and folate deficiency leading to pancytopenia. Hence, proper dietary counselling and well-balanced dietary plans even with plant originate food can prevent the micronutrients deficiency and avoid the deleterious consequences like pancytopenia. There are no many studies on pregnancy with pancytopenia. Hence, further larger studies are required.

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