IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Study of coagulation profile in Iron deficiency Anaemia in Antenatal group in Karnataka Population

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Abstract

Background: Iron Deficiency Anaemia (IDA) is a quite common factor during pregnancy in under developed countries. It impairs the coagulation factors of the blood and leads to frequency of pre-term labour and low birth weight infants.

Method: 92 pregnant women aged between 19-35 years having Iron deficiency Hb% lesser than 10 (gm/dl) were compared with same number of (92) of normal healthy pregnant women. The blood examination of Hb% CBC, PT, INR, APTT, CT, BT ferritin was carried out in every woman and compared.

Results: The haematological parameters and coagulation profile parametric values were quite lesser in Iron deficiency group and p values were highly significant ($p<0.001$) except Bleeding time.

Conclusion: This pragmatic study will be a tool for physician, Gynaecologist to treat such patients efficiently to prevent morbidity and mortality in mother and infant.

Keywords: Hb%, INR, Ferritin, MCH, MCHC, CBC.

Introduction

Iron deficiency Anaemia (IDA) is the most common type of Anaemia globally [1][2]. Females in developing countries or females of middle socio-economic status are always in the state of IDA during their reproductive years. The iron storage in their body is not well developed because of poor nutritional intake, recurrent infections, menstrual blood loss and repeated pregnancies. Hence majority of Indian women suffers from IDA and foliate deficiency during pregnancy [3]. During pregnancy Iron balance must be adequate for the production of Haematological and myoglobin [4]. IDA during pregnancy associated with increased frequency of pre-term labour and low birth weight infants.

Coagulation results from interaction of blood vessels, platelets coagulation factors. Coagulation system undergoes significant changes in pregnancy Decline in platelet count may results in preeclampsia which may lead to morbidity and mortality of both mother and infant by damaging vital organs like liver and kidney. IDA leads to thrombocytopenia in pregnancy associated with decrease in APTT values, which may cause risk blood clot. Hence coagulation and haematological studies were evaluated and compared in healthy women too.

Material and Method

92 pregnant patients aged between 19 to 35 years regularly visiting to Sambram Institute of Medical Sciences and research Institute hospital DK Halli, BEML Nagar, KGF Kolar (dist) – 563115, Karnataka were studied.

Inclusive Criteria: Hb% less than 10 mg% for iron deficiency in second trimester pregnancy were selected for study.

Exclusion Criteria: The third trimester pregnancy and patients already on iron supplementation treatment were excluded from the study.

Method: 92 (Ninety two) antenatal females having Hb% less than 10 are compared with same number (92) controlled group of antenatal without iron deficiency (healthy group). CBC, Hb%, PT, INR, APTT, BT, CT, serum ferritin test were conducted in every patients.

The duration of study was June-2016 to May-2017.

Statistical analysis: Parameters of both groups were compared with t test and significant results were noted. The statistical data was performed in SPSS software.

Observation and Results

Table-1: Comparison haematology parameters in both groups:

- Hb (gm/dl) – 9.06 (SD±1.30) in IDA group, 12.41 (SD±0.96) in controlled group, t test was 19.8 p<0.001
- TLC: 9360.20 (SD±29.70) in ID group, 8679.16 (SD±26.48) t test 164.3 p<0.001.
- DLC: 1766820.5 (SD±678) in ID group 708627.3 (SD±145) t test 90.9 p<0.000.
- MCV (f1): 77.30 (SD±10.2) in ID group, 87.11 (SD±12.40) in controlled group, t test 5.8, p<0.001
- MCH (pg): 24.08 (SD±4.48 in ID group, 29.11 (SD±2.90) in controlled group, t test was 9.04, p<0.001
- MCHC: 30.08 (SD±1.89) in ID group, 32.65 (SD±2.15) in controlled, t test 8.61, p<0.000

Table-2: Comparison of coagulation profile in both groups

PT: 10.8 (SD±2.50) in ID group, 73.48 (SD±2.10) in controlled group t test 7.87 and p<0.001.

INR: PT: 0.70 (SD±2.50) in ID group, 0.98 (SD±0.16) in controlled group t test 11.1 and p<0.001.

APTT: 27.02 (SD±3.04) in ID group, 33.56 (SD±4.02) in controlled group t test 12.4 and p<0.001.

BT: 3.23 (SD±1.88) in ID group, 3.39 (SD±1.72) in controlled group t test 0.54 and p<0.54 (p value is insignificant)

CT: 7.82 (SD±1.96) in ID group, 10.04 (SD±3.18) in controlled group t test 5.7 and p<0.001.

Ferritin: 7.68 (SD±11.8) in ID group, 98.10 (SD±53.8) in controlled group t test 15.7 and p<0.0001.

Discussion

The present study of coagulation profile in IDA in antenatal group in Karnataka Population Hb (gm/dl) 9.06 (SD±1.30) in ID group, 12.41 (SD±0.96) in controlled group t test 19.8 and p value was highly significant (p<0.001), TLC: 9360.20 (SD±29.70) in ID group, 8679.16 (SD±26.48) in controlled group t test 164.3 p<0.001. DLC: 176820.5 (SD±678) in ID group, 708627.3 (SD±145) in controlled group t test was 90.9 and p<0.001. MCV (f1): 77.30 (SD±10.2) in ID group, 87.11 (SD±12.4) in controlled t test 5.8 p<0.000. MCH (pg): 24.08 (SD±4.48) in ID group, 29.11 (SD±2.90) t test 9.04 p value (p<0.001). MCH (g/dl): 30.08 (SD±1.89) in ID group, 32.65 (SD±8.61) p<0.01 (Table-1). PT 10.8 (SD±2.50) in ID group 13.48 (SD±2.10) in controlled group t test 7.87 p<0.001, INR: 0.70 (SD±0.18) in ID group 0.98 (SD±0.16) in controlled group t test 11.1 p<0.000. APTT value 27.02 (SD±3.04) in ID group, 33.56 (SD±4.02) in controlled group t test 12.4

p<0.001, BT 3.23 (SD±1.88) 3.39 (SD±1.72) t test 0.60 p>0.54, (p value is insignificant) CT 7.82 (SD±1.96) in ID group, 10.04 (SD±3.18) in controlled group 5.7 t test p<0.001. Ferritin: 7.68 (SD±11.80) in ID group, 98.10 (SD±53.83) t test was 15.7 p<0.001. These findings are more or less in agreement with previous studies.

A number of normal physiologic processes occur during pregnancy leading to term physiologic anaemia of pregnancy. The plasma volume increases (40-50 %) relative to red cell mass (20-30%) and accounts for fall in haemoglobin concentration. However if Hb% falls below 11 gm/dl is considered as IDA. The increased demand on bone marrow requires women increase. Their daily iron intake from 18 mg per day to 27 mg per day [8], the risk of adverse pregnancy outcomes is highest when maternal anaemia is detected early (in first trimester) pregnancy as most women do not have adequate iron stores for pregnancy secondary to chronic blood loss from menstruation and some may not tolerate oral iron therapy due to impaired ingestion or side effects. If oral iron therapy is ineffective owing to side effects Intravenous iron is a safe option of type-II iron complexes that are well tolerated Low-molecular weight iron dextrin administration ideal during pregnancy and the post-partum period as there are no adverse events are reported. Similarly Iron polymaltose, iron sorbitol, iron iso-maltoside, iron sucrose are also preferred during pregnancy [9]. One should take care to avoid achieving high iron storage which may be harmful to pregnant women [10]. IDA during pregnancy may result into thrombocytopenia, preeclampsia and Hellp syndrome. Bleeding disorder complication may be an inherited or acquired coagulopathy. Acquired bleeding disorder during pregnancy may cause massive postpartum haemorrhage, missed septic abortion, abruption placentae, ruptured uterus, hypovolemic shock, amniotic fluid embolism, intrauterine death.

Summary and Conclusion

Many haematological problems develop in pregnancy due to IDA pregnancy can exacerbate underlying haematological disorders as well as predispose emergencies. These conditions are a significant source of morbidity that has implications for both the mother and foetus. But this study demands further embryological, genetic, patho-physiological, nutritional studies because the factors and exact mechanism of coagulation in IDA is still un-clear

Table – 1

Comparison of Haematological parameters in both groups

Parameters	Mean values with SD in Iron deficiency (92)	Mean value in controlled group (92)	t test	P value
Hb% (gm/dl)	9.066 (SD±1.30)	12.140 (SD±0.96)	19.8	P<0.000
Total leucoytic count (TLC)	9360.20 (SD±29.70)	8679.16 (SD±26.48)	164.3	P<0.001
Deferential leucocytic count (DLC)	1766820.5 (SD±678)	708627.3 (SD±145)	90.9	P<0.001
MCV (f1) (Mean carpuscular volume)	77.30 (SD±10.25)	87.11 (SD±12.40)	-5.8	P<0.000
MCH (pg) Mean carpscular Haemoglobin)	24.08 (SD±4.48)	29.11 (SD±2.90)	-9.04	P<0.001
MCHC (g/dl) (Mean cell Haemoglobin concentration	30.08 (SD±1.89)	32.65 (SD±2.15)	-8.61	P<0.000

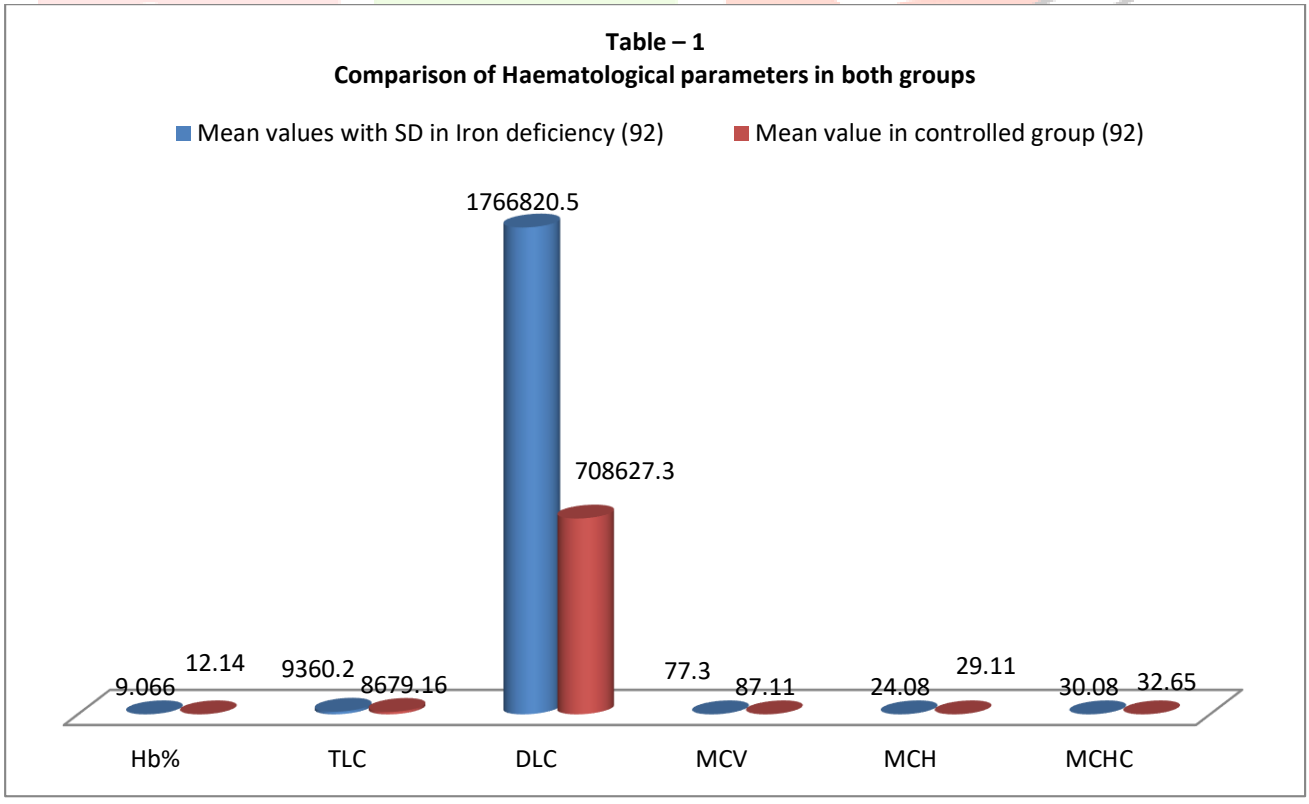
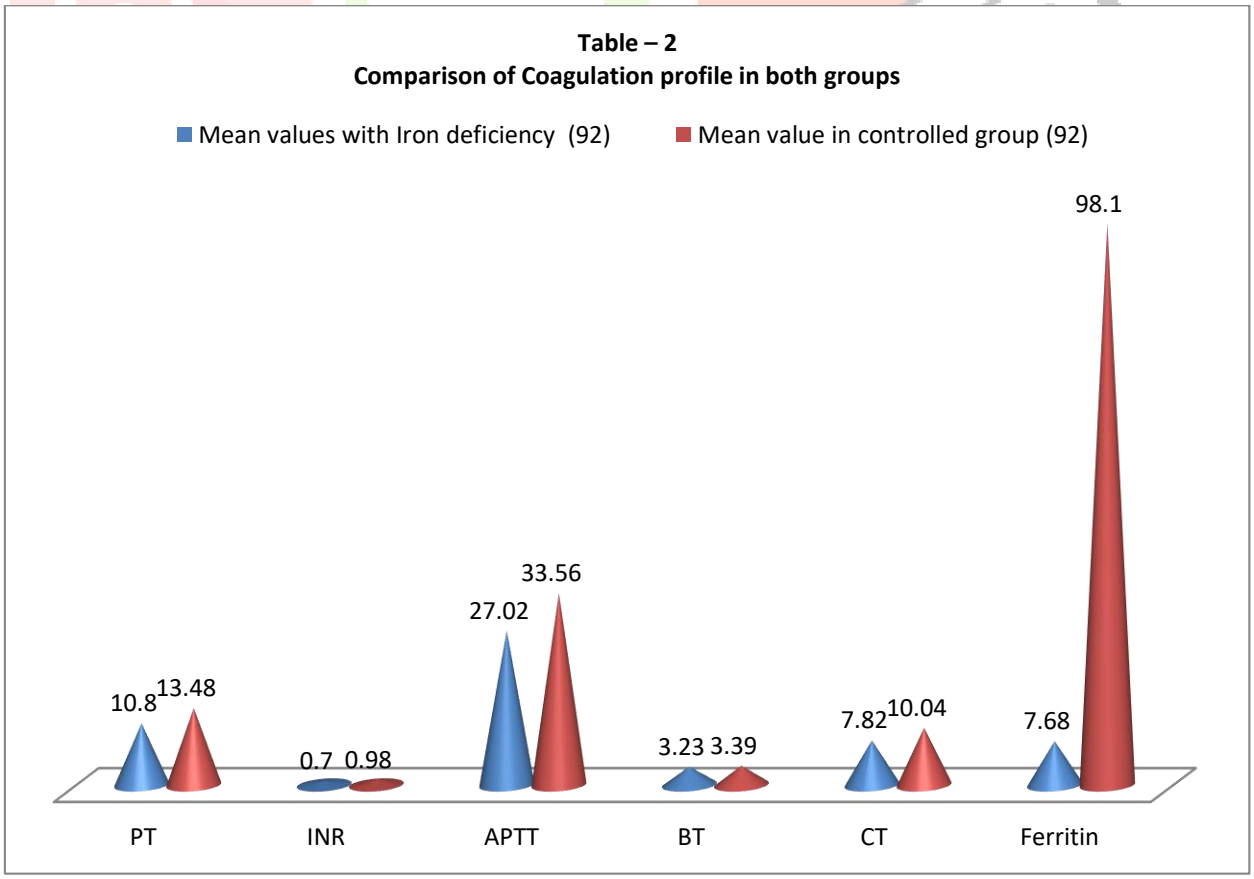


Table – 2

Comparison of Coagulation profile in both groups

Parameters	Mean values with Iron deficiency (92)	Mean value in controlled group (92)	t test	P value
PT (Prothrombin Time)	10.8 (SD±2.50)	13.48 (SD±2.10	7.87	P<0.001
INR (International Normalised ratio)	0.70 (SD±0.18)	0.98 (SD±0.16)	11.1	P<0.000
APTT (Activated partial prothombo plastin time)	27.02 (SD±3.04)	33.56 (SD±4.02)	-12.4	P<0.001
BT (Bleeding Time)	3.23 (SD±1.88)	3.39 (SD±1.72)	0.60	P>0.54 Insignificant
CT (Clotting Time)	7.82 (SD±1.96)	10.04 (SD±3.18)	5.7	P<0.001
Ferritin	7.68 (SD±11.80)	98.10 (SD±53.88)	-15.7	P<0.001



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