

# Our Experience of Blood Transfusions in Patients with Moderate Anemia Undergoing Elective Cesarean Sections at Government Medical College, Ananthapuramu

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## ABSTRACT

**Introduction:** Anemia during pregnancy increases the incidence of preterm labor, preeclampsia, sepsis. Anemia also effects fetal outcome in the form of preterm baby, IUGR, increased mortality rate. The aim of the present study was to evaluate the perioperative requirement of blood transfusions, complications and outcome of patients with Moderate anemia undergoing Elective Cesarean section.

**Material and Methods:** This retrospective study is conducted over a period of one year from Jan 2015 to Dec 2015, in pregnant women with moderate anemia undergoing elective cesarean section. Data regarding patient details, hemoglobin estimation, cross matching, need of transfusions, multiple blood transfusions, any intra operative or post operative complications and outcome was assessed.

**Results:** Number of patients with moderate anemia was 470 out of 557 elective LSCS patients. Out of 470 Elective LSCS cases with moderate anemia, 17 were in Group I (Hb <8 g/dl), 195 were in Group II (Hb 8-9 g/dl) and 258 were in Group III (Hb >9 g/dl). 45 out of 470 Elective LSCS women with moderate anemia received blood transfusions. There was significant reduction in blood transfusions in Group II and III patients.

**Conclusion:** It is safe always to cross match and preserve blood as there is a threat of ongoing blood loss per and post operatively; but restricted blood transfusion practices are advocated only in cases of hemodynamic instability perioperatively to avoid blood transfusion reactions and infection transmission (HBV, HIV).

**Keywords:** Blood transfusion, Elective LSCS, Moderate Anemia.

## INTRODUCTION

Anemia is defined as quantitative or qualitative deficiency of RBC or hemoglobin in circulation resulting in decreased oxygen carrying capacity of blood to organs and tissues. Anemia is major public health problem globally especially in developing countries like India and Africa. In India, anemia contributes to 10-15% of maternal deaths.<sup>1</sup> Nearly two billion people are suffering from anemia (iron deficiency anemia).<sup>2</sup>

WHO estimates that in India, prevalence of anemia in pregnant women is 65-75%.<sup>3</sup> Due to anemia, nearly half of the maternal deaths occur in South Asian countries.<sup>4</sup>

According to ICMR 1989 Anemia is classified as follows according to Hemoglobin levels<sup>5</sup>:

Very Severe anemia - <4g/dl

Severe anemia - 4-6.9 g/dl

Moderate anemia - 7-9.9 g/dl

Mild anemia - 10-10.9 g/dl.

Pregnant women with Hemoglobin level of 11% and hematocrit value of less than 33%<sup>6</sup> are consider as anemic according to WHO. WHO classification of Anemia based on Hb levels.

Mild anemia: 10-10.9 g/dl

Moderate anemia: 7-9.9 g/dl

Severe anemia: <7 g/dl

Mild anemia may not cause any significant effect on pregnancy and during labor. Moderate anemia can cause fatigue, poor work performance. Severe anemia in pregnant women is associated with poor outcome and may results in breathlessness, palpitations, tachycardia, post partum depression, cardiac failure.<sup>5,7,8</sup> Anemia during pregnancy increases the incidence of preterm labor, preeclampsia, sepsis. Anemia also effects fetal outcome in the form of preterm baby, IUGR, increased mortality rate.<sup>7</sup>

Anemia during pregnancy has to be corrected before labor for better outcome of mother and baby. By good antenatal care, anemia can be easily diagnosed and managed.<sup>5</sup> Treatment of anemia depends on Hemoglobin level. Mild anemia can be treated using oral iron preparations, whereas moderate and severe anemia may have to be managed by i.v iron preparations or blood transfusions. Decision has to be taken whether blood transfusion is necessary or not based on clinical findings. Transfusion threshold is the Hb value, and the Hb value should not fall below this threshold value during the perioperative period, particularly in the context of ongoing or anticipated blood loss.

Blood transfusion helps to save lives in critical conditions. But at the same time there can be adverse effects of blood transfusion that vary from milder headache, fever, rash, itching to major side effects like life threatening anaphylaxis as well as transmission of infection like HIV, HBV, HCV.<sup>9,10</sup> This morbidity and mortality of blood transfusion can be minimized by properly estimating the need of blood transfusion. So the decision of selecting patients for blood transfusion is done carefully to strike a balance between genuine indications versus adverse effects of blood transfusion.

When Hb concentration is >10g/dl transfusion is rarely indicated, when Hb concentration is <6 g/dl, transfusion is always indicated and if Hb concentration is 6-10 g/dl then decision of transfusion should be made based on patient risk for complications of inadequate oxygenation, as stated by ASA task

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force on blood component therapy (1994).<sup>11</sup>

Scanty literature is found regarding role of blood transfusion among patients with moderate anemia posted for elective LSCS. So we undertook this retrospective analysis to assess the incidence of blood transfusions in patients with moderate anemia and undergoing Elective LSCS.

The aim of the present study is to evaluate the requirement of blood transfusions, complications and outcome of patients with Moderate anemia undergoing Elective Cesarean section perioperatively at Government General Hospital, Ananthapuramu, A.P, India where blood bank facilities are restricted.

## MATERIAL AND METHODS

This retrospective study was done in a government general hospital (Government General Hospital attached to the Government Medical College, Ananthapuramu, Andhra Pradesh, India) a tertiary center catering primarily to the rural and low socioeconomic population of the district. Most of the patients were assessed in this study come to hospital nearer to Expected Date of Delivery without proper antenatal work up.

The study was conducted over a period of one year from Jan 2015 to Dec 2015, in pregnant women with moderate anemia undergoing Elective Cesarean section after taking approval from ethical committee of the institute. The sample size was calculated by qualitative data by referring various previous literatures.

A total of 8047 deliveries were registered from our institute in 2015. Among those 557 underwent elective LSCS. All Elective LSCS sections were done under spinal anesthesia by monitoring blood pressure mean arterial pressure, heart rate, ECG and SpO<sub>2</sub>. Elective LSCS patients with moderate anemia were categorized in to three subgroups based on hemoglobin level: Group I - Hb <8 g/dl; Group II - Hb 8 - 9 g/dl; and Group III - Hb >9 g/dl.

Cross matching was done and Compatible units of blood were preserved routinely for all the patients undergoing Elective LSCS. CT ratio (Cross match transfusion ratio) was calculated by dividing the number of units of blood cross matched to the number of units transfused. Data regarding patient details, hemoglobin estimation, cross matching, need of transfusions, multiple blood transfusions, any intra operative or post operative complications and outcome was assessed and entered into spread excel sheet.

## STATISTICAL ANALYSIS

Statistical analysis was done and expressed in the form of ratio, percentages and histograms.

## RESULTS

Total number of deliveries in 2015 at the institute was 8047. Among these, Elective LSCS was done in 557 patients (6.9% of total deliveries). Number of patients with moderate anemia was 470 out of 557 elective LSCS patients.

Patients with Moderate anemia undergoing Elective LSCS were subcategorized into three groups based on Hb levels. Out of 470 Elective LSCS cases with moderate anemia, 17 were in Group I, 195 were in Group II and 258 were in Group III (Figure-1).

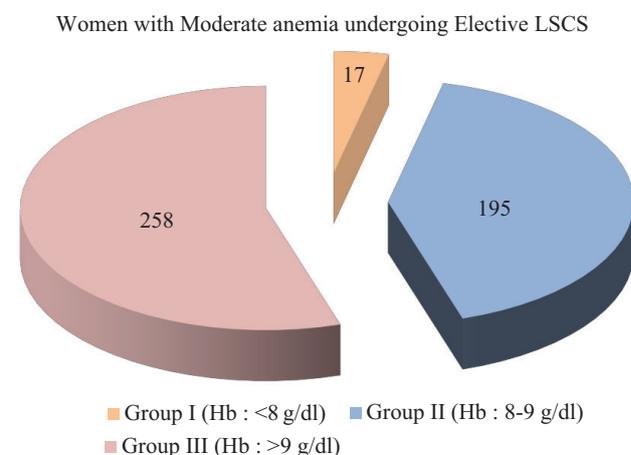
Out of 557 total Elective LSCS, 49 patients received blood transfusions. Number of patients receiving blood transfusion was 45 out of 470 Elective LSCS women with moderate anemia.

Total number of compatible blood units received by the studied population was 57 and varied from single bag to 5 bags per patient. Blood transfusion was given in 47% (8) of Group I; 14% (28) of Group II; 3.5% (9) of group III patients (Figure-2). 57 blood units or bags were transfused to 45 patients undergoing elective LSCS with moderate anemia. More number of blood bags were transfused to Group I moderate anemia patients (Hb < 8 g/dl), 18 blood units were transfused to 8 patients (Table-1). The ratio of number of patients typed and cross matched to patients transfused (CT ratio was 10:1) (Table-1). The ratio of units of blood typed and cross matched to units transfused was 11.8 (57 out of 482).

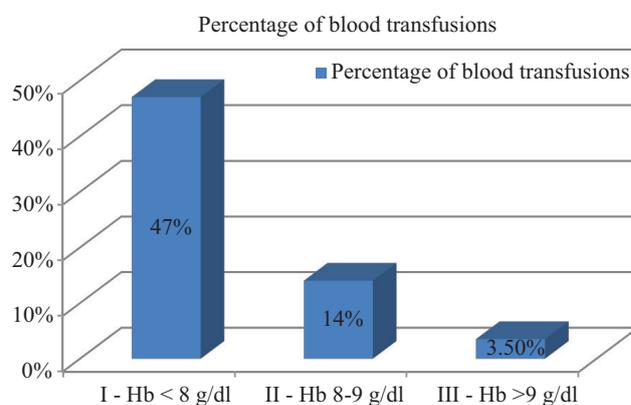
The ratio of total units transfused (n=57) to the total cesarean sections (n=470) was 0.12 unit per patient. In group I the blood transfusions were in 8 patients (47%) of which 4 patients received transfusions preoperatively; 2 patients post operatively and 2 patients both pre and post operatively. No intra operative transfusions in Group I (Figure-3).

In group II the number of transfusions came down significantly to 14% (28 out of 195) (Figure-2). 11 patients received transfusion preoperatively; 1 patient received intra operatively and 16 patients received postoperatively. None of them had multiple transfusions (Figure-3). In Group III patients, out of 258 patients only 9 (3.5%) received blood transfusions, all of them in postoperative period (Figure-3).

Among Group I patients breathlessness and wound gaping were observed in 4 and 2 patients respectively. Among Group



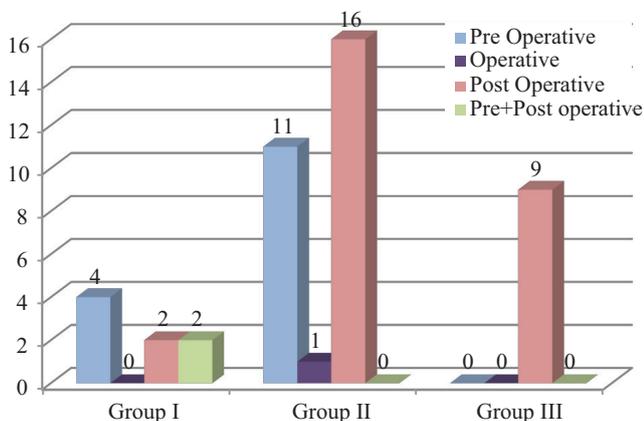
**Figure-1:** Pie chart showing distribution of women undergoing Elective LSCS with moderate anemia according to Hb levels



**Figure-2:** Bar diagram showing percentage of blood transfusions in different groups

Group	Total No. of Patients		No. of patients who received blood transfusions		No. of Transfused Blood bags	CT ratio
	No.	Percentage	No.	Percentage		
I	17	3.6%	8	47%	18	2:1
II	195	41.4%	28	14%	28	7:1
III	258	54.8%	9	3.5%	11	29:1
Total	470	100	45	9.5%	57	10:1

**Table-1:** Percentage of Blood transfusions among Elective LSCS patients with moderate anemia



**Figure-3:** Bar diagram showing Number of blood transfusions occurred during perioperative period

II patient’s breathlessness was observed in 4 members. No morbidity reported from group III patients. No Maternal death was observed in any of elective LSCS patients.

**DISCUSSION**

Rural Indian women with moderate anemia present without any clinical signs and symptoms of anemia, as they can tolerate this chronic anemia without any ill effects. Cardiac output usually does not change until hemoglobin concentration falls to below 7 grams.<sup>12</sup> Without much significant maternal and fetal effects our obstetric patients usually tolerate moderate anemia. In our study this is reflected in the form of reduced need for blood transfusion in spite of moderate anemia undergoing surgery (LSCS).

Factors like hemoglobin level, blood volume, the volume of blood lost any consisting diseases and complications decide the ability of pregnant women with anemia to withstand blood loss at the time of delivery (LSCS).<sup>13</sup> Blood transfusion is used only when strictly needed for fear of transmission of diseases like HIV, HBV as well as blood transfusions reactions.<sup>14,15</sup>

For the safe conduct of anesthesia a minimum of hemoglobin of 10 grams was believed to be required by anesthetist since long time. No single index can be the basis of perioperative transfusion due to better means of understanding and monitoring the relationship between oxygen delivery and oxygen consumption.<sup>16</sup>

FDA drug bulletin 1989 states that “adequate oxygen carrying capacity can be met by as low as hemoglobin of 7 grams when intra vascular volume is adequate for perfusion.”<sup>17</sup>

The factors deciding the individual patients transfusion trigger is to be based on clinical judgment in conjunction with monitoring of tissue oxygen delivery. Therefore the concept of an acceptable hemoglobin level varies with the underlying medical condition, extent of physiological compensation the threat of intra operative bleeding and ongoing blood losses post

operatively may be in the form of atonic PPH.

Clinical and hematological grounds will decide the blood transfusion. Transfusion is rarely indicated in stable patient when hemoglobin > 10 g and is almost always indicated when Hb < 6 grams.<sup>18,19</sup> In our study we found that there was a significant increase in blood transfusion in Group I (47%). If the hemoglobin is between 8 and 9 g/dl the decision of blood transfusion is to be made on the informed basis according to preexisting medical conditions, continuous bleeding and threat of blood loss.

In asymptomatic parturient there is little evidence of benefit of blood transfusion.<sup>19</sup> The present study also showed the same results as there was significant reduction in blood transfusions in Group II and III patients. Subramanyam KL et al<sup>16</sup> observed the same results as our study.

As per this study the CT ratio (Cross match transfusion ratio) was 11.8:1 (57 out of 482 in Moderate anemia). Fauzia A Khan et al<sup>20</sup> documented that the ratio of units of blood typed and cross matched to blood units transfused was 9.7:1.

In this study among Group I patients breathlessness and wound gaping were observed in 4 and 2 patients respectively. Among Group II patient’s breathlessness was observed in 4 members. No morbidity reported from group III patients. No Maternal death was observed in any of elective LSCS. Subramanyam KL et al [16] documented that breathlessness was observed in all the groups.

No difference in mortality rates is established by Herbert in large RCT between liberal and restrictive transfusion strategies in non cardiac and non critically ill patients who can tolerate lower levels of hemoglobin.<sup>21</sup> In an attempt to increase tissue oxygen delivery the maintenance of higher hemoglobin concentration by blood transfusion is not associated with any clinical benefit according to the study by Reiles and Linden.<sup>22</sup>

It may be concluded that any particular single value of hemoglobin level is not a trigger to initiate transfusion after considering various clinical data. Pregnant women’s physiological aspects like cardio vascular fitness, age, operative blood loss and disease status are more important than relying on single value of hemoglobin. The potential clinical benefits adverse effects and cost of blood component therapy may be considered for the decision of blood transfusion. After an internal audit on transfusion guidelines Mallet found a 43% decrease in blood transfusions.<sup>23</sup>

In our hospital acceptable hemoglobin from anesthetist point of view is concerned only for the maintenance of hemodynamics during Cesarean section. It is a general policy that we wait and watch in all asymptomatic parturient with hemoglobin of 8-9 g/dl in order to strike a balance between benefits of replenishing oxygen carrying capacity by transfusion versus transfusion associated reactions and infection transmission. But

obstetrician has to visualize perspectives of post op morbidity, wound healing, fatigue, lactation adequacy and quality of life of the women in post natal period. Hence the obstetrician has to consider maintenance of hemoglobin to normality by other means like IV iron sucrose infusion before the women is discharged from the institute. They can also be supplemented by other measures like deworming, good diet, oral iron proper, post natal follow up, advice on spacing etc., after the discharge.

## CONCLUSION

Cesarean section is the most common surgery done at district hospitals both in government and private setup where moderate anemia always poses a challenge of controversy of blood transfusion decision. It is safe always to cross match and preserve blood as there is a threat of ongoing blood loss per and post operatively; but restricted blood transfusion practices are advocated only when there is perioperative hemodynamic instability.

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