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Original Research Article

## Changing trends of blood transfusion requirement in obstetrics and gynaecology

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### ABSTRACT

**Background:** With the advent of the new pharmacological drugs and surgical advances compared to yesteryears, that the requirement of blood transfusion in obstetrics and gynaecology has decreased. Earlier obstetrical haemorrhage had been the commonest reason for blood transfusion. This trend seems to be changing. To evaluate this an observational study was done at a peripheral hospital to assess various indications for blood transfusion in maternity ward over a period of one year.

**Methods:** A total of 129 transfusions were studied in a period of one year and requirement of transfusion was assessed by the same team of doctors as per AABB guidelines for blood transfusion.

**Results:** A total of 87 obstetric patients required transfusion out of which 51.2% patients were transfused for anaemia near term. Postpartum haemorrhage constituted only 1.15% and ante partum haemorrhage only 4.6%. 17.24% of patients were transfused for incomplete abortion after taking medical abortion. 42 patients were transfused blood for various gynaecological reasons of which puberty menorrhagia constituted 19.01% and patients with perimenopausal bleeding were 28.57%.

**Conclusions:** This study highlights the changing trends in requirement of blood transfusion and the need to emphasise on antenatal nutrition, supplements and contraception.

**Keywords:** Blood transfusion, Medical abortion, Obstetrics and gynaecology, Postpartum haemorrhage, Puberty menorrhagia

### INTRODUCTION

Obstetric and gynaecologic conditions associated with the need for blood transfusion often leads to morbidity and mortality. The increasingly important issues in blood transfusion are various indications for transfusion, including adverse events associated with transfusion incompatibility reactions, host sensitisation, potential infection, transmission of prions and rising costs. Blood transfusion to patients should be advised so as to not to compromise the affected woman nor expose her to unnecessary risk.<sup>1</sup> Strategies to maximise the

haemoglobin level at delivery as well as to minimise blood loss also should be implemented.

Role of blood in oxygen delivery- Blood delivers oxygen to the tissues, and the vast majority of oxygen delivered is bound to haemoglobin in RBCs. Thus, anaemia has the potential to reduce oxygen delivery. However, most patients are able to increase tissue oxygen delivery by increasing cardiac output over a range of haemoglobin concentrations. The major physiologic considerations relevant to anaemic patients are the degree to which oxygen delivery to the tissues is adequate and whether

compensatory mechanisms for maintaining oxygen delivery will become overwhelmed or deleterious.<sup>2</sup>

Blood transfusion may be a lifesaving procedure but it is not without risk. Recipients may rarely develop transfusion-transmitted infections or suffer immunological sequelae such as red cell alloimmunisation. The major risk is of a patient receiving incorrect blood component. Hence blood transfusion must be done only after due diligence to the situation and adhering to guidelines. All possible policies should be looked into for preventing blood transfusion in patients to reduce the risk of transfusion. There are no firm criteria for initiating red cell transfusion.<sup>3</sup> The decision to perform blood transfusion should be made on both clinical and haematological grounds. Blood transfusion is almost always required when haemoglobin is less than 6 gm% and it is rarely required when haemoglobin is greater than 10 gm%. It is to be understood that patients with acute haemorrhage can have normal haemoglobin, hence clinical evaluation of the patient in this situation is more important to assess requirement of blood transfusion.

Over the last 30 years there has been a general trend towards a reduced use of blood transfusion in obstetric and gynaecological practice. The reason for this trend being risk of transfusion especially blood borne diseases and better pharmacological, surgical and mechanical innovations to reduce blood loss and iron supplementation for high risk people.<sup>3</sup>

Obstetrical haemorrhage, largely placenta praevia was considered the largest risk factor for blood transfusion apart from operative delivery and instrumental delivery. Gynaecological indications required for transfusion were radical hysterectomies and hysterectomies post operatively. An observational study was done in a zonal hospital to study the changing trends of indications for blood transfusion in obstetrics and gynaecology.

**METHODS**

An observational study was done over a period of one year from December 2016 to December 2017 in a zonal hospital and various indications for blood transfusion in obstetrics and gynaecology were studied. The transfusion trigger was kept as 6 gm% and haemodynamic instability due to massive haemorrhage. A total of 129 transfusions were done in a period of one year and the indications of transfusion were studied. The decision for blood transfusion was done by the same team of specialists in all cases. Written informed consent was taken from all patients for all transfusions.

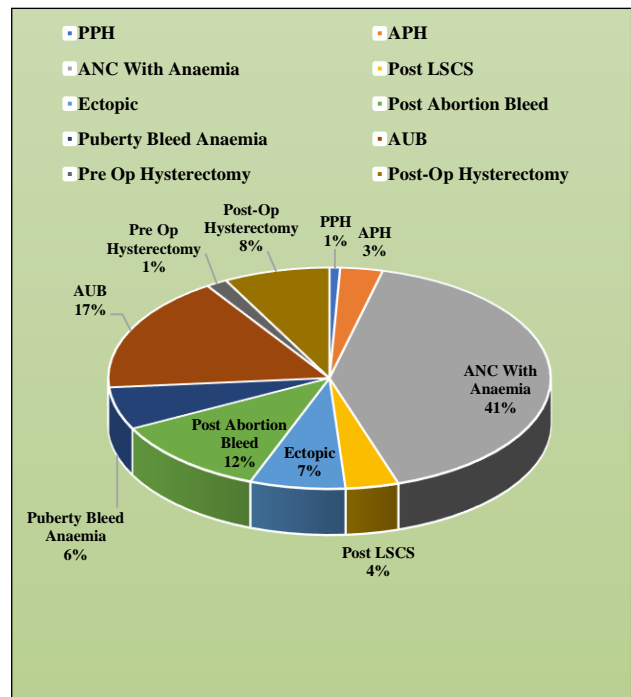
The trigger for transfusion for all cases was haemoglobin less than 6 gm% and all cases with haemoglobin less than 7 gm% with haemodynamic instability i.e. tachycardia with heart rate more than 100 /min and hypotension with blood pressure less than 100/70 mm Hg. Patients with

acute haemorrhage presenting as haemorrhagic shock were transfused blood irrespective of their presenting haemoglobin. Patients with chronic anaemia with haemoglobin more than 7 gm% and haemodynamically stable were treated as per the cause of anaemia after peripheral blood smear and serum iron studies. Transfusion reactions encountered were treated as per anaphylactic reaction protocol and the same was recorded.

The pre-transfusion Hb was recorded along with their haemodynamic parameters like pulse and blood pressure. The group of blood transfused was noted and the number of units of blood required for each patient was noted. Haemoglobin was checked 24 hours after the last transfusion and was recorded. The incidence of requirement of blood transfusion in obstetrics and gynaecology and various indications have been studied.

**RESULTS**

A total of 129 transfusions were done over a period of one year for various obstetric and gynaecologic indications (Figure:1). 87 units of blood (67.44% of total transfusions) were transfused for obstetric indications. 34.88% of these transfusions were done for patients during antenatal period found to be anaemic with haemoglobin less than 6 gm%, most of them who were unbooked cases and diagnosed as microcytic hypochromic anaemia on peripheral smear.



**Figure 1: Overall Causes of Blood Transfusion.**

17.24% of transfusions were to patients who had presented with haemorrhagic shock and incomplete abortion due to medical abortifacients taken without

medical advice. 10.34% patients were transfused for ruptured ectopic pregnancy post operatively. 6.2% of patients were transfused for antepartum haemorrhage before or during caesarean section. 3.88% of patients were transfused blood after caesarean section for traumatic post-partum haemorrhage. Ruptured ectopic pregnancy constituted 6.98% of blood transfusions who presented with haemorrhagic shock.

Gynaecologic indications required 42 units of transfusion constituting 32.56% of the total transfusions. 17.05% of transfusions were given to patients with menorrhagia refractory to medication or not on any medication presenting with excessive bleeding p/v with haemoglobin less than 6 gm% and haemodynamic instability. 6.2% of patients were transfused for puberty menorrhagia.

Patients taken up for hysterectomy for dysfunctional uterine bleeding with failed medical management constituted 1.55% of transfusions to increase pre-op haemoglobin level as part of presurgical workup. 7.75% of transfusions were required for patients after hysterectomy for increased operative blood loss.

The average pre-transfusion haemoglobin was 7.84gm%. The average post transfusion haemoglobin was 9.19gm%. The average gain in haemoglobin was 0.39gm%. The average gain in haemoglobin per unit was 0.32gm%.

## DISCUSSION

The physiological changes in pregnancy such as the increase in red cell mass, plasma volume and cardiac output provides a compensatory reserve for acute blood loss at delivery. The homeostatic response to massive blood loss is effective in young patients without medical problems. Intense sympathetic activity causes a cardiovascular system response that aims to maintain cardiac output. Blood loss of up to 15% (or 750 mL in the 64 kg adult) of total body volume would not normally affect a patient's blood pressure and as long as no further loss is anticipated the patient could be managed conservatively.<sup>4</sup> It should be remembered however that hypotension may occur at lower volumes of blood loss in patients using regional blocks. Circulating volume should be maintained however with crystalloids and colloids for any losses above this amount and it is not necessary to transfuse patients to maintain blood volume as tissue oxygenation is not affected until the haematocrit falls to 0.21. No important physiologic impairment may be noted at haemoglobin levels as low as 6 to 8 g/dL<sup>5</sup>

With the advent of increased understanding of complications and side effects associated with blood transfusion there has been decreasing trend of blood transfusion. At our centre we conducted a prospective observational study to understand the incidence of requirement of blood transfusion and the various indications for transfusion. Over the past 30 years there

has been a changing trend for blood transfusions and the reasons understood are:

- Fear of both patients and clinicians for transfusions related complications
- Better pharmacological methods for treating the root cause of anaemia
- Cost issues<sup>3</sup>

The guidelines used for transfusion were according to the United States Report of Health and Human Services and the same team of doctors judged the requirement of blood transfusion.<sup>6</sup> These guidelines stated that adequate oxygen carrying capacity to maintain cardiopulmonary function can be met by a haemoglobin level of 7g/dL (which is equivalent to a haematocrit of 0.21) when intravascular volume is adequate for perfusion.

Those of relevance to this study are:

- Acute blood loss of any amount if there is clinical evidence of inadequate oxygen-carrying capacity.
- A Hb of < 7 g/dL (haematocrit of 0.21) if not due to a treatable cause.
- Symptomatic anaemia regardless of Hb level.
- Patients receiving general anaesthesia if their pre-operative Hb is < 7 g/dL,
- A major bloodletting operation and a Hb of < 10 g/dL (haematocrit of < 0.30).

One of the haematological changes in pregnancy is the increase and shift in 2, 3-diphosphoglycerate curve to the right making oxygen readily available to the fetus. Therefore, in anaemic mothers, fetal oxygen requirements should not be jeopardized unless the anaemia is severe or the fetus is already compromised by placentation problems.<sup>3</sup>

The commonest cause of anaemia in pregnancy is iron deficiency and the early treatment of this condition would avoid the need to transfuse later. A study done by kamani et al, suggested transfusion in 12% of women for anaemia.<sup>7</sup> In the study done by Saxena S et al, suggested 20% of 263 patients with iron-deficiency anaemia were transfused and 25% of the transfused women patients were transfused to raise their haematocrits in the absence of symptoms. In addition, 40% of the patients were not prescribed any iron therapy including 13 of the transfused patients.<sup>8</sup> There is also evidence that only 23% of the clinical records of transfused patients in 43 European hospitals had a documented reason for transfusion.<sup>9</sup>

However, our study demonstrated transfusion rate of 34.88% for antenatal patients with anaemia. Antenatal patients near term with haemoglobin less than 6 gm% or with haemoglobin less than 7 gm% with deranged haemodynamic parameters were transfused blood. Antenatal patients with anaemia before 35 weeks period of gestation were treated according to the cause of anaemia diagnosed by peripheral smear and iron studies.

Most of the patients transfused were unbooked cases and were not on advised haematinics. This result brings us to the perspective of inadequate care of the patient during antenatal period, poor nutrition and awareness of importance of haematinic therapy.

17.24% of patients were transfused blood who presented with severe anaemia due to excessive blood loss after taking unsupervised medical abortion over the counter. There have been no studies published reflecting this entity. Most of the patients were more than 8 weeks of gestation and took medical abortion without medical advice. This result suggests the poor awareness of contraceptive measures in the population and the ease of availability of abortifacients as an over-the-counter drug with complete ignorance of the possible complications.

Kamani et al. in a retrospective review of 7731 mothers found that antepartum haemorrhage was responsible for 12% of transfusions.<sup>7</sup> Our study suggests 6.2% transfusions for antepartum haemorrhage. This suggests better pharmacological and surgical techniques to contain the bleeding. Early diagnosis of abruptio placenta and timely intervention has also decreased the requirement of blood transfusion.

Camann et al., had found a decline in blood transfusions from 6% to 3% over a four-year period.<sup>10</sup> Another study done by Cooley JR et al, showed a 63% reduction in blood transfusion over a four-year period despite an increase in caesarean rate by 77% owing to adequate haematinic therapy during antenatal period.<sup>11</sup> Present study showed 3.88% transfusions for patients after caesarean sections. The reduction in the rate of transfusion can be attributed to better uterotonics and surgical techniques during atonic or traumatic postpartum haemorrhage.

Menorrhagia limits normal activities and causes anaemia in two thirds of women with objective menorrhagia (loss of 80 mL blood per cycle). Prostaglandin disorders may be associated with idiopathic menorrhagia, and with heavy bleeding due to fibroids, adenomyosis, or use of intrauterine devices (IUDs). Fibroids have been found in 10% of women with menorrhagia overall, and in 40% of women with severe menorrhagia; but half of women undergoing a hysterectomy for menorrhagia are found to have a normal uterus.

A study conducted by Gupte et al, suggested a transfusion rate of 17.2 % for cases of abnormal uterine bleeding refractory to medical management.<sup>12</sup> Our study suggested a transfusion rate of 17.05% for patients with abnormal uterine bleeding refractory to medical management. 1.55% of patients required transfusion for abnormal uterine bleeding with failed medical management for pre-operative workup for undergoing hysterectomy. Adolescence is a period of enormous physical and psychological change for young girls. Many adolescents with menstrual disturbances never present to their family

doctor or gynaecologist. Embarrassment about discussing menstruation, fear of disease, and ignorance about services available may lead to delayed presentation or consultation with doctor. A study done by A. Rathod et al, suggested 17.52 % transfusion for puberty menorrhagia to correct severe anaemia.<sup>13</sup> The present study suggests 6.2% of transfusion for puberty menorrhagia.

Ross et al reported a cross-match rate for hysterectomy as 28%, and the transfusion rate varied between 2.8% and 8.6%.<sup>14</sup> The transfusion rate for abdominal hysterectomy has been reported as 8.6% compared with 2.3% for vaginal hysterectomy.<sup>15</sup>

7.75% of blood transfusions in our study were required for post hysterectomy blood loss. Our patients constituted abdominal, laparoscopic and vaginal hysterectomies. The subjective decrease in incidence can be attributed to better surgical techniques and more energy sources available during surgery to control the bleeding.

About 35% of the blood transfusions in our study were due to massive haemorrhage. As per the united states report of health and human resources, blood transfusion is indicated in the setting of massive haemorrhage with acute blood loss.

In present study blood transfusion was done in patients with massive haemorrhage despite adequate pre-transfusion haemoglobin due to haemodynamic instability for ruptured ectopic pregnancy, incomplete abortion, antepartum haemorrhage, postpartum haemorrhage and massive intra operative blood loss after caesarean and hysterectomies. Hence the average pre-transfusion haemoglobin was 7.84%, despite our threshold for transfusion being 6 gm%.

## CONCLUSION

Our study emphasises on the changing indications for blood transfusion with the advent of new pharmacological methods and surgical techniques. Our study reveals the undernutrition of antenatal clientele and the need for better awareness strategies. Also, the availability of medical abortion drugs across the counter contributes to increased blood loss after incomplete abortion being unsupervised.

There are certain Limitations of the study, such as the sample size of this study has been small and a study with a greater sample size needs to reaffirm the findings. This study has not included component therapy though it is understood to be more advantageous in clinical practice. Component therapy was not accessible at this hospital easily, hence whole blood was transfused to all patients.

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