TO DETERMINE THE INCIDENCE OF BLOOD TRANSFUSION BORNE INFECTIONS IN CHILDREN RECEIVING RECURRENT BLOOD TRANSFUSIONS

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ABSTRACT: OBJECTIVES: To determine the incidence of blood transfusion borne infections in children receiving recurrent blood transfusions in SBHGMC Dhule, pediatrics dept. **DESIGN:** Prospective observational study. **SETTINGS:** Dept. of pediatrics, SBHGMC, Dhule, Maharashtra. **PERIOD:** From April 2014 to June 2014. **PARTICIPANTS:** 50 children (<12yrs) requiring recurrent blood transfusions based on clinical and laboratory findings. **METHODS:** 50 children <12 year of age receiving recurrent blood transfusions were enrolled in the study i.e. those children who received more than two transfusions in the past were included. A detailed history was taken & physical examination was done. After consent, these patients were investigated for blood transfusion borne infections i.e. HIV, Hepatitis B & malaria. For Hepatitis B- HBsAg was done. For HIV- ELISA was done. For Malaria- Peripheral blood smear examinations for malarial parasites was done. Causes of anemia in these children requiring recurrent blood transfusions were also analyzed. **RESULT:** This prospective study conducted over a period of 3 months (April 2014 to June 2014) in the dept. of pediatrics, SBHGMC Dhule showed following results. Among the 459 patients admitted in ward during this period, 50 children were k/c/o anemia requiring recurrent blood transfusions (10.9%). The cause of anemia in these children were -Thalassemia major n=42 (84%)-Sickle cell anemia n=6 (12%)-Aplastic anemia n=2 (4%) Out of these children, 5 were HBsAg positive (10%). None of these children was positive for HIV/malaria. Among HBsAg positive children 3 children (60%) had received hepatitis B vaccine in the past. None of the parents of HBsAg positive children were HBsAg positive. **CONCLUSION:** The commonest cause of recurrent blood transfusion in the study was Thalassemia major. The incidence of blood transfusion borne infection in these children is 10%. All being hepatitis B. Among HBsAg positive children, 60% of the children had received hepatitis B vaccine in the past. This concludes a) One should be stricter in selecting a donor for blood transfusion. b) Need for new screening method to detect these infections in donated blood. c) Need for booster dose of hepatitis B vaccine in children requiring recurrent blood transfusions. **KEYWORDS:** HBV, HIV, transfusion transmitted infections risk.

INTRODUCTION: Blood transfusion is life-saving in no. of conditions.¹ Some children require recurrent blood transfusions. Some of these conditions are thalassemia major, sickle cell anemia, hereditary spherocytosis, aplastic anemia, G6PD deficiency, leukemias etc.^{2, 3} Though life-saving blood transfusion is associated with several side effects & risk like blood transfusion reactions, infections, development of red blood cell antibodies and iron overload in different organs of the body.⁴

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This prospective study was conducted to estimate the incidence of blood transfusion borne infections in children <12 years of age requiring recurrent blood transfusions admitted in paediatric ward of SBHGMC Dhule in period between April 2014 to June 2014.

METHODS:

- This is a prospective observational study conducted in the pediatric ward of SBHGMC Dhule.
- All children <12 years of age who received more than two blood transfusions in the past were enrolled after informed consent was obtained from the parents or guardian. The study was conducted over a period of 3 months between April 2014 and June 2014.
- All these children were admitted for blood transfusion. Indication for blood transfusion was anaemia (HB<10gm%).⁵
- A detailed history was taken & physical examination was done after consent. These children were investigated for certain blood transfusion borne infections i.e. Hepatitis B, HIV & malaria.

For Hepatitis B-HBsAg was done. For HIV- ELISA was done. For Malaria- Peripheral blood smear examinations for malarial parasites was done. After that blood was transfused in these children.⁶

DATA MANAGEMENT AND STATISTICAL ANALYSIS: Data were entered on daily basis. Analysis was performed. The protocol was reviewed & approved by the local ethical committee.

RESULTS: A total of 50 children <12 years of age requiring recurrent blood transfusions were enrolled in the study. Analyzed data showed following results.

1. Total ward admissions during that period was 459. Thus children with recurrent blood transfusions accounts to 10.9% of total ward admissions.
2. The cause of anaemia in these children were
 - Thalassemia major n=42 (84%)
 - Sick cell anaemia n=6 (12%)
 - Aplastic anaemia n=2 (4%)

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3. Out of these 50 children, 5 children (10%) were HBsAg positive. None of the children were positive for HIV or malaria.

4. Fig. shows cumulative age distribution of HBsAg positive patients.

HBsAg positive results in children receiving recurrent blood transfusions
Total children (n=50). HBsAg positive (n=5)

I. Age group (years)

<1yr. (n=1)	n=0 (0%)
1-6yrs. (n=17)	n=1 (5.9%)
6-12yrs. (n=32)	n=4 (12.5%)

II. Sex

Male (n=28)	n=4 (14.2%)
Female (n=22)	n=1 (4.5%)

III. Icterus

Present	(n=40) n=5 (12.5%)
Absent	(n=10) n=0 (0%)

IV. Hepatosplenomegaly

Present	(n=38) n=5 (13%)
Absent	(n=12) n=0 (0%)

V. Diagnosis

Thalassemia	(n=42) n=4 (9.5%)
Sickle cell anemia	(n=6) n=0 (0%)
Aplastic anemia	(n=2) n=1 (50%)

VI. Hepatitis B vaccine

Given	(n=37) n=3 (8%)
Not given	(n=13) n=2 (15%)

DISCUSSION: Though blood transfusions are acclaimed for their life enhancing properties, a darker side that is overlooked is their capacity to create serious complications.^{7,8} The only blood transfusion borne infection identified in this study was hepatitis B infection:

- HBsAg positive children in age <1yr was 0%, 1-6 yrs. was 5.9%, 6-12yrs was 12.5%. This shows that with increasing age the risk of HBV infection increases. This is probably because the no. of transfusions increases & the effectiveness of hepatitis B vaccine decreases.⁹⁻¹² This questions the need for booster doses of hepatitis B vaccine in such high risk patients.
- None of these patients were HIV positive. This is probably because the risk of giving blood during an infections window period were estimated as
For HIV- 1 in 4,93,000
For HBV- 1 in 63,000

This shows that rate of transmission of HBV during the window period is much more as compared to HIV.^{3,4}

- This also calls for new screening method to detect HBV infection in donated blood which will reduce the risk of transmission of HBV infection further.¹³

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- Thalassemia patients are at great risk for acquiring HBV infection as compared to sickle cell anaemia. This is because of more frequent transfusions required in them.¹⁴
- 8% of children who received hepatitis B vaccine were HBsAg positive, while 15% of the children who had not received hepatitis B vaccine were HBsAg positive. This shows the effectiveness of hepatitis B vaccine in preventing HBV infections in these children receiving recurrent blood transfusions. Yet HBsAg positivity in children who have received all 3 doses of hepatitis B vaccine questions the need for booster doses of hepatitis B vaccine in children receiving recurrent blood transfusions.

Based on current scientific evidence, booster vaccination against hepatitis B for immunocompetent children and adults is not recommended for long term protections.^{15,16} However immunocompromised children and children receiving recurrent blood transfusions, should be monitored and receive a booster vaccination if their anti HBs levels decreases below 10 mIU/ml.¹⁷

- In conclusion the commonest blood borne infection identified in this study was hepatitis B. Among HBsAg positive patients, 8% of the patients had received hepatitis B vaccine.
- Thus
 - a) One should be stricter in selecting a donor for blood transfusion.
 - b) Need for new screening method to detect these infections in donated blood.
 - c) Need for booster dose of hepatitis B vaccine in children requiring recurrent blood transfusions.

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