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ASSOCIATION B/W TRANSFUSION OF BLOOD AND SURGICAL SITE INFECTION ORIGINAL ARTICLE

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ABSTRACT

Objective of this study is to evaluate the surgical site infection (SSI) after blood transfusion. This observational study was performed at Isra University Hospital, Al Tibri medical college, over a time of One year from January 2014 to February 2015. Total 195 cases were incorporated in the study who had elective surgeries and no co morbidities. Written informed consent has been taken from cases. Patients below 16 years and above 50 years, who presented with infection, sepsis, pneumonia, dirty wound, co morbidities (smoking, diabetes, immunosuppressive therapy, age), emergency surgeries and UTI before surgery were excluded from the study. Cases were distributed into 2 groups. Group 1, who received blood transfusion and group 2, who had not received. Mean age in this study was 35.35+10.11 years, and female were found in the majority as compare to males with percentage of 32.3% and 67.7% respectively. No significant difference was found between both genders P-value 0.54. Transfusion of blood was done in the 72 cases, and out of them infection was found in 14.9% cases; while 123 cases were without transfusion of blood and out of them infection was found in 7.19% of the cases with significant difference P value 0.03. There was strong relation of transfusion of blood with infection because in this series, infection was most commonly seen in those patients who received multiple transfusions before and during surgery. P value 0.001. Our findings show that Wound Infection is highly associated with transfusion of blood.

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INTRODUCTION

Blood is every time lost during surgery and there is no doubt that transfusion is life saving during surgery. At the other hand blood transfusion has unwanted effects onto immune system. Transfusion not just increases inflammation but also suppresses Immunity¹. Transfusion related immunomodulation has paradoxical effect on immune system regarding RBC transfusion. Conversely RBC transfusion may promote immunity which causes host all immunization and this all immunization causes immune activation and results in clinical symptoms like lung injury, multi organ malfunction and graft versus host reaction². Degree of transfusion related immunomodulation is dependent on several factors including type of preparation method, product transfused and storage period of the host and product factors³. There are numerous factors which affect the choice to administer blood to the cases. Some surgeons would rather transfuse for symptomatic anemia, while others would as well need the support of statistical hemoglobin interruptions to hold up this choice. Transfusion of blood stimulated immune response impairment may decrease resistance to bacterial contamination as seen in cases with post operative contagious complications. There are lot of risk factors responsible for surgical site infection. Transfusion of blood Impact on risk of surgical site infection lingers controversial whereas several studies suggests that blood transfusion is cause for surgical site infection.⁵ Therefore the aim of our study was to evaluate the surgical site infection (SSI) after blood transfusion.

MATERIAL AND METHODS

This prospective observational study was performed in Isra university hospital, Al Tibri medical college over a period of One year from Jan 2014 to February 2015. Total 195 cases were incorporated in study those had elective surgeries and no co morbidities. All the patients with given preoperative transfusion of blood within 72 hours before surgery, and within 72 hours after surgery were documented. Written informed consent has been taken from cases. Patients less than 16 years and more than 50 years of age, infection before surgery, pneumonia, dirty wound, co morbidities (smoking, diabetes, immunosuppressive therapy, chronic HCV and HBV and old age) were excluded from the study. Diagnosis of postoperative infection of wound were done in relation to the ASEPSIS score (further treatment, the serous discharge presence, purulent exudates, erythema, and deep tissues separation, the bacteria isolation, and period of inpatients study). All the cases were distributed into 2 groups. Group 1, those were underwent transfusion of blood and group 2, those were underwent surgery without transfusion of blood. Number of transfusions was noted and Infection was noted in both groups to see the association between transfusion of blood and infection. All the data was documented in the predesigned proforma. Data was analyzed on SPSS version 16. Chi square test was applied and P value <0.05 was considered significant.

RESULTS

TABLE: 1. Distribution according to age and gender n= 195.

Gender	Frequency	Percent	Mean age
Male	63	32.3	Mean +SD
Female	132	67.7	35.36+ 10.11 years
Total	195	100.0	

Mean age was 35.35+10.11 years, and female were found in the majority as compare to males with percentage of 32.3% and 67.7% respectively. TABLE: 1

TABLE: 2. Gender and type of infections n= 195.

Infection	Gender		P-Value
	Male	Female	
Healthy	55	111	0.54
Erythema	0	6	
Haematoma	1	4	
Seroma	4	8	
Pus discharge	3	3	
Total	63	132	

No significant difference was found between both genders P-value 0.54. TABLE: 2.

TABLE:3. Infection according to types Surgery n= 195.

OPERATIVE TECHNIQUES	INFECTION		P VALUE
	PRESENT	NOT PRESENT	
Thyroid surgery	1(20.0%)	4(80.0%)	0.30
Open urogenital surgery	2(7.7%)	24(92.3%)	
APR	0(0.0%)	2(100.0%)	
Orthopedics surgery	2(22.2%)	7(77.8%)	
Neurosurgery	1(25.0%)	3(75.0%)	
Prostate surgery	1(8.3%)	11(91.7%)	
Lymph node excision	0(0.0%)	1(100.0%)	
Oesophagectomy	1(50.0%)	1(50.0%)	
Cholecystectomy	4(19.0%)	17(81.0%)	
Exploratory laparotomy	9(24.3%)	28(75.7%)	
Appendectomy	1(25.0%)	3(75.0%)	
Hernia surgery	0(0.0%)	16(100.0%)	
Gynaecological surgery	9(17.0%)	44(83.0%)	
Breast surgery	2(66.7%)	1(33.3%)	

In this series no significant difference was found in surgery type P-value 0.30. TABLE: 3.

TABLE:4. Transfusion of blood and type of infections n= 195.

Transfusion	INFECTIONS					P-Value
	Healthy	Erythema	Haematoma	Seroma	Pus discharge	
with transfusion	54 (75.0%)	3 (4.2%)	4 (5.6%)	7 (9.7%)	4 (5.6%)	0.03
without transfusion	112 (91.1%)	3 (2.4%)	1 (0.8%)	5 (4.1%)	2 (1.6%)	

In this series significant infection was found in the cases who received transfusion of blood. P value 0.03. Transfusion of blood was done in the 72 cases out of 195 cases, and infection was found in 14.9% of the patients following by seroma was seen in 6.2% of the cases, erythema, pus discharge, and hematoma with percentage of 3.1%, 3.1% and 2.6% respectively. While in remaining 123 cases out of 195 cases those were without transfusion of blood, infection was found in 7.19% of the cases. Therefore according to these results transfusion of blood having a good relationship with post operative wound contamination. TABLE: 4.

TABLE:5. Transfusion of blood and types of infections n= 195.

Transfusions	INFECTION					P-Value
	Healthy	Erythema	Haematoma	Seroma	Pus discharge	
Pre	23 (82.1%)	0 (0.0%)	1 (3.6%)	2 (7.1%)	2 (7.1%)	0.001
Post	29 (93.5%)	0(0.0%)	1(3.2%)	1(3.2%)	0 (.0%)	
Multiple	6(31.6%)	3(15.8%)	2(10.5%)	4(21.1%)	4(21.1%)	
Without	108(92.3%)	3(2.6%)	1(.9%)	5(4.3%)	0(.0%)	

There was strong relation of transfusion of blood with infection because in this series, infection was most commonly seen in those patients who received multiple transfusions before and during surgery. Seroma, erythema and pus discharge were most commonly seen in cases having multiple transfusions with significant difference as compare to single transfusion either pre or post surgery. P value 0.001. TABLE: 5.

DISCUSSION

Our study reinforced existing suspicions on the function of transfusions during surgery as causal risks for the postoperative wound infection and all the cases with other risk factors of infection, like diabetes, hypertension, smoking, obesity, old age, dirty wound surgeries, prolonged surgeries and already infected wound surgeries before the transfusion of blood were excluded to see the proper infection due to transfusion of bloods. Because some studies had reported that infection raised by a number of preoperative factors comprising diabetes, smoking cigarette, use of steroid, obesity, alcohol intake, age extremes, besides the type of procedure of surgery performed.⁶

In this study considerable relationship was establish between preoperative, postoperative and multiple transfusions and the presence of infections P value 0.001. Similarly Mangram AJ et al⁸ identified preoperative transfusion of products of the blood being a main cause for infections of surgical site. Link between infections of surgical site and products of the blood has been a subject of argue for above 2 decades.

In this study transfusion of blood was upheld the relationship between the results of the blood usage and the improvement of infection at surgical site.⁹

Different randomized controlled trials showed association b/w multiple blood transfusion type and generally complication rate of the complications.¹⁰ Mean age in this study was 35.35±10.11 years, and females were found in the majority as compared to males with percentage of 32.3% and 67.7% respectively. These findings of increased female ratio may be due to gynaecological surgeries and more prevalent cholecystectomies.

Transfusion of blood was done in the 36.9% of the cases, and out of these cases, infection was found in 14.9%. Transfusion of blood was found to have a good association to the post operative infection. In this series mostly infection was found in the cases those having multiple transfusion of blood. As well as Rohde et al,¹¹ reported that the utilization of higher amount of RBCs is related to a high risk of contaminations. In the cases which were provided with red blood just with extensive iron deficiency, infection was 12% while in those cases having transfused red blood for mild anemia, infection extent was 17%. The relationship mechanism of it, though, has not been well-characterized. Allergenic materials of blood possess immunomodulatory consequences that can possibly elevate risk of cancer recurrence, nosocomial infections, and probably the later autoimmune diseases development.¹² It is as well probable that the products of the blood transfusion play the role as the marker in cases with a higher quantity of co morbidities and additional risk factors of infections of surgical site, that autonomously puts them at an inherently higher risk for contamination. There is a strong relation of transfusion of blood with infection because in this series infection was most common in those patients having multiple transfusion as pre and post operative transfusions, as well as seroma, erythema and pus discharge were the most common in cases those having multiple transfusions with significant difference as compared to single transfusion pre or post surgery. P value 0.001.

Brecher ME et al,¹³ reported that microbiological contamination of blood and products of the blood is a well-recognized transfusion risk contributing to the morbidity and mortality linked to the transfusion. Blajchman MA et al,¹⁴ demonstrated that the risk of transmission of bacterially contaminated blood components is manifold higher than the combined risk of common transmissible viruses. On few events, products of the blood are infected with bacteria, which may lead to life-threatening contamination, also recognized as infection of transfusion. Acute infection risks of bacteria is projected, as of 2002, at about 1 in transfusions of 50,000 platelet, and 1 in 500,000 RBC transfusions.¹⁵ Earlier studies which have done efforts to relate products of blood application through SSIs was carried out on cases experiencing colorectal, orthopedic, cardiothoracic, and abdominal operations.^{16, 13} While a number of studies have pointed out that transfusion of blood is a considerable risk factor for contamination.^{14, 17.}

CONCLUSIONS

In the conclusion of this study infection is highly associated with transfusion of blood. In our hospitals only virology had been screened. Blood culture also should be carried out routinely in all donors, and infected blood donors should be returned to the decrease the infection in surgeries. More big sample size containing studies are required to assess the confirmed results.

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