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Research Article

**IMPACTS OF TRANSFUSION BLOOD ON FUNCTIONS OF
KIDNEYS AFTER ORTHOPEDIC SURGERY**

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Abstract:

Objective: The impact of the transfusion of blood before the surgery on the function of the kidneys remained as a part of subject in different research works. The aim of this study is to investigate the impacts of transfusion of blood on the function of kidneys after surgery in the patients who underwent orthopedic surgical intervention.

Methodology: Total one hundred and thirty-six patients who underwent surgical intervention because of different orthopedic pathologies from July 2018 to January 2019 were under evaluation. The division of the patients carried out into 2 groups depending upon the amount of the transfusion of blood. Total 69.80% (n: 95) patients who found with transfusion of lower than 3 units were the part of Group-1 & 30.20% (n: 41) patients who received three or greater than 3 blood units were the part of Group-2.

Results: We found no statistical disparities between the patients of both groups before surgery regarding sex, hypertension, DM, failure of the kidney & habits of cigarette smoking. No disparities between the patients of both group regarding stay in hospital after surgery, pulmonary and associated other complications & mortality. When the comparison of the blood parameters of the patients of both groups carried out describing the functions of kidneys and other organ systems, we detected no significant disparity.

Conclusion: Transfusions of blood have no negative impacts on after surgery BUN & levels of creatinine in the patients with underwent surgery for the orthopedic complications.

KEY WORDS: Transfusion, Arthroplasty, Blood, Kidney, Orthopedic, Surgery, Pulmonary, Intervention.

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INTRODUCTION:

About 10.0% of transfusions of blood during operations in United States of America are because of the surgeries for the orthopedic complications. Among the complied orthopedic operations, arthroplasty for the replacement of joints makes the highest amount with thirty-nine percent [1, 2]. There are reports about the high rates of mortality & morbidity because of increased transfusion of blood during orthopedic surgeries constant with the increased complications of transfusion of blood in other surgery fields [1-4]. Most important problem because of during operation transfusion of blood among patients who are undergoing interventions with surgeries, are hemolytic & allergic reactions, lung injury linked with transfusion, circulatory overload linked with the transfusion, graft versus-host anomaly & other infections [1, 3-8]. One other complication of transfusion of blood during operation is the dysfunction of the kidney as mentioned in many other works [9-11]. We did not find any research about the investigation of the impacts of transfusion of blood on the function of kidneys in orthopedic surgeries. In current research study, we detected the impact of the transfusion of blood during surgery on the functions of the kidneys in the patients undergoing operations because of orthopedic complications.

METHODOLOGY:

Total one hundred and thirty-six patients underwent surgery in Allied / DHQ Hospital Faisalabad in orthopedic department due to various orthopedic complications from July 2018 to January 2019 were under evaluation retrospectively. We used the records from the files of the patients after getting the approval for the conduction of study from ethical committee of the hospital. Patient's age, sex, comorbidities as DM, hypertension, diseases of lungs, chronic diseases of kidney & habit of cigarette smoking as well as surgery types, general anesthesia,

levels of blood glucose after and before surgery were in record. We also make the record of the amount of the transfused blood & mortalities and morbidities after the surgical intervention. Total 136 patients having surgery consisted forty-seven hip arthroplasties, thirty-five bipolar

Arthroplasties of hip, eighteen arthroplasties of knee, two arthroplasties of shoulder, sixteen were open reduction & fixation from inside, nine patients faced intramedullary nailing & nine 9 were the victims of latter spinal instrumentations. Total 69.80% (n: 95) received less than three units during operation were the part of Group-1 & 30.20% (n: 41) patients who got more than three units were the part of Group-2. The comparison of function of kidneys of the patients of both groups carried out after surgery. The levels of HCT were less in twenty-four percent patients. Patients who were suffering from the dysfunction of kidneys were under treatment in department of nephrology. No patients were under dialysis. All the patients with levels of creatinine of 2 md/dl before surgery were not the part of this research work. SPSS software utilized for analysis of the collected information. Chi square method used to compare the information between both groups. Various methods were in use for the comparison of the values before and after the surgery.

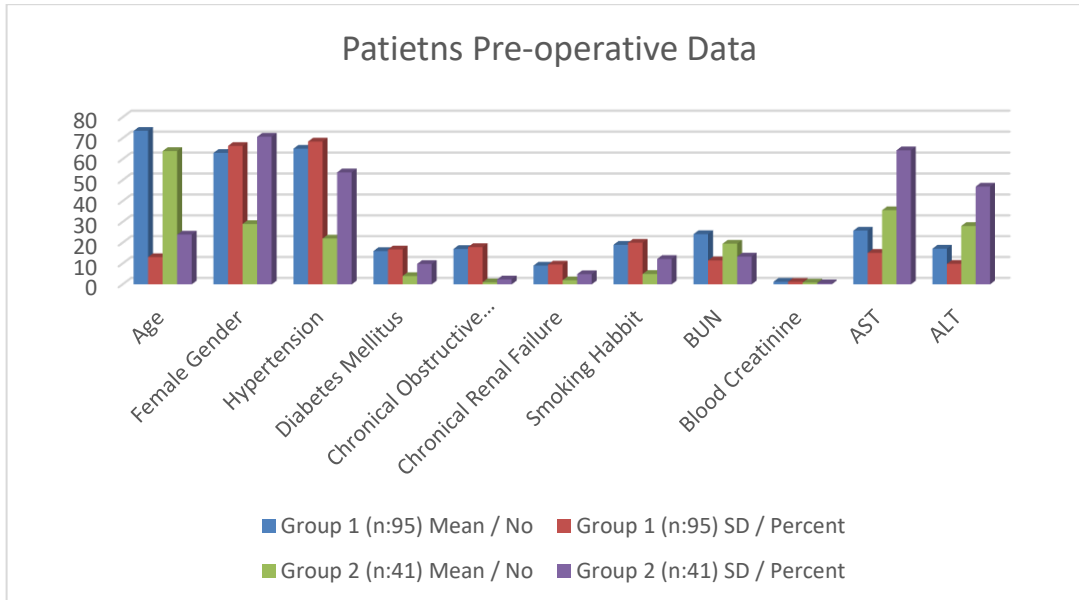
RESULTS:

The before surgery information was not different in patients of both groups regarding age, sex, availability of hypertension, DM, deficiency in kidney function & habits of cigarette smoking. We found the more patients were suffering from the obstructive pulmonary disease in Group-1. Levels of creatinine, AST & ALT regarding blood were same in both groups. We found the high level of BUN among the patients of Group-1 (Table-1).

Table-I: Preoperative Patient Data

Preoperative Data	Group 1 (n:95)		Group 2 (n:41)		P Value
	Mean / No	SD / Percent	Mean / No	SD / Percent	
Age	73.5	13.1	63.88	23.9	0.0580
Female Gender	63	66.3	29	70.7	0.6130
Hypertension	65	68.4	22	53.7	0.1000
Diabetes Mellitus	16	16.8	4	9.8	0.2840
Chronical Obstructive Lung Disease	17	17.9	1	2.4	0.0150
Chronical Renal Failure	9	9.5	2	4.9	0.5040
Smoking Habit	19	20	5	12.2	0.2730
BUN	24.12	11.51	19.54	13.35	0.0010
Blood Creatinine	1.26	1.22	0.9	0.53	0.0540
AST	25.84	15.14	35.59	64.23	0.4790
ALT	17.15	9.87	28.04	46.93	0.8090

BUN: Blood Urea Nitrogen, AST: Aspartate Amino Transferase, ALT: Alanine Amino Transferase

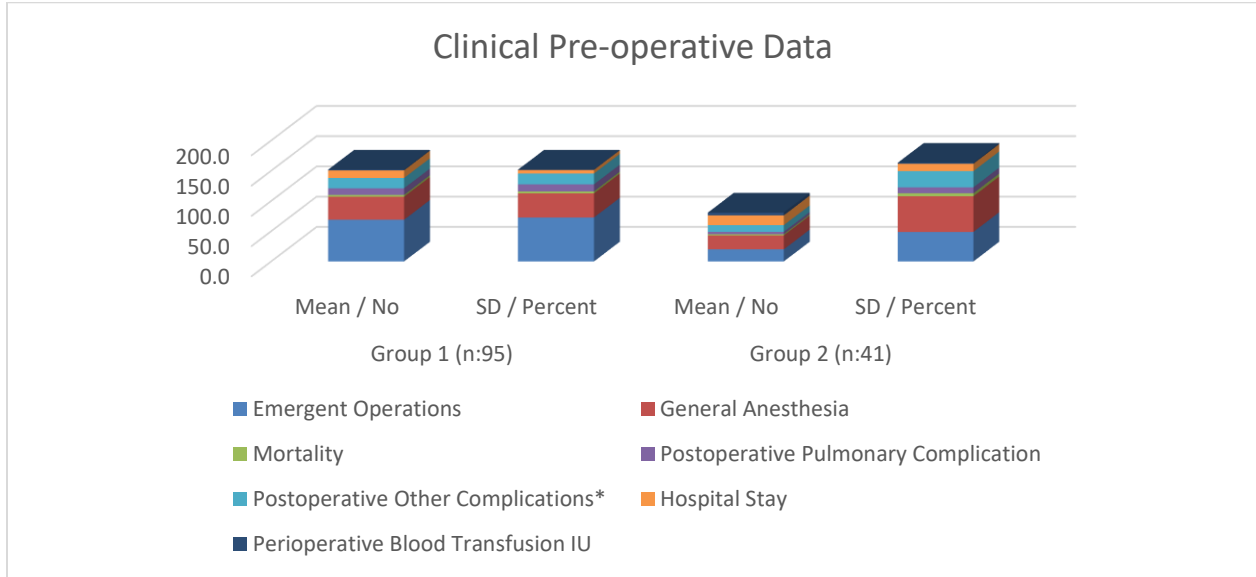


Most of the patients underwent surgery in emergency state as well as under anesthesia were the part of Group-1. We saw no disparities among the patients of both groups regarding stay duration in the hospital, pulmonary and other problems & mortalities after the surgery (Table-2).

Table-II: Clinical Preoperative Patient Data

Perioperative Clinical Data	Group 1 (n:95)		Group 2 (n:41)		P Value
	Mean / No	SD / Percent	Mean / No	SD / Percent	
Emergent Operations	69.0	72.60	20.0	48.80	0.0070
General Anesthesia	38.0	40.00	23.0	59.00	0.0450
Mortality	3.0	3.20	2.0	4.90	0.6370
Postoperative Pulmonary Complication	11.0	11.60	4.0	9.80	1.0000
Postoperative Other Complications*	17.0	17.90	11.0	26.80	0.2370
Hospital Stay	12.6	5.95	16.1	12.12	0.4470
Perioperative Blood Transfusion IU	1.2	0.40	4.6	1.62	<0.0010

*These complications include liver dysfunction, infection, neurocognitive dysfunction, heart failure, deep vein thrombosis and pulmonary embolism

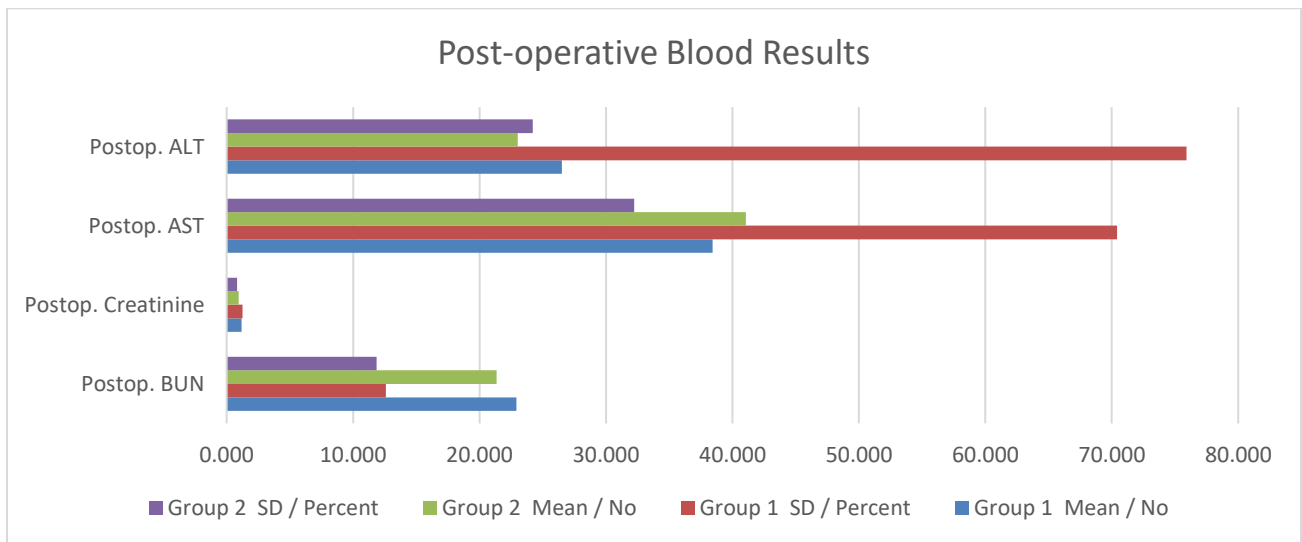


We discovered no difference in the comparisons of the function of kidneys and function of other systems among the patients of both groups (Table-3).

Table-III: Postoperative Blood Parameters

Post-Operative Blood Results	Group 1		Group 2		P Value
	Mean / No	SD / Percent	Mean / No	SD / Percent	
Postop. BUN	22.910	12.580	21.350	11.860	0.5190
Postop. Creatinine	1.170	1.250	0.950	0.820	0.2210
Postop. AST	38.430	70.430	41.050	32.220	0.2240
Postop. ALT	26.510	75.900	23.020	24.200	0.4310

BUN: blood urea nitrogen, AST: aspartate aminotransferase, ALT: alanine aminotransferase.

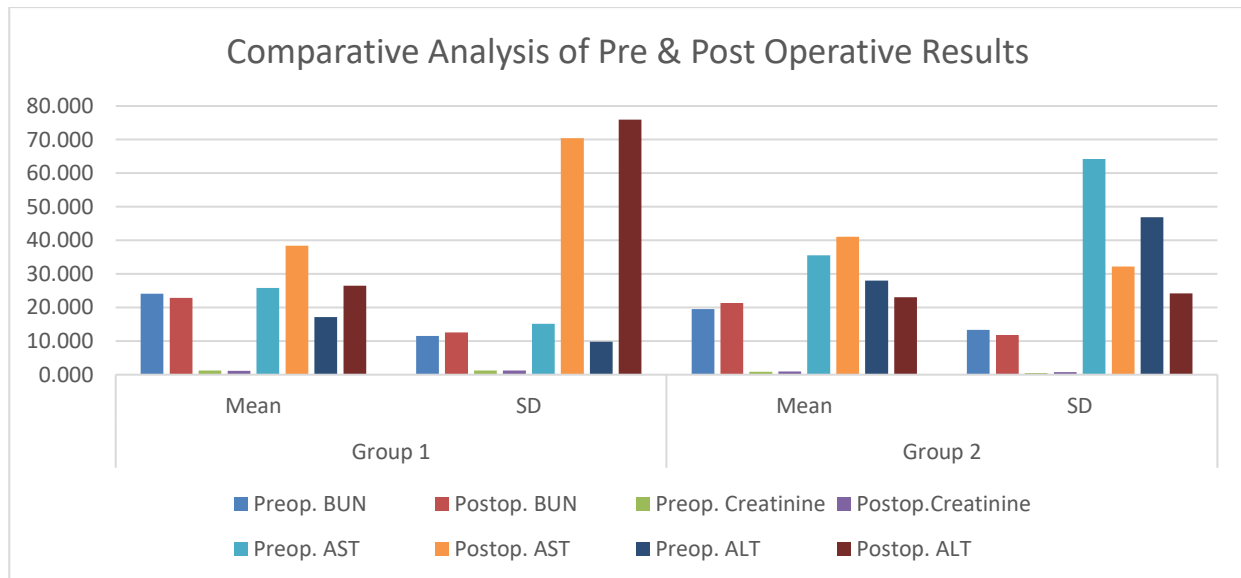


When analysis of the comparison for the changes in the parameters of blood before and after surgery carried out we discovered the reduced level of creatinine in the patients of Group-1 after surgery. The levels of AST were high after surgery in the patients of both groups in comparison with the levels before surgery. We did not find any important difference BUN levels & ALT amount before and after the surgery in the patients of both groups (Table-4).

Table-IV: Preoperative-Postoperative Differences in Blood Parameters

Parameters	Group 1			Group 2		
	Mean	SD	P	Mean	SD	P
Preop. BUN	24.120	11.510	0.32	19.540	13.350	0.3240
Postop. BUN	22.910	12.580		21.350	11.860	
Preop. Creatinine	1.260	1.220	0.007	0.900	0.530	0.5950
Postop. Creatinine	1.170	1.250		0.950	0.820	
Preop. AST	25.840	15.140	0.001	35.590	64.230	0.0050
Postop. AST	38.430	70.430		41.050	32.220	
Preop. ALT	17.150	9.870	0.344	28.040	46.930	0.4980
Postop. ALT	26.510	75.900		23.020	24.200	

BUN: blood urea nitrogen, AST: aspartate aminotransferase, ALT: alanine aminotransferase.



DISCUSSION:

With the enhancements of the surgical interventions in the practices of health care, the occurrence of during operation transfusion of blood is increasing day by day. Various research studies have concluded various complications linked with the transfusion of blood [1, 12]. Rise in the complications after surgery like hemolytic & allergic reactions, transfusion related lung injury, circulatory load related to transfusion, infection and mortality because of transfusions of blood in the fields of orthopedic or other surgeries was the subject of many research works [1-8]. Ponnusamy published an article about

the impact of transfusion of blood in orthopedic operations [1].

The very frequent complications according to the article were allergic reactions in twenty-one percent & transfusion associated injury of lung in twenty-seven percent. In these abnormalities, very frequent causes of mortality were disease of graft-verseshost (85.0% to 100%), transfusion related circulatory overload (2.0% to 15.0%) & transfusion related lung injury (5.0 to 10.0%). Different research works emphasize the rise in the danger of transmission of viruses & suppression of immunity [2, 13]. We were not able to find the statistical difference in the

frequencies of the complications of lungs between the patients of both groups regarding the amount of the transfused blood which was not consistent with the previous literature. One other complication of transfusion of blood during surgery is dysfunction of the kidneys after surgery. This subject was not under consideration in the orthopedic field but it was common in the reports of cardiovascular surgeries [9-11, 14]. Kuduvalli interrogated the impacts of transfusion of blood on mortality and morbidity after surgery in the operation of bypass surgery. He discovered 2.60% frequency of after surgery failure of kidney in the blood transfused patients in comparison with the non-transfused patients which was much significant difference [10]. Another research study states high occurrence of the failure of kidney linked with the products of blood transfusion cardiovascular surgeries.

In accordance with one research work, the occurrence of kidney in the group of transfused patients was 8.0% in comparison with the 1.80% in the group of non-transfused patients [9]. Godet interrogated the factors of danger for kidney failure after surgery among the patients who were undergoing surgeries of thoracic & thoracic-abdominal aortas. The stated that average amount of transfusion of the red blood cells was 11 U in the group of acute kidney failure in comparison with the 7 U in the non-kidney failure group [11]. The transfusion of blood was badly affecting the function of kidneys after cardiovascular surgeries, but we cannot prove such impact in orthopedic operations in this research study.

There are some limitations of the research works as it was a retrospective research study, the record of all the complications after the operation was not in the documents. The population size was very small to generalize the findings. There were limited parameters assessed for the indication of the function of kidneys.

CONCLUSION:

The results of this work conclude that rates of the complication after surgery increases with the transfusion of blood during surgery. We were unable to prove that transfusion of blood in orthopedic operations had very unfavorable impacts on the function of kidneys after operation. We have the belief that with a large sample size as well as with high amount of parameters, we will be able get more precise outcome.

REFERENCES:

1. Busch MP, Kleinman SH, Nemo GJ. Current & emerging infectious risks of blood transfusions. *JAMA*. 2003; 289:959-962.

2. Menis M, Anderson SA, Forshee RA, McKean S, Johnson C, Holness L, et al. Transfusion-associated circulatory overload (TACO) & potential risk factors among the inpatient US elderly as recorded in Medicare administrative databases during. *Vox Sang*. 2014; 106:144-152. doi: 10.1111/vox.12070
3. Steinitz D, Harvey EJ, Leighton RK, Petrie DP. Is homologous blood transfusion a risk factor for infection after hip replacement? *Can J Surg*. 2001; 44:355-358.
4. Alam A, Lin Y, Lima A, Hansen M, Callum JL. The prevention of transfusion associated circulatory overload. *Transfus Med Rev*. 2013; 27:105-112.
5. Hirayama F. Current understanding of allergic transfusion reactions: incidence, pathogenesis, laboratory tests, prevention & treatment. *Br J Haematol*. 2013; 160:434-444.
6. Ponnusamy KE, Kim TJ, Khanuja HS. Perioperative Blood Transfusions in Orthopaedic Surgery. *J Bone Joint Surg Am*. 2014; 96:1836-1844.
7. Innerhofer P, Klingler A, Klimmer C, Fries D, Nussbaumer W. Risk for postoperative infection after transfusion of white blood cell-filtered allogeneic or autologous blood components in orthopedic patients undergoing primary arthroplasty. *Transfusion*. 2005; 45:103-110.
8. Young SW, Marsh DJ, Akhavan MA, Walker CG, Skinner JA. Attitudes to blood transfusion post arthroplasty surgery in the United Kingdom: A national survey. *Int Orthop*. 2008; 32:325-329. doi: 10.1007/s00264-007-0330-0
9. Gokalp O, Kestelli M, Yurekli I, Besir Y, Yilik L, Yasa H, et al. Effect of the use of fresh frozen plasma in cardiac surgery on the postoperative serum creatinine values. *Turkish J Thorac Cardiovasc Surg*. 2011; 19:490-494.
10. Innerhofer P, Walleczek C, Luz G, Hobisch-Hagen P, Benzer A, Stöckl B, et al. Transfusion of buffy coat-depleted blood components and risk of postoperative infection in orthopedic patients. *Transfusion*. 1999; 39:625-632.
11. Whitson BA, Huddleston SJ, Savik K, Shumway SJ. Risk of adverse outcomes associated with blood transfusion after cardiac surgery depends on the amount of transfusion. *J Surg Res*. 2010; 158:20-27.
12. Kuduvalli M, Oo AY, Newall N, Grayson AD, Jackson M, Desmond MJ, et al. Effect of peri-operative red blood cell transfusion on 30-day and 1-year mortality following coronary artery bypass surgery. *Eur J Cardiothorac Surg*. 2005; 27:592-598.

13. Godet G, Fléron MH, Vicaut E, Zubicki A, Bertrand M, Riou B, et al. Risk factors for acute postoperative renal failure in thoracic or thoracoabdominal aortic surgery: a prospective study. *Anesth Analg.* 1997; 85:1227-1232.
14. Helm AT, Karski MT, Parsons SJ, Sampath JS, Bale RS. A strategy for reducing blood-transfusion requirements in elective orthopaedic surgery. Audit of an algorithm for arthroplasty of the lower limb. *J Bone Joint Surg Br.* 2003;85(4):484-489.