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EFFECT OF PERIOPERATIVE BLOOD TRANSFUSION ON KIDNEY FUNCTIONS IN TOTAL KNEE ARTHROPLASTY

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Abstract:

Introduction: *Approximately 10% of all perioperative blood transfusion in USA is due to surgeries performed for orthopaedic pathologies. The main objective of the study is to analyse the effect of perioperative blood transfusion on kidney functions in total knee arthroplasty.* ***Material and methods:*** *This cross-sectional study was conducted in Rawalpindi Medical University during June 2019 to January 2020. The data was collected from 50 patients of both genders. Age, gender, comorbidities like hypertension, diabetes mellitus, chronic obstructive lung disease, chronic renal disease and smoking habits as well as types of operations, anesthesia, preoperative and postoperative blood glucose levels, perioperative amounts of blood transfusion and postoperative morbidities and mortalities were recorded.* ***Results:*** *The data was collected from 50 patients of both genders. The mean age was 22.91 ± 12.58 years. In terms of preoperative bloodwork, creatinine, aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels were statistically similar (P > 0.05). However preoperative BUN level was statistically higher. When the patients were compared for blood parameters showing postoperative renal and other system functions, no statistical differences were detected (P > 0.05).* ***Conclusion:*** *It is concluded that postoperative complication rates increase with perioperative blood transfusion.*

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INTRODUCTION:

Approximately 10% of all perioperative blood transfusion in USA is due to surgeries performed for orthopaedic pathologies. Among these orthopaedic surgeries performed, joint replacement arthroplasty constitudes the majority with 39%. A critical component of successful patient care in total knee arthroplasty (TKA) is a blood management strategy. TKA can result in substantial perioperative blood loss, rendering patients at increased risk of requiring allogenic blood transfusion. Total knee and hip arthroplasty and fracture surgery is the number one reason for transfusion in patients undergoing surgery and accounts for 9.8% of all transfused red blood cell units [1]. Complications of allogenic blood transfusion include the risk of disease transmission, hemolytic reaction, fluid and hemodynamic overload, acute lung injury, coagulopathy, allergic reaction and febrile non-hemolytic reaction. Allogenic transfusion is associated with immunomodulation, and an increased incidence of prosthetic infection [2]. Bierbaum et al. reported a transfusion rate of 39% following TKA, with an increased risk of fluid overload, infection rate and duration of hospitalization in the patients who received allogenic transfusion. Several studies have highlighted the disadvantages of allogenic blood including a negative effect on postoperative complications, length of hospital stay, cost and mortality [3].

Total knee arthroplasty (TKA) is currently the most cost-effective and efficacious way for treating patients with end-stage knee osteoarthritis who suffer from severe pain, activity limitation and for whom conservative treatment is unsuccessful. Based on National registries, TKA is considered to be the most common major orthopaedic surgery performed worldwide. It's really important to mention that the number of TKA surgeries performed each year increases and is projected to have a five to six-fold increase by 2030 [4].

Blood loss during TKA is putting the patient at risk for a blood transfusion. It's reported that patients undergoing

TKA may result in blood loss between 1000 mL and 1500 mL which necessitates subsequent allogeneic blood transfusion (ABT) in 10%-38% of them [5]. Leading complications due to perioperative blood transfusion in patients undergoing surgical interventions are hemolytic and allergic reactions, transfusion-associated acute lung injury, transfusion-associated circulatory overload, graft-versus-host disease and infection. Another complication of perioperative blood transfusion is renal dysfunction as specified in several studies [6]. The main objective of the study is to analyse the effect of perioperative blood transfusion on kidney functions in total knee arthroplasty.

MATERIAL AND METHODS:

This cross-sectional study was conducted in Rawalpindi Medical University during June 2019 to January 2020. The data was collected from 50 patients of both genders. Age, gender, comorbidities like hypertension, diabetes mellitus, chronic obstructive lung disease, chronic renal disease and smoking habits as well as types of operations, anesthesia, preoperative and postoperative blood glucose levels, perioperative amounts of blood transfusion and postoperative morbidities and mortalities were recorded.
The data was collected and analyzed using SPSS version 19.0.

RESULTS:

The data was collected from 50 patients of both genders. The mean age was 22.91 ± 12.58 years. In terms of preoperative bloodwork, creatinine, aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels were statistically similar ($P > 0.05$). However preoperative BUN level was statistically higher. When the patients were compared for blood parameters showing postoperative renal and other system functions, no statistical differences were detected ($P > 0.05$).

Table 01: Preoperative-postoperative differences in blood parameters.

	Group 1	**Group 2**	**P**
Postop. BUN	22.91 ± 12.58	21.35 ± 11.86	0.519
Postop. Creatinine	1.17 ± 1.25	0.95 ± 0.82	0.221
Postop. AST	38.43 ± 70.43	41.05 ± 32.22	0.224
Postop. ALT	26.51 ± 75.9	23.02 ± 24.2	0.431

DISCUSSION:

By the increase of surgical procedures in current health practices, perioperative blood transfusion incidence is also increasing. Besides financial burden many studies have also reported several medical complications associated with blood transfusions [6]. By the increase of surgical procedures in current health practices, perioperative blood transfusion incidence is also increasing. Besides financial burden many studies have also reported several medical complications associated with blood transfusions [7]. Increase in postoperative complications like hemolytic and allergic reactions, transfusion-associated acute lung injury, transfusion-associated circulatory overload, graft-verse-host disease and infection as well as mortality due to blood transfusions in either orthopaedic or other fields of surgery are reported in numerous studies. Ponnusamy et al. recently published a review about effects of blood transfusion in orthopaedic surgery [8]. Most common minor and major complications in this review were respectively allergic reactions (21%) and transfusion-associated acute lung injury (27%) [9]. Among these complications most common reasons of mortality were graft-verses-host disease (85-100%), transfusion-associated circulatory overload (2-15%) and transfusion-associated acute lung injury (5-10%). Many other studies also emphasize the increase in the risk of viral transmission and immunosuppression [10].

CONCLUSION:

It is concluded that postoperative complication rates increase with perioperative blood transfusion. In contrast to other surgical disciplines we could not prove that blood transfusion in orthopaedic surgery had adverse effects on postoperative renal functions.

REFERENCES:

1. Alam A, Lin Y, Lima A, Hansen M, Callum JL. The prevention of transfusion associated circulatory overload. Transfus Med Rev. 2013;27:105–112.
2. Hirayama F. Current understanding of allergic transfusion reactions: incidence, pathogenesis, laboratory tests, prevention & treatment. Br J Haematol. 2013;160:434–444.
3. 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.
4. Innerhofer P, Walleczek C, Luz G, Hobisch-Hagen P, Benzer A, Stöckl B, et al. Transfusion of buffy coatdepleted blood components and risk of postoperative infection in orthopedic patients. Transfusion. 1999;39:625–632.
5. 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.
6. 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.
7. 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.
8. 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.
9. Busch MP, Kleinman SH, Nemo GJ. Current & emerging infectious risks of blood transfusions. JAMA. 2003;289:959–962.
10. 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.