

considerations of important confounders. We aimed to evaluate the relationship between perioperative use of allogeneic blood transfusion and oncological outcomes after lung cancer resection.

Materials and Methods: Patients undergoing curative resections for stage I through III non-small-cell lung cancer at a medical center between 2005 and 2015 were collected and evaluated through May 2017. Postoperative disease-free and overall survival were measured using Cox regression models with inverse probability of treatment weighting (IPTW) to balance observed covariates in the sequential cohort of patients receiving an incremental amount of blood. Restricted cubic spline functions were used to characterize dose-response effects of the amount of transfusion on cancer recurrence and mortality.

Results and Discussion: A total of 1,859 patients were analyzed with a median follow-up time of 42 months (interquartile range 24.9 – 71.9); 214 (11.5%) of them received red cell transfusions during or within 7 days after surgery. Perioperative blood transfusion was associated with early cancer recurrence (IPTW adjusted HR: 1.73, 95% CI: 1.52 – 1.96, $p < 0.001$) and greater all-cause mortality (IPTW adjusted HR: 2.38, 95% CI: 1.98 – 2.86, $p < 0.001$) after lung cancer resection. A non-linear dose-response association was noted between the amount of transfusions and recurrence or all-cause mortality, which is important in understanding the mechanism of transfusion-related immune modulation.

Conclusions: Allogeneic blood transfusion was an independent risk factor for recurrence and death after resections for non-small-cell lung cancer. The non-linear relationship between transfusion amounts and recurrence risk is crucial in clarifying the mechanism of transfusion-related immune modulation. Our results justify minimizing uses of transfusions in lung cancer resection.

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Prehabilitation and patient blood management during colorectal cancer surgery

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Background and Goal of Study: The worldwide trend towards the use of blood replacement in surgery with significant blood loss. There are many complications of blood transfusion and without the use of alternatives risks cannot be prevented. We used new blood management strategies with erythropoiesis stimulants for the prehabilitation of patients in colorectal surgery. The goal of the study was to improve the outcome anesthesia, reducing risks and complications in patients with two different perioperative blood management strategies.

Materials and Methods: 50 patients were divided into 2 groups due to blood management strategy: in 1 group ($n = 25$) we used 10,000 IU the epoetin-alpha (erythropoietin) with Iron (III) oxide 1mg/kg 5,3 days prior to the surgery and intraoperatively. Haemotransfusions were not planned in this group. In the 2 group ($n = 25$) were scheduled to blood transfusion based on intraoperatively blood loss (RBC:FFP to 1:1). The baseline hemoglobin and hematocrit level was not different in both group (118±3 g/l; erythrocytes 4.7±0.5 G/l, Ht - 37±3%). Monitoring of red blood carried out 6, 12, 24, 48 and 72 hours after surgery. Restrictive infusion tactics were chosen for all patients. A sternal puncture and ultrastructural examination was performed intraoperatively.

Results and Discussion: All patients of 1 group showed an increase in hemoglobin by 17-19% from baseline. 24 patients (96%; $p < 0.05$) tended to decrease hemoglobin 6, 12, 24 hours after surgery by an average of 13-15%. Further restoration to the initial level after 48 hours, and even increase above by 10-12%. At the same time, the hematocrit remained constant nearly of 2-3% from the initial. In patients in group 2, no significant decrease of red blood was observed, due to intraoperatively transfusion of erythrocytes. Anemia was observed in 17 cases (68%) to 48 hours after surgery, requiring additional blood transfusion. After 72 hours hemotransfusion were not necessary. In sternal bone marrow punctate in 1st group there was activation of erythrocyte proliferation in 24 (96%; $p < 0.05$) cases (normoblast level was 20 ± 2%) versus 12 ± 1% level of normoblastes in 2 group with moderate activity of erythrocyte proliferation.

Conclusion: Prehabilitation with blood management strategy allows to maintain adequate hemoglobin level without blood transfusion, and complications associated with haemotransfusion.

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Implementation impact of a patient blood management program in primary total hip and knee arthroplasty, an uncontrolled before-after study

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Background and Goal of Study: Total hip and knee arthroplasty are a high prevalence surgery with significant blood loss that often implies the need of an allogeneic blood transfusion with its well-known risks. Patient Blood Management (PBM) is a combination of strategies in order to reduce the transfusions in patients undergoing surgery and have proved to be effective in elective orthopaedic surgery. The objective of this study is to know the impact of implementing a PBM program on transfusion rates in primary total hip and knee arthroplasty.

Materials and Methods: In January 2014 administration of an intraoperative dose of Tranexamic Acid unless contraindicated began and one year later the full PBM Program was implemented treating all patients with preoperative haemoglobin under 13mg/dl to raise it, intraoperatively with the administration of two doses of Tranexamic Acid unless contraindicated and careful haemostasis of the surgical field and postoperatively transfusion threshold at 8 gr/dl of haemoglobin was settled except particular medical circumstances and giving a second blood bag only if necessary. All patients who had a primary total knee or hip arthroplasty from January 2012 to September 2019 were included. Before the PBM program implementation, transfusion rates were obtained by reviewing all medical records and comparing them with the blood bank records. Since the PBM program began, data was recorded on the number of: patients involved, patients transfused, bags of blood used, patients treated for preoperative haemoglobin optimisation and complications.

Results and Discussion: Since January 2014 a total of 2.051 patients were involved in the PBM program implementation. The percentage of transfused patients decreased from 37.6% in 2012 to 20.5% in 2014 (when administration of Tranexamic Acid began) and after to 5% in 2018-2019 and the number of blood bags from 43.1 bags / 100 patients in 2014 to 8,5 bags / 100 patients in 2019

From 2015 to 2019, a 18,02% of patients were treated to optimize the haemoglobin level without any complications secondary to the treatment. These results have made us change our blood reserve policy, reserving it only in patients with tranexamic acid contraindicated or those in which the haemoglobin has not been optimized.

Conclusion: Implementation of a PBM program in elective orthopaedic surgery is safe and leads to an important decrease in transfusion rates.

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Transfusion ratio and hemoglobin levels in a perioperative blood management program for hip and knee arthroplasty

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Background and Goal of Study: Rates of blood transfusion after primary arthroplasty have fallen precipitously since blood management strategies have been instituted. A perioperative blood management program (BMP) for knee and hip arthroplasty has been progressively implemented in our hospital since 2015. At that time, the transfusion rate was 14,5%, while on 2018 it was reduced to 4,4%.

As our goal of study both the preoperative hemoglobin levels and transfusion rates obtained with different treatments (iron vs. erythropoietin) were analyzed. We also analyzed whether patients with preoperative anemia using the World Health Organization's (WHO) criteria, had a poorer response to the treatment.

Materials and Methods: We analyzed retrospectively our data from 2018, and 358 patients underwent knee and hip arthroplasty. One of the preoperative goals in our BMP was to improve the level of hemoglobin up to 13g/dl. Forty seven patients (13%) were treated: sixteen patients (34%) received endovenous iron, and thirty-one (66%) additional erythropoietin (EPO). Cyanocobalamin and folate were also administered in both of the groups when its deficiency was detected. We used Chi-square, Fisher's exact test, to find out if transfusion rates and the level of preoperative hemoglobin achieved, differed between different treatments. We also analyzed if hemoglobin levels achieved were lower in anemic patients.

Results and Discussion: Sixteen patients in the EPO group (50%) and five in the iron group (31%) achieved a preoperative hemoglobin level of 13g/dl. Differences