Protection of erythropoietin against ischemic neurovascular unit injuries through the effects of connexin43.


Abstract

Erythropoietin (EPO) has protective effects on many neurological diseases, including cerebral ischemia. Here, we aimed to test EPO's effects on ischemic neurovascular unit (NVU) injuries and examine whether the effects were dependent on connexin43 (Cx43) mediated gap junctional intercellular communication (GJIC). We detected the expression of Cx43 and phosphorylation of Cx43 (p-Cx43) at 1 d, 3 d, and 7 d after middle cerebral artery occlusion (MCAO). Meanwhile, we examined the effects of EPO on NVU injuries including neuronal survival, astrocyte activation and regeneration of endothelial cells as well as whether the effects were Cx43 dependent by using multiple inhibitors. We found EPO highly increased p-Cx43, but not total Cx43 at all chosen times. Importantly, EPO led to neurological and blood-brain barrier functions improvement by associating with promotion of angiogenesis as well as reduction of neuronal
death, astrocyte activation and neurotoxic substances levels. Moreover, these effects were significantly weakened by the inhibitors blocking GJIC, Cx43 communicative function, phosphorylation and expression, only Cx43 redistribution inhibitor excluded. Our data suggest the protective effects of EPO on NUV injuries are highly associated with the increase of p-Cx43, which improves GJIC to reduce neurotoxic substances.


Mortality Risk of Darbepoetin Alfa Versus Epoetin Alfa in Patients With CKD: Systematic Review and Meta-analysis.

Wilhelm-Leen ER1, Winkelmayer WC2

Author information

- 1Division of Nephrology, Stanford University School of Medicine, Palo Alto, CA.
- 2Division of Nephrology, Stanford University School of Medicine, Palo Alto, CA; Section of Nephrology, Baylor College of Medicine, Houston, TX. Electronic address: winkelma@bcm.edu.

Abstract

BACKGROUND:

Epoetin alfa (EPO) and darbepoetin alfa (DPO) are erythropoiesis-stimulating agents that are widely and interchangeably used for the treatment of anemia in patients with advanced chronic kidney disease and end-stage renal disease. No study has specifically compared the risks of hard study outcomes between EPO and DPO, including mortality.

STUDY DESIGN:

Systematic review of the literature and meta-analysis.

SETTING & POPULATION:

Patients enrolled in randomized trials comparing EPO versus DPO for the treatment of anemia in adults with chronic kidney disease, including those requiring dialysis.

SELECTION CRITERIA FOR STUDIES:

We conducted a systematic search of the literature (PubMed, CENTRAL, SCOPUS, and EMBASE, all years) and industry resources, using predefined search terms and data abstraction tools. We then summarized key characteristics and findings of these trials and performed a random-effects meta-analysis of trials with at least 3 months' duration to identify the summary OR of mortality between patients randomly assigned to DPO versus EPO.
INTERVENTION:
DPO versus EPO.

OUTCOME:
All-cause mortality.

RESULTS:
We identified 9 trials that met the stated inclusion criteria. Overall, 2,024 patients were included in the meta-analysis, of whom 126 died during follow-up, which ranged from 20 to 52 weeks. We found no significant difference in mortality between patients randomly assigned to DPO versus EPO (OR, 1.33; 95% CI, 0.88-2.01). No treatment heterogeneity across studies was detected (Q statistic=4.60; P=0.8).

LIMITATIONS:
Generalizability to nontrial populations is uncertain.

CONCLUSIONS:
Few trials directly comparing DPO and EPO have been conducted and follow-up was limited. In aggregate, no effect of specific erythropoiesis-stimulating agent on mortality was identified, but the confidence limits were wide and remained compatible with considerable harm from DPO. Absent adequately powered randomized trials, observational postmarketing comparative effectiveness studies comparing these erythropoiesis-stimulating agents are required to better characterize the long-term safety profiles of these agents.


Dose conversion ratio in hemodialysis patients switched from darbepoetin alfa to PEG-epoetin beta: AFFIRM study.
Choi P1, Farouk M, Manamley N, Addison J.

Author information

1Department of Nephrology, John Hunter Hospital, Lookout Road, New Lambton Heights, NSW, 2305, Australia, peter.choi@hnehealth.nsw.gov.au.

Abstract

INTRODUCTION:
There is limited information published on switching erythropoiesis-stimulating agent (ESA) treatment for anemia associated with chronic kidney disease (CKD) from darbepoetin alfa (DA) to methoxy polyethylene glycol-epoetin beta (PEG-Epo) outside the protocol of interventional clinical studies. AFFIRM (Aranesp Efficiency Relative to Mircera) was a retrospective, multi-site, observational study designed to estimate the population mean maintenance dose conversion ratio [DCR; dose ratio achieving comparable hemoglobin level (Hb) between two evaluation periods] in European hemodialysis patients whose treatment was switched from DA to PEG-Epo.
METHODS:

Eligible patients had received hemodialysis for ≥ 12 months and DA for ≥ 7 months. Data were collected from 7 months before until 7 months after switching treatment. DCR was calculated for patients with Hb and ESA data available in both evaluation periods (EP; Months 1 and 2 were defined as the pre-switch EP, and Months 6 and 7 as the post-switch EP). Red blood cell transfusions pre- and post-switch were quantified.

RESULTS:

Of 302 patients enrolled, 206 had data available for DCR analysis. The geometric mean DCR was 1.17 (95% CI 1.05, 1.29). Regression analysis indicated a non-linear relationship between pre- and post-switch ESA doses; DCR decreased with increasing pre-switch DA dose. The geometric mean weekly ESA doses were 24.1 μg DA in the pre-switch EP and 28.6 μg PEG-Epo in the post-switch EP. Mean Hb was 11.5 g/dL in the pre-switch EP and 11.4 g/dL in the post-switch EP. There were 16 transfusions and 34 units transfused in the pre-switch period, versus 48 transfusions and 95 units transfused post-switch. Excluding patients receiving a transfusion within 90 days of or during either EP, the DCR was 1.21 (95% CI 1.09, 1.35).

CONCLUSION:

In these hemodialysis patients switched from DA to PEG-Epo the DCR was 1.17 and 1.21 after accounting for the effect of transfusions. The number of transfusions and units transfused increased approximately threefold from the pre-switch to the post-switch period.

ANEMIA MANAGEMENT

IRON

Indian J Pediatr. 2015 Feb 1. [Epub ahead of print]

Iron Deficiency Anemia in Children.

Subramaniam G1, Girish M.

Author information

1Department of Pediatrics, Midas Children Hospital, Nagpur, India, girishsubramaniam25@gmail.com.

Abstract

Iron deficiency is not just anemia; it can be responsible for a long list of other manifestations. This topic is of great importance, especially in infancy and early childhood, for a variety of reasons. Firstly, iron need is maximum in this period. Secondly, diet in infancy is usually deficient in iron. Thirdly and most importantly, iron deficiency at this age can result in neurodevelopmental and cognitive deficits, which may not be reversible. Hypochromia and microcytosis in a complete blood count (CBC) makes iron deficiency anemia (IDA) most likely diagnosis. Absence of response to iron should make us look for other differential diagnosis like β thalassemia trait and anemia of chronic disease. Celiac disease is the most important cause of true IDA not responding to oral iron therapy. While oral ferrous sulphate is the cheapest and most effective therapy for IDA, simple nonpharmacological and pharmacological measures can go a long way in prevention of iron deficiency.
Preoperative Anemia Increases Postoperative Complications and Mortality Following Total Joint Arthroplasty.

Viola J1, Gomez MM1, Restrepo C1, Maltenfort MG1, Parvizi J1.

Author information

• 1The Rothman Institute at Thomas Jefferson University, Philadelphia, Pennsylvania.

Abstract

Single-institution, large case-controlled study examines the association between preoperative anemia and adverse outcomes following total joint arthroplasty (TJA). We collected data from our institutional database of patients who underwent primary and aseptic revision TJA. Only 2576 patients had anemia preoperatively, and 10,987 patients had hemoglobin within the normal range. Multivariate analysis was used to determine the effect of preoperative anemia on the incidence of medical complications, infection, LOS and mortality. Anemic patients had a higher rate of complications (odds ratio 2.11), namely cardiovascular 26.5% versus 11.8%, and genitourinary 3.9% versus 0.9%. Our study confirms that patients with preoperative anemia are likely to exhibit a higher incidence of postoperative complications following TJA. Preoperative optimization may be needed in an effort to reduce these complications.

Continuous monitoring of haemoglobin concentration after in-vivo adjustment in patients undergoing surgery with blood loss.

Frasca D1, Mounios H, Giraud B, Boisson M, Debaene B, Mimoz O.

Author information

• 1Department of Anaesthesia and Intensive Care, University Hospital of Poitiers, Poitiers, France.

Abstract

Non-invasive monitoring of haemoglobin concentration provides real-time measurement of haemoglobin concentration (SpHb) using multi-wavelength pulse co-oximetry. We hypothesised that in-vivo adjustment using the mean of three haemoglobinometer (HemoCue®) measurements from an arterial blood sample at the first SpHb measurement (HCueART) would increase the accuracy of the monitor. The study included 41 adults for a total of 173 measurements of haemoglobin concentration. In-vivo adjusted SpHb was automatically calculated by the following formula: in-vivo adjusted SpHb = unadjusted SpHb -
(SpHb - HCueART). The accuracy of in-vivo adjusted SpHb was compared with SpHb retrospectively adjusted using the same formula, except for haemoglobin level which was assessed at the central laboratory and then compared with all other available invasive methods of haemoglobin measurement (co-oximetry, HbSAT; arterial HemoCue, HCueART; capillary HemoCue, HCueCAP). Compared with laboratory measurement of haemoglobin concentration, bias (precision) for unadjusted SpHb, in-vivo adjusted SpHb, retrospectively adjusted SpHb, HbSAT, HCueART and HCueCAP were -0.4 (1.4), -0.3 (1.1), -0.3 (1.1), -0.6 (0.7), 0.0 (0.4) and -0.5 (1.2) g.dl$^{-1}$, respectively. In-vivo adjustment of SpHb values using the mean of three arterial HemoCue measurements improved the accuracy of the device similar to those observed after a retrospective adjustment using central laboratory haemoglobin level.

**ANESTHETIC TECHNIQUES**

**AUTOTRANSFUSION**


*Is cell salvaged vaginal blood loss suitable for re-infusion?*

Teare KM$^1$, Sullivan IJ$^2$, Ralph CJ$^3$.

**Author information**

- $^1$Department of Anaesthesia, Royal Cornwall Hospital Trust, Truro, Cornwall, UK. Electronic address: kateteare@yahoo.co.uk.
- $^2$Blood Transfusion Department, Royal Cornwall Hospital Trust, Truro, Cornwall, UK.
- $^3$Department of Anaesthesia, Royal Cornwall Hospital Trust, Truro, Cornwall, UK.

**Abstract**

**BACKGROUND:**

Haemorrhage is one of the commonest causes of maternal critical care admission. Cell salvage used during caesarean section can contribute to a reduction in allogeneic blood consumption. This study sought to provide a practical method to salvage blood lost after vaginal delivery and a description of the constituents before and after washing.

**METHODS:**

Blood lost after vaginal delivery was collected from 50 women and washed in a cell salvage machine. No blood was re-infused to any patient in this study. The following measurements were made pre- and post-wash: haemoglobin (haematocrit), alpha-fetoprotein, albumin, lactate dehydrogenase, plasma free haemoglobin, heparin concentration, fetal red cells and identification of bacterial species and colony-forming units (cfu).

**RESULTS:**

Median haemoglobin concentration post-wash was 15.4g/dL. Alpha-fetoprotein, lactate dehydrogenase and albumin concentrations were significantly reduced post-wash (<1KU/L, 183IU/L, 0.011g/L, respectively; P <0.001). Median fetal red cell level post-wash was 0.15mL [range 0-19mL]. Median bacterial contamination concentration post-wash was 2cfu/mL, with a median total count of 303cfu.
CONCLUSIONS:

Vaginal blood can be collected efficiently with little disruption to patient management. The amounts of haemolysis and washout of non-red cell blood components are consistent with results in our cell salvage quality assurance programme for caesarean section and non-obstetric surgery. Although bacteria are detectable in all the post-wash and post-filter samples, the median residual contamination is similar to that found with cell salvage in caesarean section, and if re-infused would result in a circulating bacteraemia of <1cfu/mL; this is similar to that seen with dental procedures (0.3-4.0cfu/mL) and is thought to be clinically insignificant.


[Effects of washed autologous blood transfusion on erythrocytic fragility in salvaged blood from diabetics].
[Article in Chinese]

Lin H¹, Zhang F, Pan Z, Chen X, Yu L, Yan M².

Author information

• ¹Department of Anesthesiology, Second Affiliated Hospital of Medical College of Zhejiang University, Hangzhou 310052, China.
• ²Email: yanminnina@hotmail.com.

Abstract

OBJECTIVE:

To explore the effects of washed autologous blood transfusion on the recovery and hemolysis of erythrocytes from diabetic patients subjected to off-pump coronary artery bypass grafting (OP-CABG).

METHODS:

A total of Sixty patients were included in this study. The patients were assigned as two groups: control (C, n = 30), and diabetic group (D, n = 30). Samples were taken from preoperation, prior to and after disposal of centrifuging and washing to determine the recovery and fragility of erythrocytes. Free hemoglobin and extracellular potassium were measured at 0, 4, 6, 12, 24 h after washing.

RESULTS:

The erythrocytic recovery did not have significant difference between two groups (C group 82.6% ± 5.6%, D group 80.9% ± 6.2%, P > 0.05). Under the same processing, the erythrocyte fragility in the diabetic group were significantly higher than the control group in preoperation and before washing (Preoperation 0.36%; D group 84.9% ± 6.7% C group 78.7% ± 4.6%, P = 0.003; Preoperation 0.68%; D group 9.0% ± 4.5% C group 1.9% ± 0.8%, P = 0.000; Before washing 0.36%; D group 80.6% ± 4.9% C group 78.0% ± 5.8%, P = 0.000; Before washing 0.68%; D group 11.0% ± 3.4% C group 2.4% ± 0.9%, P = 0.000). However, after washing there were no significant differences of erythrocyte fragility between groups. Free hemoglobin and blood potassium at 4, 6, 12, 24 h after washing were significantly increased (P < 0.05) in a time-dependent manner in the two groups. But there was no obvious difference in the interior-group at the same time point.
CONCLUSIONS:

Autotransfusion has no significant extra damage on erythrocytes from diabetic patients undergoing OP-CABG, and the salvaged blood should be transfused as soon as possible to reduce hemolysis.


Effectiveness of autologous transfusion system in primary total hip and knee arthroplasty.

Schneider MM¹, Kendoff D², Olooughlin PE³, Hessling C², Gehrke T², Citak M².

Author information

- ¹Orthopaedic Surgery, Helios ENDO-Klinik, Hamburg, Germany Department of Orthopaedic Surgery, Traumatology and Sports Medicine, Cologne Merheim Medical Center, Witten/Herdecke University, Cologne, Germany.
- ²Orthopaedic Surgery, Helios ENDO-Klinik, Hamburg, Germany.
- ³Department of Orthopaedic Surgery, Cappagh National Orthopaedic Hospital, Finglas Dublin, Ireland.

Abstract

BACKGROUND:

Autologous transfusion has become a cost-efficient and useful option in the treatment of patients with high blood loss following major orthopaedic surgery. However, the effectiveness of autologous transfusion in total joint replacement remains controversial.

OBJECTIVE:

The current study analyzed the efficacy of autologous transfusion with washed shed blood (WSB) in primary total knee and total hip arthroplasty (TKA, THA).

METHODS:

Between January 2011 and December 2011, patients being treated with a primary TKA (n=162) and/or THA (n=227) and who met the inclusion criteria were recruited to the study in consecutive fashion.

RESULTS:

The patient age, BMI and ASA scores showed no statistically significant correlation to the degree of blood loss, quantity of autotransfusion necessary or Hb differential in TKA patients. The use of an autologous transfusion system in TKA and THA is not correlated statistically to a reduction in the amount of allogenic or autologous transfusion.

CONCLUSIONS:

The use of the autotransfusion system does not correlate significantly with the amount of allogenic transfusion in TKA and THA in the current authors’ patient cohort. Age, BMI and ASA score appeared not to exert significant influence on the total amount of autotransfusion or Hb difference.

Janssen SJ¹, Braun Y², Wood KB², Cha TD², Schwab JH².

Author information

   ¹Department of Orthopaedic Surgery, Spine Service, Massachusetts General Hospital - Harvard Medical School, Room 3.946, Yawkey building, 55 Fruit Street, Boston, MA 02114. Electronic address: steinjanssen@gmail.com.
   ²Department of Orthopaedic Surgery, Spine Service, Massachusetts General Hospital - Harvard Medical School, Room 3.946, Yawkey building, 55 Fruit Street, Boston, MA 02114.

Abstract

BACKGROUND CONTEXT:

Allogeneic blood transfusions have an immunomodulating effect and previous studies in other fields of medicine demonstrated an increased risk of infections after administration of allogeneic blood transfusions.

PURPOSE:

Our primary null hypothesis is that exposure to allogeneic blood transfusion in patients undergoing lumbar spine surgery is not associated with postoperative infections after controlling for patient and treatment characteristics. Secondarily, we assessed if there was a dose-response relationship per unit of blood transfused.

STUDY DESIGN/SETTING:

Retrospective cohort study from a tertiary care spine referral center.

PATIENT SAMPLE:

3,721 Patients who underwent laminectomy and/or arthrodesis of the lumbar spine.

OUTCOMES MEASURES:

Postoperative infection, including: pneumonia, endocarditis, meningitis, urinary tract infection, central venous line infection, surgical site infection, and sepsis, within 90 days after lumbar spine surgery.
METHODS:

Multivariable logistic regression analyses were used to assess the relationship of perioperative allogeneic blood transfusion with specific and overall postoperative infections accounting for age, duration of surgery, duration of hospital stay, comorbidity status, preoperative hemoglobin, sex, type of operation, multilevel treatment, operative approach, and year of surgery.

RESULTS:

The adjusted odds ratio for exposure to allogeneic blood transfusion from multivariable logistic regression analysis was: 2.6 for any postoperative infection (95% confidence interval [CI]: 1.7 - 3.9, P < 0.001); 2.2 for urinary tract infections (95% CI: 1.3 - 3.9, P = 0.004); 2.3 for pneumonia (95% CI: 0.96 - 5.3, P = 0.062); and 2.6 for surgical site infection requiring incision and drainage (95% CI: 1.3 - 5.3, P = 0.007). Secondary analyses demonstrated no dose-response relationship between the number of blood units transfused and any of the postoperative infections. Due to the low number of endocarditis (1 case, 0.031%), meningitis (1 case, 0.031%), central venous line infection (1 case, 0.031%), and sepsis (14 cases, 0.43%), we abstained from multivariable analysis.

CONCLUSIONS:

Conscious of the limitations of this retrospective study, our data suggests an increased risk of surgical site infection, and urinary tract infection, and overall postoperative infections, but not pneumonia, after exposure to allogeneic blood transfusion in patients undergoing lumbar spine surgery. These findings should be taken into account when considering blood transfusion and developing transfusion policies for patients undergoing lumbar spine procedures.


Transfusion of plasma, platelets, and red blood cells in a 1:1:1 vs a 1:1:2 ratio and mortality in patients with severe trauma: the PROPPR randomized clinical trial.

Holcomb JB1, Tilley BC2, Baraniuk S2, Fox EE1, Wade CE1, Podbielski JM1, del Junco DJ1, Brasel KJ3, Bulger EM4, Callcut RA5, Cohen MJ6, Cotton BA7, Fabian TC8, Inaba K7, Kerby JD9, Muskat P9, O’Keeffe T9, Rizoli S10, Robinson BR12, Scalea TM13, Schreiber MA14, Stein DM13, Weinberg JA6, Callum JL15, Hess JR16, Matijevic N1, Miller CN17, Pittet JF18, Hoyt DB19, Pearson GD20, Leroux B21, van Belle G22; PROPPR Study Group.

Collaborators (147)

Abstract

IMPORTANCE:

Severely injured patients experiencing hemorrhagic shock often require massive transfusion. Earlier transfusion with higher blood product ratios (plasma, platelets, and red blood cells), defined as damage control resuscitation, has been associated with improved outcomes; however, there have been no large multicenter clinical trials.

OBJECTIVE:

To determine the effectiveness and safety of transfusing patients with severe trauma and major bleeding using plasma, platelets, and red blood cells in a 1:1:1 ratio compared with a 1:1:2 ratio.

DESIGN, SETTING, AND PARTICIPANTS:

Pragmatic, phase 3, multisite, randomized clinical trial of 680 severely injured patients who arrived at 1 of 12 level I trauma centers in North America directly from the scene and were predicted to require massive transfusion between August 2012 and December 2013.

INTERVENTIONS:

Blood product ratios of 1:1:1 (338 patients) vs 1:1:2 (342 patients) during active resuscitation in addition to all local standard-of-care interventions (uncontrolled).

MAIN OUTCOMES AND MEASURES:

Primary outcomes were 24-hour and 30-day all-cause mortality. Prespecified ancillary outcomes included time to hemostasis, blood product volumes transfused, complications, incidence of surgical procedures, and functional status.

RESULTS:

No significant differences were detected in mortality at 24 hours (12.7% in 1:1:1 group vs 17.0% in 1:1:2 group; difference, -4.2% [95% CI, -9.6% to 1.1%]; P = .12) or at 30 days (22.4% vs 26.1%, respectively; difference, -3.7% [95% CI, -10.2% to 2.7%]; P = .26). Exsanguination, which was the predominant cause of death within the first 24 hours, was significantly decreased in the 1:1:1 group (9.2% vs 14.6% in 1:1:2 group; difference, -5.4% [95% CI, -10.4% to -0.5%]; P = .03). More patients in the 1:1:1 group achieved hemostasis than in the 1:1:2 group (86% vs 78%, respectively; P = .006). Despite the 1:1:1 group receiving more plasma (median of 7 U vs 5 U, P < .001) and platelets (12 U vs 6 U, P < .001) and similar amounts of red blood cells (9 U) over the first 24 hours, no differences between the 2 groups were found for the 23 prespecified complications, including acute respiratory distress syndrome, multiple organ failure, venous thromboembolism, sepsis, and transfusion-related complications.
CONCLUSIONS AND RELEVANCE:

Among patients with severe trauma and major bleeding, early administration of plasma, platelets, and red blood cells in a 1:1:1 ratio compared with a 1:1:2 ratio did not result in significant differences in mortality at 24 hours or at 30 days. However, more patients in the 1:1:1 group achieved hemostasis and fewer experienced death due to exsanguination by 24 hours. Even though there was an increased use of plasma and platelets transfused in the 1:1:1 group, no other safety differences were identified between the 2 groups.


Predictors of perioperative blood transfusions in patients with chronic kidney disease undergoing elective knee and hip arthroplasty.

Graves A¹, Yates P, Hofmann AO, Farmer S, Ferrari P.

Author information

¹Department of Nephrology, Fremantle Hospital, University of Western Australia, Perth, Western Australia, Australia.

Abstract

BACKGROUND:

Lower preoperative haemoglobin and older age pose a risk for perioperative allogeneic blood transfusions (ABT). The presence of chronic kidney disease (CKD) is associated with low haemoglobin, greater bleeding and ABT utilization.

STUDY DESIGN AND METHODS:

The interaction between estimated glomerular filtration rate (eGFR) and haemoglobin on perioperative ABT, length-of-stay and mortality was assessed in 86 patients with CKD stage 3 or higher undergoing elective total knee or hip arthroplasty compared with 294 without CKD. Multivariate analyses for ABT risk with haemoglobin, eGFR, age, gender, duration of surgery and primary versus revision surgery were performed.

RESULTS:

Patients with CKD had lower preoperative haemoglobin and higher incidence of ABT. Haemoglobin was independently associated with increased odds of ABT (0.74 (95% confidence interval 0.71-0.77), P = 0.001), but eGFR was not (0.98 (0.96-1.02), P = 0.089). Length-of-stay and 1 year mortality did not differ between non-transfused CKD patients and controls. Transfused CKD patients had significantly higher length-of-stay compared with transfused controls (25 ± 21 vs 19 ± 16 days, P < 0.0001), although 1 year mortality between transfused CKD patients and controls did not differ significantly.

CONCLUSION:

CKD alone, in the absence of anaemia, does not predispose to increased risk of ABT or length-of-stay in patients with mild-to-moderate CKD undergoing elective joint surgery. However, low haemoglobin is
associated with increased ABT utilization and increased length-of-stay. Considering that 1 in 4 patients undergoing elective hip or knee arthroplasty has CKD, optimal preoperative patient blood management may improve outcome in this population.

COST EFFECTIVENESS


[Medical and economic impact of a haemostatic sealant on the rate of transfusion after total knee arthroplasty.]

[Article in French]

Choufani C¹, Barbier O², Bajard X², Ollat D², Versier G².

Author information

• ¹Service de chirurgie orthopédique et traumatologique, hôpital d'instruction des armées Bégin, 69, avenue de Paris, 94160 Saint-Mandé, France. Electronic address: camchouf@hotmail.com.
• ²Service de chirurgie orthopédique et traumatologique, hôpital d'instruction des armées Bégin, 69, avenue de Paris, 94160 Saint-Mandé, France.

Abstract

OBJECTIVES:

Blood loss reduction in total knee arthroplasty (TKA) contributes to the prevention of morbidity and mortality and in the management of health care costs. Fibrin haemostatic sealant have controversial effectiveness in reducing postoperative blood loss and transfusion requirements. Our study evaluated the medical and economic benefits of this treatment with the assumption that it decreases the frequency of blood transfusion after TKA.

METHODS AND PATIENTS:

Our single-center and randomized study included 60 patients pose unilateral primary TKA for osteoarthritis. Distribution was done in 2 groups of 30 patients each. Group 1 patients treated with a dose of 5mL Evicel®, compared to untreated group 2. Were collected the number of patients transfused. The treatment cost was compared to the sealant cost.

RESULTS:

Results are not statistically significant. Two patients were transfused in group 1 and 3 in group 2 (P=0.64). The treatment cost for 30 patients is 13,500 €, for a savings of cells packed at 187 €, an additional cost of 13,313 € in group 1.

CONCLUSION:

The use of fibrin haemostatic sealant in TKA did not induce a significant difference in terms of blood or transfusion savings, with a significant cost. We do not recommend its routine use in TKA.
Cost savings of red cell salvage during cesarean delivery.

Albright CM¹, Rouse DJ, Werner EF.

Author information

- ¹Division of Maternal Fetal Medicine, Women and Infants Hospital, the Alpert Medical School of Brown University, Providence, Rhode Island.

Abstract

OBJECTIVE:

To use decision analysis to evaluate whether and under what conditions routine setup of intraoperative cell salvage during cesarean delivery is cost-saving.

METHODS:

We developed a decision model to compare costs associated with two strategies for cesarean delivery: 1) routine setup of intraoperative cell salvage; or 2) standard care without intraoperative cell salvage. One-, two-, and three-way sensitivity analyses as well as Monte Carlo simulation were used to assess the robustness of our findings.

RESULTS:

Among nonselected women undergoing cesarean delivery, our base case estimate was that 3.2% would require red blood cell transfusion. Under this assumption, cell salvage is cost-saving only if each woman requires at least 60 units. Conversely, if only two units on average are required, the probability of transfusion needs to be at least 58% for cell salvage to be cost-saving. In our base case analysis, setup of intraoperative cell salvage during routine cesarean deliveries is not cost-saving, increasing the cost per cesarean delivery by $223.80. We found that cell salvage would be cost-saving only in very high-risk scenarios. For example, severe maternal anemia or abnormal placentation, in which 54% and 75% of women are transfused three and two units per case, respectively, would make cell salvage cost-saving.

CONCLUSION:

Setup of intraoperative cell salvage during cesarean delivery is cost-saving and should be considered only when there is a predictably high probability of transfusion or when a massive transfusion is reasonably likely.

Improvements in patient blood management for pediatric craniosynostosis surgery using a ROTEM® -assisted strategy - feasibility and costs.
Haas T, Goobie S, Spielmann N, Weiss M, Schmugge M.

Author information

- 1Department of Anaesthesia, University Children's Hospital Zurich, Zurich, Switzerland.

Abstract

BACKGROUND:

Moderate to severe intraoperative bleeding and the presence of acquired coagulopathy remain serious problems in the management of major pediatric craniosynostosis surgery. After implementation of a ROTEM®-assisted patient blood management (PBM) strategy, using primarily purified coagulation factor concentrates, feasibility and costs of this new regimen were analyzed.

METHODS:

Retrospective analysis of all consecutive children who underwent primary elective major craniofacial surgery for craniosynostosis repair was carried out at the Children's University Hospital, Zurich, between 2007 and 2013. Laboratory workup and transfusion requirements were compared.

RESULTS:

A total of 47 children (36 in the historic group and 11 after implementation of PBM) were analyzed. Although all patients in this study needed transfusion of red blood cell concentrates, there was a total avoidance of perioperative transfusion of fresh frozen plasma and a reduction in transfused platelets (one of nine children vs nine of 36 children in the historic group) after implementation of the PBM strategy. Based on a predefined ROTEM® threshold in the PBM group (FibTEM MCF <8 mm), administration of fibrinogen concentrate was necessary in all of these children. The mean total costs per patient consisting of transfused allogeneic blood products and coagulation factor concentrates were reduced by 17.1% after implementation of PBM (1071.82 EUR per patient before vs 888.93 EUR after implementation).

CONCLUSIONS:

The implementation of a ROTEM®-assisted PBM is feasible and is associated with a considerable reduction in intraoperative transfusion requirements and thereby a decrease in transfusion-related direct costs.
Abstract

BACKGROUND:

Humans are able to compensate for low-volume blood loss with minimal change in traditional vital signs. We hypothesized that a novel algorithm, which analyzes photoplethysmogram (PPG) wave forms to continuously estimate compensatory reserve would provide greater sensitivity and specificity to detect low-volume blood loss compared with traditional vital signs. The compensatory reserve index (CRI) is a measure of the reserve remaining to compensate for reduced central blood volume, where a CRI of 1 represents supine normovolemia and 0 represents the circulating blood volume at which hemodynamic decompensation occurs; values between 1 and 0 indicate the proportion of reserve remaining.

METHODS:

Subjects underwent voluntary donation of 1 U (approximately 450 mL) of blood. Demographic and continuous noninvasive vital sign wave form data were collected, including PPG, heart rate, systolic blood pressure, cardiac output, and stroke volume. PPG wave forms were later processed by the algorithm to estimate CRI values.

RESULTS:

Data were collected from 244 healthy subjects (79 males and 165 females), with a mean (SD) age of 40.1 (14.2) years and mean (SD) body mass index of 25.6 (4.7). After blood donation, CRI significantly decreased in 92% (α = 0.05; 95% confidence interval [CI], 88-95%) of the subjects. With the use of a threshold decrease in CRI of 0.05 or greater for the detection of 1 U of blood loss, the receiver operating characteristic area under the curve was 0.90, with a sensitivity of 0.84 and specificity of 0.86. In comparison, systolic blood pressure (52%; 95% CI, 45-59%), heart rate (65%; 95% CI, 58-72%), cardiac output (47%; 95% CI, 40-54%), and stroke volume (74%; 95% CI, 67-80%) changed in fewer subjects, had significantly lower receiver operating characteristic area under the curve values, and significantly lower specificities for detecting the same volume of blood loss.

CONCLUSION:

Consistent with our hypothesis, CRI detected low-volume blood loss with significantly greater specificity than other traditional physiologic measures. These findings warrant further evaluation of the CRI algorithm in actual trauma settings.


How do we treat life-threatening anemia in a Jehovah's Witness patient?

Posluszny JA Jr1, Napolitano LM.

Author information
Division of Acute Care Surgery [Trauma, Burns, Critical Care, Emergency Surgery], Department of Surgery, University of Michigan, Ann Arbor, Michigan.

Abstract

The refusal of allogeneic human blood and blood products by Jehovah's Witness (JW) patients complicates the treatment of life-threatening anemia. For JW patients, when hemoglobin (Hb) levels decrease beyond traditional transfusion thresholds (<7 g/dL), alternative methods to allogeneic blood transfusion can be utilized to augment erythropoiesis and restore endogenous Hb levels. The use of erythropoietin-stimulating agents and intravenous iron has been shown to restore red blood cell and Hb levels in JW patients, although these effects may be significantly delayed. When JW patients have evidence of life-threatening anemia (Hb <5 g/dL), oxygen-carrying capacity can be supplemented with the administration of Hb-based oxygen carriers (HBOCs). Although HBOCs are not Food and Drug Administration (FDA) approved, they may be obtained and administered with FDA, institutional review board, and patient approval. We describe a protocol-based algorithm to the management of life-threatening anemia in JW patients and review time to anemia reversal and patient outcomes using this approach.

HEMATOLOGY


Five hematologic tests and treatments to question.

Hicks LK¹, Bering H², Carson KR³, Haynes AE⁴, Kleinerman J⁵, Kukreti V⁶, Ma A⁷, Mueller BU⁸, O'Brien SH⁹, Panepinto JA¹⁰, Pasquini MC¹¹, Rajasekhar A¹², Sarode R¹³, Wood WA⁷

Author information

¹University of Toronto, St. Michael's Hospital, Toronto, Ontario, Canada;
²Harvard Vanguard Medical Associates, Beverly, MA;
³Washington University, St. Louis, MO;
⁴AE Health Consulting, Dunnville, Ontario, Canada;
⁵Medical Specialists of Taunton, Taunton, MA;
⁶University of Toronto, University Health Network, Toronto, Ontario, Canada;
⁷University of North Carolina, Chapel Hill, NC;
⁸All Children's Hospital Johns Hopkins Medicine, St. Petersburg, FL;
⁹Nationwide Children's Hospital, Columbus, OH;
¹⁰Medical College of Wisconsin/Children's Hospital of Wisconsin, Milwaukee, WI;
¹¹Medical College of Wisconsin, Milwaukee, WI;
¹²University of Florida, Gainesville, FL; and.
¹³University of Texas Southwestern Medical Center, Dallas, TX.

Abstract

Choosing Wisely® is a medical stewardship initiative led by the American Board of Internal Medicine Foundation in collaboration with professional medical societies in the United States. The American Society of Hematology (ASH) released its first Choosing Wisely® list in 2013. Using the same evidence-based methodology as in 2013, ASH has identified 5 additional tests and treatments that should be questioned by clinicians and patients under specific, indicated circumstances. The ASH 2014 Choosing Wisely® recommendations include: (1) do not anticoagulate for more than 3 months in patients
experiencing a first venous thromboembolic event in the setting of major, transient risk factors for venous thromboembolism; (2) do not routinely transfuse for chronic anemia or uncomplicated pain crises in patients with sickle cell disease; (3) do not perform baseline or surveillance computed tomography scans in patients with asymptomatic, early-stage chronic lymphocytic leukemia; (4) do not test or treat for heparin-induced thrombocytopenia if the clinical pretest probability of heparin-induced thrombocytopenia is low; and (5) do not treat patients with immune thrombocytopenia unless they are bleeding or have very low platelet counts.

HEMOSTATIC MANAGEMENT

DRUGS


Reducing blood loss in simultaneous bilateral total knee arthroplasty: Combined intravenous-intra-articular tranexamic acid administration. A prospective randomized controlled trial.

Karaaslan F1, Karaoğlu S2, Mermerkaya MU3, Baktir A4.

Author information

• 1Bozok University Faculty of Medicine, Department of Orthopaedics and Traumatology, TR-66200 Yozgat, Turkey. Electronic address: Fkaraaslan@Gmail.Com.
• 2Memorial Kayseri Hospital, Department of Orthopaedics and Traumatology, TR-38010 Kayseri, Turkey.
• 3Bozok University Faculty of Medicine, Department of Orthopaedics and Traumatology, TR-66200 Yozgat, Turkey.
• 4Modern Dünya Hospital, Department of Orthopaedics and Traumatology, TR-38010 Kayseri, Turkey.

Abstract

BACKGROUND:

We asked whether tranexamic acid (TXA) administration could reduce blood loss and blood transfusion requirements after simultaneous bilateral total knee arthroplasty (TKA). This study examined the role of a novel method of TXA administration in TKA.

METHODS:

TXA was administered as a bolus dose of 15mg/kg 10min before the inflation of the tourniquet on the first side. This was followed by intra-articular administration of 3grams at 10min before the deflation of the tourniquet. IV infusion of 10mg/kg/h was continued for 3h following completion on the second side. We measured volume of drained blood 48h postoperatively, decrease in hemoglobin levels 12h postoperatively, amount of blood transfused (BT), and number of patients requiring allogenic BT.

RESULTS:

Median postoperative volume of drained blood was lower in the group receiving TXA (500.00mL) than in control subjects (900.00mL) (p <0.05) [95% CI (-525.00) to (-300.00)]. The median hemoglobin decrease
12 h postoperatively was lower in patients receiving TXA (2.10g/dL) than in control subjects (3.10g/dL) 
(p<0.05) [95% CI (-1.60) to (-0.60)]. The amount of BT and number of patients requiring BT were lower in 
patients receiving TXA than in control subjects. Nevertheless, the number of allogeneic units of packed red blood cells transfused in the postoperative period was not significantly higher in the control group than in the TXA group (p=0.109) [95% CI (0.101) to (0.117)].

CONCLUSIONS:

This prospective randomized study showed that during simultaneous bilateral TKA, TXA reduced blood loss with negligible side effects.

HEMOSTATIC MANAGEMENT

SURGICAL


**Fibrin glue closure for intractable pancreatic fistulae after pancreaticoduodenectomy.**

Okamoto K1, Koyama I, Hara K, Aikawa M, Okada K, Watanabe Y, Miyazawa M.

**Author information**

- 1Department of Gastroenterological Surgery, Saitama International Medical Center, Saitama Medical University. Saitama, Japan. kokamoto@saitama-med.ac.jp.

**Abstract**

**CONTEXT:**

Treatment of pancreatic fistulae after pancreaticoduodenectomy is extremely important because it determines the patient's postoperative course. In particular, treatment of grade B cases should be conducted in a timely manner to avoid deterioration to grade C.

**OBJECTIVE:**

We report the successful treatment of six cases of postoperative intractable, grade B pancreatic fistulae, in which fistula closure was achieved through the use of tissue adhesive.

**METHODS:**

Six subjects presented at our hospital with grade B pancreatic fistulae after pancreaticoduodenectomy. In all cases, the drain amylase values were high immediately after the operation, and the replacement of the drain was enforced. Closure of the fistula was performed by pouring tissue adhesive into the fistula from the drain, after the fistula had been straightened.

**RESULTS:**

Closure of the fistula was achieved in all six cases at the first attempt. The average fistula length was 13.2 cm, the average volume of pancreatic fluid discharge just before treatment was 63.3 mL, the
average amylase value in the drainage was 40,338.5 IU/L, and the subjects were discharged from hospital an average of 8.8 days after treatment. There were no recurrences after treatment.

CONCLUSION:

Intractable pancreatic fistulae can be effectively treated using the tissue adhesive method


Clausen C¹, Dahl B², Frevert SC³, Hansen LV², Nielsen MB³, Lönn L⁴.

Abstract

PURPOSE:

To assess whether preoperative transcatheter arterial embolization of spinal metastases reduces blood loss, the need for transfusion with allogeneic red blood cells (RBCs), and surgery time in the surgical treatment of patients with symptomatic metastatic spinal cord compression.

MATERIALS AND METHODS:

This single-blind, randomized (1:1), controlled, parallel-group, single-center trial was approved by the Danish National Committee on Biomedical Research Ethics and was conducted from May 2011-March 2013. Participants (N = 45) were scheduled for decompression and posterior thoracic/lumbar spinal instrumentation and randomly assigned to either preoperative embolization (n = 23) or a control group (n = 22). The primary outcome was intraoperative blood loss. Secondary outcomes were perioperative blood loss, allogeneic RBC transfusion, and surgery time. Analyses were performed by intention-to-treat.

RESULTS:

The intention-to-treat analysis included 45 patients. Mean intraoperative blood loss did not differ significantly (P = .270) between the embolization group (618 mL [SD, 282 mL]) and the control group (735 mL [SD, 415 mL]). There was also no significant difference in allogeneic RBC transfusion (P = .243). Surgery time was significantly shorter in the embolization group (P = .031): median 90 minutes (range, 54-252 min) versus 124 minutes (range, 80-183 min). The subanalysis of hypervascular metastases revealed a significant (P = .041) reduction in blood loss in the embolization group: 645 mL (SD, 289 mL) versus 902 mL (SD, 416 mL).
CONCLUSIONS:

Preoperative embolization in patients with symptomatic spinal metastasis independent of primary tumor diagnosis did not reduce intraoperative blood loss and allogeneic RBC transfusion significantly but did reduce the surgery time. A small reduction of intraoperative blood loss was shown in hypervascular metastases.

HEMOSTATIC MANAGEMENT

TOPICAL APPLICATIONS


Using absorbable chitosan hemostatic sponges as a promising surgical dressing.


**Author information**

- 1MOE Key Laboratory of Macromolecular Synthesis and Functionalization, Department of Polymer Science and Engineering, Zhejiang University, Hangzhou 310027, China.
- 2College of Life and Environmental Science, Hangzhou Normal University, Hangzhou 310036, China.
- 3Division of Basic Medical Science, Hangzhou Normal University, Hangzhou 310036, China.
- 4MOE Key Laboratory of Macromolecular Synthesis and Functionalization, Department of Polymer Science and Engineering, Zhejiang University, Hangzhou 310027, China. Electronic address: wangzk@zju.edu.cn.
- 5MOE Key Laboratory of Macromolecular Synthesis and Functionalization, Department of Polymer Science and Engineering, Zhejiang University, Hangzhou 310027, China. Electronic address: huql@zju.edu.cn.

**Abstract**

As absorbable hemostatic dressings, chitosan with a deacetylation degree of 40% (CS-40) and 73% (CS-73) have been fabricated into sponges via a modified method. The hemostatic, biocompatible and biodegradable properties were evaluated through in vivo assays. In a hepatic hemorrhage model, the chitosan sponges, with excellent blood compatibility, achieved less blood loss than the gelation sponge (GS). In addition, CS-40 showed better hemostatic capability and biodegradability than CS-73. After implantation, a histological analysis indicated that CS-40 exhibited the best biodegradability, tissue regeneration and least tissue adhesion. By contrasting CS-40 and CS-73, the deacetylation degree is confirmed to be a key factor for the hemostatic effect, biodegradability, biocompatibility and tissue regeneration. Our overall results demonstrated the potential application of CS-40 for use in absorbable hemostatic dressings.


**Topical intra-articular compared with intravenous tranexamic acid to reduce blood loss in primary total knee replacement: a double-blind, randomized, controlled, noninferiority clinical trial.**

*Gomez-Barrena E*, *Ortega-Andreu M*, *Padilla-Eguiluz NG*, *Pérez-Chrzanowska H*, *Fiqueredo-Zalve R*.
Abstract

BACKGROUND:

Abundant literature regarding the use of intravenous tranexamic acid (TXA) in primary total knee replacement is available. Randomized controlled trials have confirmed the efficacy of topical TXA compared with placebo, but the comparison between topical and intravenous TXA is unclear. The present study was designed to verify noninferior efficacy and safety of topical intra-articular TXA compared with intravenous TXA in primary total knee replacement with cemented implants.

METHODS:

A Phase-III, single-center, double-blind, randomized, controlled clinical trial was performed to compare topical intra-articular TXA (3 g of TXA in 100 mL of physiological saline solution) with two intravenous doses of TXA (15 mg/kg in 100 mL of physiological saline solution, one dose before tourniquet release and another three hours after surgery) in a multimodal protocol for blood loss prevention. The primary outcome was the blood transfusion rate, and the secondary outcomes included visible blood loss (as measured in the drain) at twenty-four hours postoperatively and invisible blood loss (as estimated from the Nadler formula) at forty-eight hours postoperatively. The sample size of seventy-eight patients was calculated to give a statistical power of 99% for demonstrating noninferiority. Thirty-nine patients each were allocated to receive topical intra-articular TXA (the experimental group) and intravenous TXA (the control group); there were no significant differences in demographics or preoperative laboratory values between the groups. Noninferiority was estimated by comparing the confidence intervals with a delta of 10%. Student t and Mann-Whitney tests were used to assess the significance of any differences.

RESULTS:

The transfusion rate was zero in both groups; thus, noninferiority was demonstrated for the primary efficacy end point, suggesting equivalence. Noninferiority was also demonstrated for the secondary efficacy end points. Drain blood loss at twenty-four hours was 315.6 mL (95% confidence interval [CI], 248.5 to 382.7 mL) in the experimental group and 308.1 mL (95% CI, 247.6 to 368.5 mL) in the control group (p = 0.948, Mann-Whitney). Also, estimated blood loss at forty-eight hours was 1259.0 mL (95% CI, 1115.6 to 1402.3 mL) in the experimental group and 1317.9 mL (95% CI, 1175.4 to 1460.4 mL) in the control group (p = 0.837, Mann-Whitney). No significant safety differences were seen between groups.

CONCLUSIONS:

Topical administration of TXA according to the described protocol demonstrated noninferiority compared with intravenous TXA, with no safety concerns. This randomized controlled trial supports the topical intra-articular administration of TXA in primary total knee replacement with cemented implants.
Sublingual misoprostol is as effective as intravenous oxytocin to reduce intra-operative blood loss during cesarean delivery in women living at high altitude.

Gavilanes P¹, Morales MF, Velasco S, Teran E.

**Abstract**

Abstract Objective: To assess the effect of sublingual misoprostol compared to intravenous oxytocin for blood loss during cesarean delivery in women living at high altitude. Study design: In a randomized trial, conducted in Quito, Ecuador (2800 m above sea level), 100 women received either sublingual misoprostol (400 µg) or intravenous oxytocin (10 IU). Results: Bleeding in the misoprostol was no different than in the oxytocin group. Shivering was reported in 66% of women in the misoprostol group. Conclusion: Sublingual misoprostol might be a valid alternative to oxytocin reduce intra-operative blood loss during cesarean section in women living at high altitude.

Umbilical cord milking reduces need for red cell transfusions and improves neonatal adaptation in preterm infants: Meta-analysis.

Dang D¹, Zhang C, Shi S, Mu X, Lv X, Wu H.

**Author information**

- ¹Department of Neonatology, First Hospital of Jilin University, Changchun, China.

**Abstract**

AIM:

To assess effects of umbilical cord milking (UCM) on early blood pressure stabilization, hemoglobin (Hb), as well as incidence of transfusion and complications in preterm infants.

**METHODS:**

This meta-analysis was conducted by searching the Pubmed, EMBASE and Cochrane Library (until July 2014) databases. Any clinical trials, including randomized control trials, comparing UCM to immediate cord clamping (ICC) were analyzed.
RESULTS:

Six studies were included in this meta-analysis. In total, 292 preterm infants were treated with UCM, while 295 received ICC. Compared to ICC, UCM increased initial Hb significantly by 1.84 g/dL (weighted mean difference; 95%CI: 0.91-2.76; P < 0.0001) and decreased the incidence of transfusion with a pooled risk ratio of 0.74 (95%CI: 0.61-0.90; P = 0.002). Incidence of necrotizing enterocolitis (NEC), intraventricular hemorrhage (IVH) and mortality were significantly lower with UCM compared with ICC. Apgar score and temperature were not significantly different between the two groups.

CONCLUSIONS:

By facilitating the early stabilization of blood pressure, UCM at preterm birth was found to be comparatively safe and associated with lower blood transfusion exposure and lower incidence of IVH, NEC and death.


Blood transfusion in obstetrics.


Author information

- 1Department of Obstetrics and Gynecology, Lady Hardinge Medical College and Smt. Sucheta, Kriplani Hospital, New Delhi, India.

Abstract

Transfusion of blood and blood components is a common practice in obstetric wards but it is not without risk. The incidence of transfusion reactions varies from 4 in every hundred transfusions for non-haemolytic reactions to one in every 40,000 for haemolytic transfusion reactions. The physiological basis of blood transfusion is outlined in this article. Most of the donated blood is processed into components: packed red cells (PRBCs), platelets, and fresh frozen plasma (FFP) or cryoprecipitate. Various alternatives to blood transfusion exist and include autotransfusion, pre-autologous blood storage, use of oxygen carrying blood substitutes and intraoperative cell salvage. Despite the risks associated with transfusions, obstetricians are frequently too aggressive in transfusing blood and blood products to their patients. Acute blood loss in obstetrics is usually due to placenta praevia, postpartum blood loss and surgery related. An early involvement of a consultant obstetrician, anaesthetist, haematologist and the blood bank is essential. There are no established criteria for initiating red cell transfusions and the decision is purely based on clinical and haematological parameters, which have been discussed along with the general principles of blood transfusion in obstetrics and some practical guidelines.

PATIENT OUTCOMES


Impact of perioperative allogeneic red blood cell transfusion on recurrence and overall survival after resection of colorectal liver metastases.

Schiergens TS1, Rentsch M, Kasperek MS, Frenes K, Jauch KW, Thasler WE.
Abstract

BACKGROUND:

Perioperative allogeneic red blood cell transfusion has been conclusively shown to be associated with adverse oncologic outcomes after resection of nonmetastatic colorectal adenocarcinoma.

OBJECTIVE:

The aim of the study was to identify risk factors for a perioperative transfusion and to assess the effects of transfusion on survival after curative-intended resection of hepatic metastases in patients featuring stage IV colorectal cancer.

DESIGN:

This was an observational study with a retrospective analysis of a prospective data collection.

SETTING:

The study was conducted at a tertiary care center.

PATIENTS:

A total of 292 patients undergoing curative-intended liver resection for colorectal liver metastases were included in the study.

MAIN OUTCOME MEASURES:

Univariate and multivariate analyses were performed identifying factors influencing transfusion, recurrence-free survival, and overall survival.

RESULTS:

A total of 106 patients (36%) received allogeneic red blood cells. Female sex (p = 0.00004), preoperative anemia (p = 0.001), major intraoperative blood loss (p < 0.00001), and major postoperative complications (p = 0.02) were independently associated with the necessity of transfusion. Median recurrence-free and overall survival were 58 months. Allogeneic red blood cell transfusion was significantly associated with reduced recurrence-free survival (32 vs 72 months; p = 0.008). It was reduced further by administration of >2 units (27 months; p = 0.02). Overall survival was not significantly influenced by transfusion (48 vs 63 months; p = 0.08). When multivariately adjusted for major intraoperative blood loss and factors univariately associated, namely comorbidities, tumor load, and positive resection margins, transfusion was an independent predictor for reduced recurrence-free survival (p = 0.03).
LIMITATIONS:

These include the retrospective and observational design, as well as the impossibility to prove causality of the association between transfusion and poor outcome.

CONCLUSIONS:

In patients undergoing liver resection for colorectal liver metastases, perioperative transfusion is independently associated with earlier disease recurrence. This emphasizes appropriate blood management measures, including the conservative correction of preoperative anemia, the use of low transfusion triggers, and the minimization of intraoperative blood loss.


[Association of perioperative transfusion and postoperative complications after radical gastrectomy for gastric cancer].
[Article in Chinese]

Xiao H1, Ouyang Y1, Tang M1, Tang W1, Pan S1, Yin B1, Luo W1, Quan H1, Qiu X1, Zuo C2.

Author information

1Department of Gastric, Duodenal & Pancreatic Surgery, Affiliated Tumor Hospital, Xiangya Medical School, Central South University, Changsha 410013, China.
2Department of Gastric, Duodenal & Pancreatic Surgery, Affiliated Tumor Hospital, Xiangya Medical School, Central South University, Changsha 410013, China. Email: zuochaohui@vip.sina.com.

Abstract

OBJECTIVE:

To explore the association of perioperative homologous blood transfusion (packed red blood cell, PRBC) and postoperative complications after radical gastrectomy in patients with gastric cancer.

METHODS:

From October 2010 to July 2013, a total of 636 patients undergoing radical gastrectomy at Department of Gastric, Duodenal & Pancreatic Surgery at Hunan Provincial Tumor Hospital were divided into 2 groups according to perioperative blood transfusion (n = 170, 26.73%) or not (n = 466, 73.27%). Their clinicopathological data, such as age, gender, co-morbidities, surgical duration, intraoperative blood loss volume and pathological stage were retrospectively analyzed by case-control study model. And the transfusion group was further divided into subgroup by transfusion volume (total PRBC<3.0, 3.0-7.5 or >7.5 U) and timing (pre-, intra- or post-operative) to examine the association of transfusion volume and timing with postoperative complications by Logistic regression.

RESULTS:

Thirty-two patients suffered from complications in the transfusion group (18.82%). And it was significantly more common than that in the control group (10.09% (47/466), P < 0.01). Moreover, the complication
rate (33.33% (12/36) ) was obviously higher in the large transfusion volume group (PRBC>7.5 U) than with those in the moderate (15.53% (16/103), P = 0.02) and low groups (12.90% (4/31) , P = 0.04). Infection was more common along with the total amount of transfused blood (6.45% (2/31), 10.68% (11/103) and 19.44% (7/36) in the low, moderate and large transfusion group respectively). Yet the differences were insignificant (P = 0.22). There was no significant difference of complication rates among the pre-, intra- and post-operative transfusion group classified by transfusion time (P = 0.39). And the postoperative infection rates were also insignificantly different (P = 0.88). Further Logistic analysis revealed that perioperative transfusion (OR = 2.71, 95% CI: 1.40-5.27, P < 0.01) was an independent risk factor for postoperative complications after radical gastrectomy.

CONCLUSIONS:

Perioperative blood transfusion is significantly associated with postoperative complications after radical gastrectomy in patients with gastric cancer. And a positive correlation exists between infection and the amount of transfused blood. But there was no association between transfusion time and complications. Thus decreasing perioperative transfusion may reduce the incidence of postoperative complications and shorten the length of hospital stays.

PATIENT BLOOD MGMT/PROGRAMS


"Patient blood management" in orthopaedic surgery.
[Article in English, Spanish]


Author information

• 1Servicio de Cirugía Ortopédica y Traumatología, Hospital Cruz Roja, Madrid, España. Electronic address: ferccanillas@yahoo.es.
• 2GIEMSA, Medicina Transfusional Perioperatoria, Facultad de Medicina, Universidad de Málaga, Málaga, España.
• 3Servicio de Hematología y Hemoterapia, Hospital General San Jorge, Huesca, España.
• 4Servicio de Anestesiología y Reanimación, Hospital Clínico Virgen de la Victoria, Málaga, España.

Abstract

Orthopaedic and trauma surgical procedures (OTS) can lead to significant blood losses and acute postoperative anaemia, which in many cases requires allogeneic blood transfusions (ABT). The clinical, economic and logistical disadvantages of ABT have promoted the development of multidisciplinary and multimodal programs generically known as Patient Blood Management (PBM) programs, which have as their objective to reduce or eliminate the need for ABT and improve clinical outcomes. These programs are supported by the implementation of four groups of perioperative measures: (1) use of restrictive transfusion criteria; (2) stimulation of erythropoiesis; (3) reduction of bleeding; and (4) autologous blood transfusion. In this article, a review is presented of the effectiveness, safety and recommendations of applicable strategies in OTS, as well as the barriers and requirements to the development and implementation of PBM programs in this surgical specialty.
[Effects of multidisciplinary blood management strategy on transfusion and outcomes in patients undergoing valvular heart surgery].

[Article in Chinese]

Ji H1, Li Z2, Sun H1, Li L1, Long C1, Ma L1, Chen L1, Wang W1, Hu S1.

Author information

- 1State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100037, China.
- 2State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100037, China. Email: yuanfang6707@sina.com.

Abstract

To evaluate the effect of multidisciplinary blood management strategy in adults patients undergoing valvular heart surgery.

METHODS:

A multidisciplinary patient blood management (PBM) strategy was instituted in Fuwai Hospital since January 2009. It includes Establishment of a multidisciplinary blood transfusion management team and designation of a coordinator; Enactment perioperative transfusion triggers (Hb < 80 g/L) for adults patients undergoing cardiac surgery; recommendation of antifibrinolytics, cell salvage, reduced cardiopulmonary bypass circuit; setting up Blood Consumption Announcement and Scoring System, which regularly publishes notifications of blood volume consumed per case, per single procedure and per surgeon. Clinical date before and after multidisciplinary patient blood management strategy will be presented.

RESULTS:

A total of 3 951 consecutive patients underwent Valvular Heart Surgery were analyzed. 1 713 cases were in pre-PBM group, and 2 238 cases were in post-PBM group. Both incidence and average units of allogeneic red blood cell transfusion perioperatively in post-PBM group were decreased (28.5% vs 75.3%, P = 0.000, and 1.2 U vs 4.0 U, P = 0.000). The postoperative length of stay in hospital and incidence of pneumonia were reduced in post-PBM group (8.2 d vs 10.5 d, P = 0.02, and 2.7% vs 3.5%, P = 0.04). The post-PBM group had lower in-hospital mortality (0.6% vs 1.2%, P = 0.000).

CONCLUSION:

Multidisciplinary patient blood management strategy significantly reduced blood transfusion, morbidity and mortality in patients underwent valvular heart surgery. It save plenty of blood resources.
Evaluation of a new restricted transfusion protocol in neonates admitted to the NICU.

Nayeri F1, Nili F2, Ebrahim B3, Olomie Yazdi Z4, Maliki Z5

Author information

1. Neonatologist, Family Health Institute, Maternal- Fetal & Neonatal Research Center, Tehran University of Medical Sciences, Tehran, Iran. fnayeri@tums.ac.ir.
2. Neonatologist, Family Health Institute, Maternal- Fetal & Neonatal Research Center, Tehran University of Medical Sciences, Tehran, Iran. fnili@sina.tums.ac.ir.
3. Pediatrician, Family Health Institute, Breast Feeding Research Center, Tehran University of Medical Sciences, Tehran, Iran. BitaEbrahim@yahoo.ca.
4. Pediatrician, Oncologist, Vali-e-Asr Hospital, Tehran University of Medical Sciences, Tehran, Iran. mfnhrc@tums.ac.ir.
5. Pediatrician, Vali-e-Asr Hospital, Tehran University of Medical Sciences, Tehran, Iran. mfnhrc@yahoo.com.

Abstract

BACKGROUND:

Although transfusion is a common procedure for treating anemia of prematurity, there is no specific protocol for blood transfusion in premature newborns. So in this study we investigate whether application of a strict protocol has any statistically significant effect on reduction of blood transfusion.

METHODS:

In this study, first group admitted in NICU during 2005 - 2006 and the second group admitted during 2006 - 2007. Whereas in the first group the blood transfusion performed based on neonatologists’ opinion following consultations with a pediatric hematologist, blood transfusion in the second group was based on the Shannon's protocol.

RESULTS:

During 2005-2006, out of 206 cases, 71 cases (%34.5) underwent blood infusion. During 2006-2007, out of 211 cases, 56 (%26.5) received blood transfusion based on the Shannon's strict protocol. Although the number of cases decreased, no significant difference was found between the two groups (p= 0.07). Conclusion: Applying strict criteria alone is not effective in reducing the frequency of transfusion in infants

SURGICAL TECHNIQUES

Autologous Platelet-Rich Plasma Reduces Transfusions During Ascending Aortic Arch Repair: A Prospective, Randomized, Controlled Trial.

Zhou SF1, Estrera AL2, Loubser P1, Ignacio C1, Panthayi S1, Miller C 3rd3, Sheinbaum R1, Safi HJ3.

Author information

• 1Department of Anesthesia, University of Texas Medical School at Houston, Memorial Hermann Heart & Vascular Institute, Houston, Texas.
• 2Department of Cardiothoracic and Vascular Surgery, University of Texas Medical School at Houston, Memorial Hermann Heart and Vascular Institute, Houston, Texas. Electronic address: anthony.l.estrera@uth.tmc.edu.
• 3Department of Cardiothoracic and Vascular Surgery, University of Texas Medical School at Houston, Memorial Hermann Heart and Vascular Institute, Houston, Texas.

Abstract

BACKGROUND:

Blood conservation using autologous platelet-rich plasma (aPRP), a technique of whole blood harvest that separates red blood cells from plasma and platelets before cardiopulmonary bypass with retransfusion of the preserved platelets after completion of cardiopulmonary bypass, has not been studied extensively. We sought to prospectively determine whether aPRP reduces blood transfusions during ascending and transverse aortic arch repair.

METHODS:

We randomly assigned 80 patients undergoing elective ascending and transverse aortic arch repair using deep hypothermic circulatory arrest to receive either aPRP (n = 38) or no aPRP (n = 42). Volume of aPRP retransfused was 726 ± 124 mL. The primary end point was transfusion amount. Secondary end points were death, stroke, renal failure, pulmonary failure, and transfusion costs. Perioperative transfusion rate was defined as blood transfusions given during surgery and up to 72 hours afterward. The surgeon and intensivist were blinded to the treatment arm. Because an anesthesiologist initiated the protocol, the surgeon was not aware of aPRP collection, as this occurred only after the sterile drape was in place. In addition, because cell salvage was performed on all cases, differentiation in perfusionist activities (during spinning of aPRP) was not evident. Platelet, fresh frozen plasma, and cryoprecipitate intraoperative transfusions were performed only after heparin was reversed and the patient was judged as coagulopathic on the basis of associated criteria: cryoprecipitate transfusion for fibrinogen level less than 150 μg/dL, platelet transfusion for platelet count less than 80,000, and fresh frozen plasma when thromboelastogram test was suggestive or a partial thromboplastin time was greater than 55 seconds, and prothrombin time was greater than 1.6 seconds.

RESULTS:

Early mortality, stroke, and respiratory complications were similar between groups. Only acute renal failure was reduced in the aPRP group, 7% versus 0% (p < 0.014). Mean transfusion rate of packed red blood cells was reduced by 34%, fresh frozen plasma by 52.8%, cryoprecipitate by 70%, and platelets by 56.7% in the aPRP group (p < 0.02). Hospital length of stay (9.4 ± 5.3 days versus 12.7 ± 6.3 days; p < 0.014) and transfusion costs ($1,396 ± $1,755 versus $2,762 ± $2,267; p < 0.004) were reduced in the aPRP group.
CONCLUSIONS:

The use of aPRP reduced allogeneic transfusions during ascending and transverse aortic arch repair with deep hypothermic circulatory arrest. This translated to less acute renal failure, decreased length of stay, and lower transfusion costs. Further studies examining the coagulation factors of aPRP are required.

TRANSFUSION PRACTICE


Clinical gestalt and the prediction of massive transfusion after trauma.

Pommerening MJ¹, Goodman MD², Holcomb JB³, Wade CE⁴, Fox EE⁵, Del Junco DJ⁶, Brasel KJ⁷, Bulger EM⁸, Cohen MJ⁹, Alarcon LH¹⁰, Schreiber MA¹¹, Myers JG¹², Phelan HA¹³, Muskat P¹⁴, Rahbar M¹⁵, Cotton BA¹⁶; MPH on behalf of the PROMMTT Study Group.

Author information

- ¹Center for Translational Injury Research, University of Texas Health Science Center at Houston, United States; Division of Acute Care Surgery, Department of Surgery, University of Texas Health Science Center at Houston, United States. Electronic address: matthew.j.pommerening@uth.tmc.edu.
- ²Division of Trauma/Critical Care, Department of Surgery, College of Medicine, University of Cincinnati, United States. Electronic address: md-goodman@hotmail.com.
- ³Center for Translational Injury Research, University of Texas Health Science Center at Houston, United States; Division of Acute Care Surgery, Department of Surgery, University of Texas Health Science Center at Houston, United States. Electronic address: john.holcomb@uth.tmc.edu.
- ⁴Center for Translational Injury Research, University of Texas Health Science Center at Houston, United States; Division of Acute Care Surgery, Department of Surgery, University of Texas Health Science Center at Houston, United States. Electronic address: charles.e.wade@uth.tmc.edu.
- ⁵Division of Trauma and Critical Care, Department of Surgery, Medical College of Wisconsin, United States. Electronic address: kbrasel@mcw.edu.
- ⁶Division of Trauma and Critical Care, Department of Surgery, School of Medicine, University of Washington, United States. Electronic address: ebulger@u.washington.edu.
- ⁷Division of General Surgery, Department of Surgery, School of Medicine, University of California San Francisco, United States. Electronic address: mcohen@sfghsurg.ucsf.edu.
- ⁸Division of Trauma and General Surgery, Department of Surgery, School of Medicine, University of Pittsburgh, United States. Electronic address: alarconl@upmc.edu.
- ⁹Division of Trauma, Critical Care and Acute Care Surgery, School of Medicine, Oregon Health & Science University, United States. Electronic address: schreibm@ohsu.edu.
- ¹⁰Division of Trauma, Department of Surgery, School of Medicine, University of Texas Health Science Center at San Antonio, United States. Electronic address: myersjg@uthscsa.edu.
Abstract

INTRODUCTION:

Early recognition and treatment of trauma patients requiring massive transfusion (MT) has been shown to reduce mortality. While many risk factors predicting MT have been demonstrated, there is no universally accepted method or algorithm to identify these patients. We hypothesised that even among experienced trauma surgeons, the clinical gestalt of identifying patients who will require MT is unreliable.

METHODS:

Transfusion and mortality outcomes after trauma were observed at 10 U.S. Level-1 trauma centres in patients who survived ≥30 min after admission and received ≥1 unit of RBC within 6 h of arrival. Subjects who received ≥10 units within 24 h of admission were classified as MT patients. Trauma surgeons were asked the clinical gestalt question "Is the patient likely to be massively transfused?" 10 min after the patients arrival. The performance of clinical gestalt to predict MT was assessed using chi-square tests and ROC analysis to compare gestalt to previously described scoring systems.

RESULTS:

Of the 1245 patients enrolled, 966 met inclusion criteria and 221 (23%) patients received MT. 415 (43%) were predicted to have a MT and 551 (57%) were predicted to not have MT. Patients predicted to have MT were younger, more often sustained penetrating trauma, had higher ISS scores, higher heart rates, and lower systolic blood pressures (all p<0.05). Gestalt sensitivity was 65.6% and specificity was 63.8%. PPV and NPV were 34.9% and 86.2% respectively.

CONCLUSION:

Data from this large multicenter trial demonstrates that predicting the need for MT continues to be a challenge. Because of the increased mortality associated with delayed therapy, a more reliable algorithm is needed to identify and treat these severely injured patients earlier.

TRANSFUSION RISKS

Pediatr Crit Care Med. 2015 Feb 2. [Epub ahead of print]
Respiratory Dysfunction Associated With RBC Transfusion in Critically Ill Children: A Prospective Cohort Study.

Kleiber N1, Lefebvre É, Gauvin F, Tucci M, Robitaille N, Trottier H, Jouvet P, Ducruet T, Poitras N, Lacroix J, Emeriaud G.

Author information

• 1Division of Pediatric Critical Care Medicine, Department of Pediatrics, CHU Sainte-Justine and Université de Montréal, Montreal, Canada. 2Division of Hematology/Oncology, Department of Pediatrics, CHU Sainte-Justine and Université de Montréal, Montreal, Canada. 3Department of Preventive and Social Medicine, Université de Montréal and CHU Sainte-Justine, Montreal, Canada. 4Unité de recherche clinique appliquée, Research Center, CHU Sainte-Justine, Université de Montréal, Montreal, Canada.

Abstract

OBJECTIVE::

Respiratory complications associated with RBC transfusions may be underestimated in PICUs because current definitions exclude patients with preexisting respiratory dysfunction. This study aims to determine the prevalence and characterize the risk factors and outcomes of new or progressive respiratory dysfunction observed after RBC transfusion in critically ill children.

DESIGN::

Prospective cohort study of all children admitted over a 1-year period.

SETTING::

A multidisciplinary PICU in a tertiary pediatric university hospital.

PATIENTS::

Patients who received a RBC transfusion while in PICU.

INTERVENTIONS::

None.

MEASUREMENTS AND MAIN RESULTS::

Two independent adjudicators established the diagnosis of respiratory dysfunction. A respiratory dysfunction associated with transfusion was considered new if it appeared after the first RBC transfusion in PICU. A progressive respiratory dysfunction associated with transfusion was diagnosed if the respiratory dysfunction was present before the transfusion and the PaO2/FIO2 or the SpO2/FIO2 ratio dropped by at least 20% thereafter. Among 842 children admitted into the PICU, 136 received at least one RBC transfusion and were analyzed. Fifty-eight cases of respiratory dysfunction associated with transfusion (43% of transfused patients) were detected, including nine new respiratory dysfunction associated with transfusion (7%) and 49 progressive respiratory dysfunction associated with transfusion (36%). Higher severity of illness, multiple organ dysfunction syndrome prior to transfusion, and volume
(mL/kg) of RBC transfusion were independently associated with respiratory dysfunction associated with transfusion. A dose-response relationship was observed between transfusion volume (mL/kg) and the prevalence of respiratory dysfunction associated with transfusion. Patients with respiratory dysfunction associated with transfusion had more progressive multiple organ dysfunction and less ventilation-free and PICU-free days at day 28.

CONCLUSIONS:

Development of respiratory dysfunction associated with transfusion is frequent in PICU and occurs mainly in patients with prior respiratory dysfunction, who would not be identified using current definitions for transfusion-associated complications. A cause-effect relationship cannot be confirmed. However, the high prevalence and the serious adverse outcomes associated with respiratory dysfunction associated with transfusion suggest that this complication should be further studied.

Clin Orthop Relat Res. 2015 Jan 31. [Epub ahead of print]

Are Allogeneic Blood Transfusions Associated With Decreased Survival After Surgery for Long-bone Metastatic Fractures?

Janssen SJ¹, Braun Y, Ready JE, Raskin KA, Ferrone ML, Hornicek FJ, Schwab JH.

Author information

- ¹Department of Orthopaedic Surgery, Orthopaedic Oncology Service, Massachusetts General Hospital - Harvard Medical School, Room 3.946, Yawkey Building, 55 Fruit Street, Boston, MA, 02114, USA, steinjanssen@gmail.com.

Abstract

BACKGROUND:

Previous studies have shown that perioperative blood transfusion increases cancer recurrence and decreases patient survival after resection of primary malignancies. The question arises whether this association also exists in patients with already disseminated disease undergoing surgery for metastatic long-bone fractures.

PURPOSES:

We sought to determine whether perioperative allogeneic blood transfusion is associated with decreased survival after operative treatment of long-bone metastatic fractures after accounting for clinical, laboratory, and treatment factors. Secondarily, we aimed to identify potential factors that are associated with decreased survival.

METHODS:

We included 789 patients in our retrospective study who underwent surgery at two institutions for a pathologic or impending metastatic long-bone fracture. We used multivariable Cox proportional hazards regression model analysis to assess the relationship of perioperative allogeneic blood transfusion with survival, and accounted for patient age, sex, comorbidities, BMI, tumor type, fracture type and location, presence of other bone and visceral metastases, previous radiotherapy and systemic therapy, preoperative embolization, preoperative hemoglobin level, treatment type, anesthesia time, blood loss, duration of hospital admission, year of surgery, and hospital.
RESULTS:

Considering transfusion as an "exposure," and comparing patients who received transfusions with those who did not, we found that blood transfusion was not associated with decreased survival after accounting for all explanatory variables (hazard ratio [HR] 1.06; 95% CI, 0.87-1.30; p = 0.57). Evaluating transfusion in terms of dose-response, we found that patients who received more transfusions had lower survival compared with those who had fewer transfusions after accounting for all explanatory variables (HR per unit of blood transfused, 1.07; 95% CI, 1.02-1.12; p = 0.005). We found that age (HR, 1.02; 95% CI, 1.01-1.02; p < 0.001), comorbidity status (HR, 1.06; 95% CI, 1.01-1.10; p = 0.014), duration of hospital stay (HR, 1.02; 95% CI 1.00-1.03; p = 0.021), tumor type (HR, 1.71; 95% CI, 1.44-2.03; p < 0.001), and visceral metastases (HR, 1.59; 95% CI, 1.34-1.88; p < 0.001) were independently associated with survival.

CONCLUSION:

We found that exposure to perioperative allogeneic blood transfusion does not decrease survival, with the numbers available. However, our sample size might have been insufficient to reveal a small but potentially relevant effect. Our results do suggest a dose-response relationship; patients who received more transfusions had lower survival compared with those with fewer transfusions. Risk of death increased by 7% per unit of blood transfused.

Transfusion-related acute lung injury after transfusion of pooled immune globulin: a case report.


Abstract

BACKGROUND:

Transfusion-related acute lung injury (TRALI) is a severe transfusion reaction that manifests as acute respiratory compromise within 6 hours of the infusion of blood products. Intravenous immune globulin (IVIG) is prepared from large pools of human plasma and is commonly administered in the outpatient setting for the treatment of a wide range of diseases. As a plasma-derived blood product, IVIG may also cause TRALI, although reports of this are exceedingly rare.

CASE REPORT:

A 77-year-old female with common variable immune deficiency had been receiving IVIG since 1996 for infection prophylaxis. During a scheduled infusion, the patient developed hypertension and dyspnea, requiring increasing oxygen supplementation and subsequent intubation. Radiographic studies demonstrated the bilateral chest infiltrates, with no evidence of infection or circulatory overload. The patient was extubated after 24 hours and discharged several days later. The patient had not previously...
received this lot of IVIG and has since received further transfusions with different lot numbers of the same product without incident.

CONCLUSION:

This case report documents a case of TRALI after IVIG transfusion. While a very rare cause, this case furthers evidence that TRALI can occur after IVIG transfusion.


**Red blood cell transfusion increases the risk of thrombotic events in patients with subarachnoid hemorrhage.**

Kumar MA1, Boland TA, Baiou M, Moussouttas M, Herman JH, Bell RD, Rosenwasser RH, Kasner SE, Dechant VE.

**Author information**

- 1Department of Neurology, Hospital of the University of Pennsylvania, University of Pennsylvania, 3 West Gates Building, 3400 Spruce Street, Philadelphia, PA, 19104, USA, Monisha.Kumar@uphs.upenn.edu.

**Abstract**

**BACKGROUND AND PURPOSE:**

Red blood cell transfusion (RBCT) may increase the risk of thrombotic events (TE) in patients with subarachnoid hemorrhage (SAH) through changes induced by storage coupled with SAH-related hypercoagulability. We sought to investigate the association between RBCT and the risk of TE in patients with SAH.

**METHODS:**

205 consecutive patients with acute, aneurysmal SAH admitted to the neurovascular intensive care unit of a tertiary care, academic medical center between 3/2008 and 7/2009 were enrolled in a retrospective, observational cohort study. TE were defined as the composite of venous thromboembolism (VTE), myocardial infarction (MI), and cerebral infarction noted on brain CT scan. Secondary endpoints included the risk of VTE, poor outcome (modified Rankin score 3-6 at discharge), and in-hospital mortality.

**RESULTS:**

86/205 (42 %) received RBCT. Eighty-eight (43 %) had a thrombotic complication. Forty (34 %) of 119 non-transfused and 48/86 (56 %) transfused patients had a TE (p = 0.002). In multivariate analysis, RBCT was associated with more TE by [OR 2.4; 95 % CI (1.2, 4.6); p = 0.01], VTE [OR 2.3; 95 % CI (1.0, 5.2); p = 0.04], and poor outcome [OR 5.0; 95 % CI (1.9, 12.8); p < 0.01]. The risk of TE increased by 55 % per unit transfused when controlling for univariate variables. Neither mean nor maximum age of blood was significantly associated with thrombotic risk.
CONCLUSIONS:

RBCT is associated with an increased risk of TE and VTE in SAH patients. A dose-dependent relationship exists between number of units transfused and thrombosis. Age of blood does not appear to play a role.

MISCELLANEOUS


Complementary and Alternative Medicine for Gastroparesis.

Lee LA¹, Chen J², Yin J³.

Author information

- ¹Division of Gastroenterology and Hepatology, Johns Hopkins Integrative Medicine & Digestive Center, Johns Hopkins University School of Medicine, 2360 West Joppa Road, Suite 200, Lutherville, MD 21203, USA. Electronic address: llee12@jhmi.edu.
- ²Clinical Motility Lab, Division of Gastroenterology and Hepatology, Johns Hopkins University School of Medicine, 4940 Eastern Avenue, A-505, Baltimore, MD 21224, USA.
- ³Veterans Research and Education Foundation, VA Medical Center, 921 NE 13th Street, Oklahoma City, OK 73104, USA.

Abstract

Complementary and alternative medicine is of great interest to patients with gastrointestinal disorders and some will choose to ask their health care providers about those therapies for which some scientific evidence exists. This review focuses on those therapies most commonly used by patients, namely acupuncture/electroacupuncture and various herbal formulations that have been the focus of clinical and laboratory investigation. A discussion of their possible mechanisms of action and the results of clinical studies are summarized.