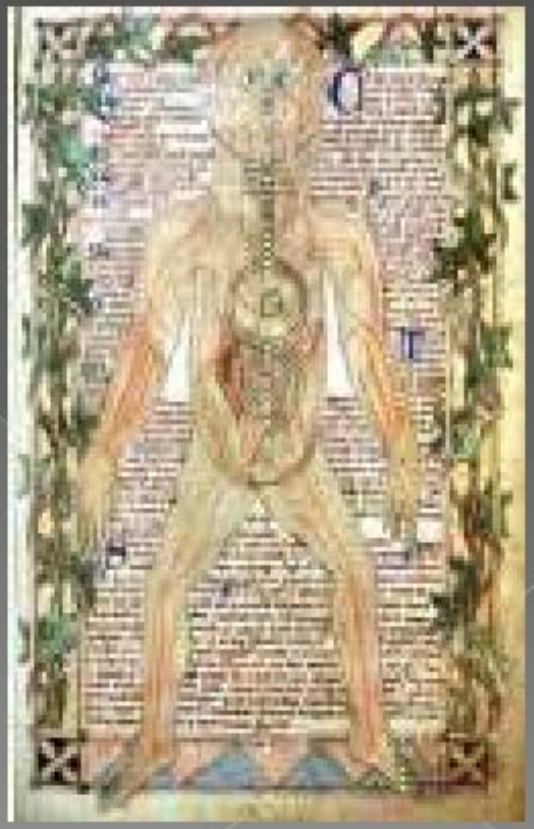
TERAPIA TRANSFUSIONAL

HOSPITAL PUERTO MONTT
Servicio Neonatologia 2015
Dra. María Inés Lagos

HIST

LA SANGRE: ELEMENTO MAGICO

- Desde la antigüedad distintos pueblos y culturas han atribuido a la sangre innumerables propiedades, al considerarla como un elemento vital y mágico.
- El antecedente de la transfusión fue la ingesta de sangre, de los enemigos o de los animales para adquirir fortaleza u otras cualidades.



HISTORIA DE LA TRANSFUSION SANGUINEA

- La medicina occidental apoyándose en la medicina galénica consideraba que la sangre contenía elementos vitales y que a través de su extracción podían eliminarse los humores malignos y con su infusión se componían los desórdenes del enfermo.
- La técnica de la sangría se estuvo realizando hasta el siglo XIX, bien por uso de flebotomías o la utilización de sanguijuelas y/o ventosas.

HISTORIA DE LAS TRANSFUSIONES

- El obstetra británico JAMES BLUNDELL se le atribuye la primera transfusión sanguínea en 1818 en mujeres con hemorragias postparto al mejorar las técnicas y utilizar instrumental más avanzado e insistir en el uso exclusivo de sangre humana.

DEFINICION

- Transferencia de componentes sanguíneos de donante a un receptor , para restablecer la función del componente en déficit.
- Es trasplante.
- Es indicación medica
- Concepto de sangre segura

155

ESTÁNDARES PARA OBTENCIÓN DE COMPONENTES SANGUÍNEOS y GESTIÓN DE INVENTARIO O STOCK

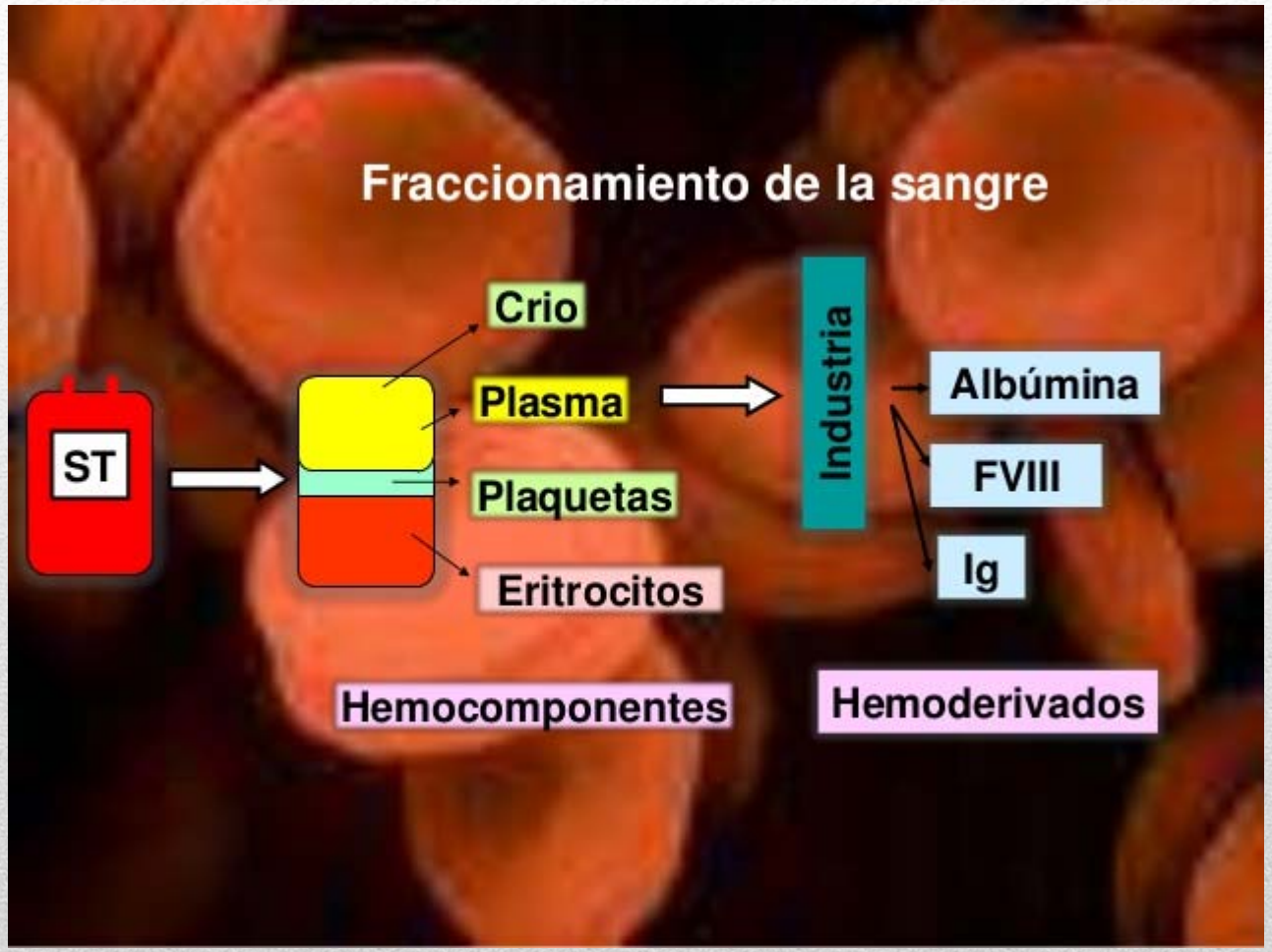
Ministerio de Salud
2013

Obtención y procesamiento

- **Obtención**
  - Fraccionamiento sangre total

- **Procesamiento**
  - **Inactivación viral (plasma)**
  - **Lavado**
  - Leucoreducción
  - Irradiación

Guía sobre transfusión de componentes sanguíneos y derivados Plasmáticos. Sociedad Española de Transfusión Sanguínea. 2010


Fraccionamiento de la sangre
ST
Crio
Plasma
Plaquetas
Eritrocitos
Industria
Albúmina
FVIII
Ig
Hemocomponentes
Hemoderivados

DONANTE

- Entrevista
- Voluntario
- No emparentado
- > 18 años
- > 50 kg : vol. Extraer 10-13% de peso

- VDRL
- VIH
- HEPATITIS B Y C
- ENF. CHAGAS
- HTLV I y II

TAMIZAJE DONANTE

- Tipificación ABO y Rh
- Estudio Ac contra Gl rojos
- Tipificación HLA

ESTUDIO SEROLOGICOS DONANTE

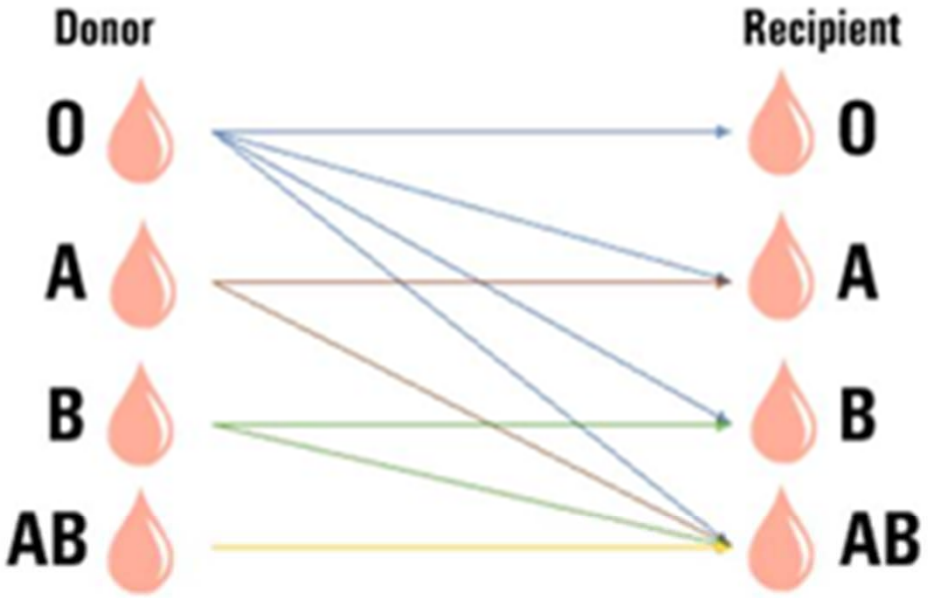
Sistema de grupo sanguíneo y aloantígenos

The ABO Blood System

Blood Type (genotype)	Type A (AA, AO)	Type B (BB, BO)	Type AB (AB)	Type O (OO)
Red Blood Cell Surface Proteins (phenotype)	 A agglutinogens only	 B agglutinogens only	 A and B agglutinogens	 No agglutinogens
Plasma Antibodies (phenotype)	 b agglutinin only	 a agglutinin only	 No agglutinin	 a and b agglutinin

Blood Group System	Antigen	Alloantibody	Clinical Significance
Rh (D, C/c, E/e)	RBC protein	IgG	HTR, HDN
Lewis (Le^a, *Leactivity='italic'>b*)	Oligosaccharide	IgM/IgG	Rare HTR
Kell (K/k)	RBC protein	IgG	HTR, HDN
Duffy (Fy^a/Fy^b)	RBC protein	IgG	HTR, HDN
Kidd (Jk^a/Jk^b)	RBC protein	IgG	HTR (often delayed), HDN (mild)
I/i	Carbohydrate	IgM	None
MNSsU	RBC protein	IgM/IgG	Anti-M rare HDN, anti-S, -s, and -U HDN, HTR

Abbreviation: RBC, red blood cell; HDN, hemolytic disease of the newborn; HTR, hemolytic transfusion reaction.

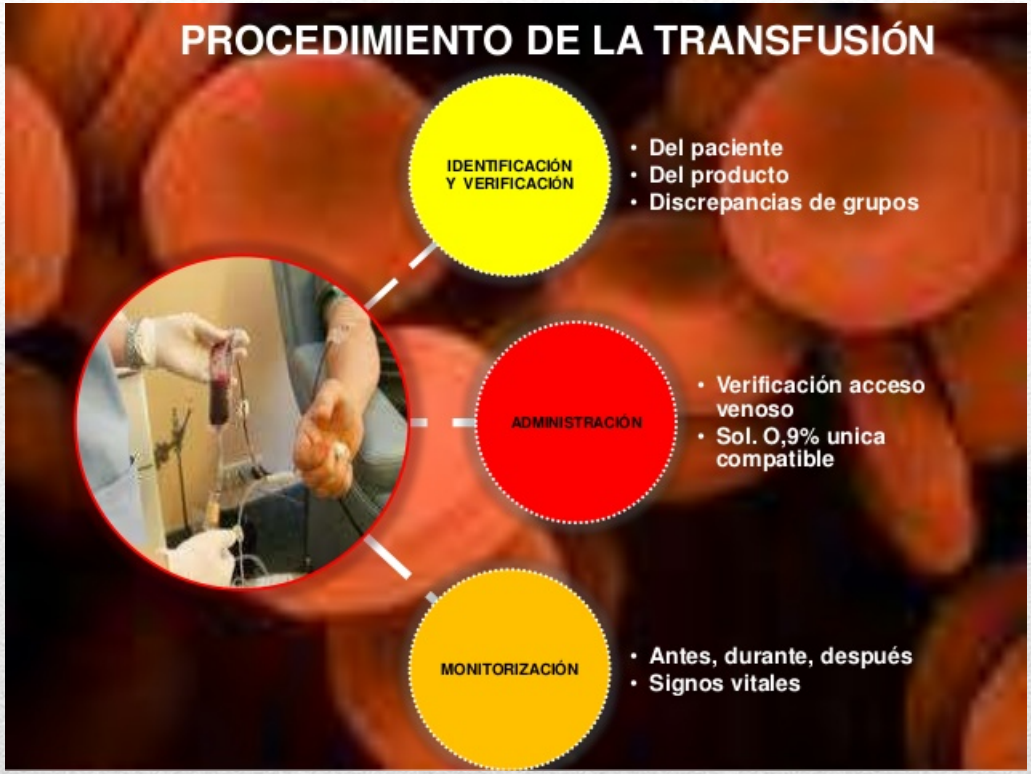

Donor
Recipient
O
A
B
AB
O
A
B
AB

SANGRE TOTAL

- Volumen: 450-550 ml Hemoglobina: 12 gr/dl, Hematocrito 35-45%
- Mezcla gl rojos y PFC
- Indicaciones:
  - Exsanguíneo transfusión en neonatos
  - Uso en máquina de circulación extracorpórea en niños menores de un año

GLOBULOS ROJOS

- Volumen: 300 ml Hematocrito: 55 - 75%
- Etiquetada y chequeada
- No mas de 30 minutos para inicio TGR
- Veloc. infusión 10 min. a 4 hrs.(60 ml/min)
- Monitorizar durante TGR. Pr. Arterial y FC cada 30 minutos.
- Entibiar solo si existe calentador de sangre.



Control matroneria

PRODUCTOS DESLEUCOCITADOS

- Prevenir reacciones febriles postransfusionales en pacientes politransfundidos y que hayan presentado al menos 2 reacciones febriles previamente
  - Prevenir inmunización a antígenos HLA en sujetos en quienes se esté programando un trasplante de médula ósea, o paciente que será politransfundido con GR o plaquetas
  - Prevención de infección por CMV (RN)

PRODUCTOS IRRADIADOS

- se obtiene sometiendo la unidad (glóbulos rojos o plaquetas) a irradiación gama (al menos 15cGy) utilizando irradiadores dedicados o equipos de radioterapia convencional.
- Está indicado su uso para prevenir la Enfermedad de Injerto versus Huésped (rn)

PLAQUETAS

- donante al azar . Se obtiene de 1 unidad de sangre total, tiene un volumen de 50-60 ml. Duran 5 días conservadas a 22 °C con agitación constante.
- donante único (aféresis). Se obtiene de un donante mediante procedimiento de aféresis, tiene un volumen 270-500 ml, y equivale a 6-10 unidades de donante al azar. Duran 5 días conservadas a 22 ºC con agitación constante
- Veloc. Infusion: 5-15 minutos
- 1 U cada 10 kg /peso.
- Con filtro

PLASMA FRESCO CONGELADO

- obtenida de 1 unidad de sangre total, congelada a menos de -25°C .
- Contiene niveles fisiológicos de todos los factores plasmáticos de la coagulación, albúmina e inmunoglobulinas. Volumen ± 200 ml .
- Dura 2 años a -30°C
- Veloc. Infusion : 30 minutos.

CRIOPRECIPITADO

- Se obtiene de una unidad de plasma fresco mediante congelación rápida y descongelación controlada.
- Contenido :
  - Factor VIII 80-120 U,
  - Factor von Willebrand 40-70%,
  - Factor XIII 20-30%,
  - Fibrinógeno 150-250 mg
  - Veloc infusion: 10-20 minutos.

COMPONENTE	VOLUMEN	CONTENIDO	CONSERVACIÓN	INFUSIÓN	COMPATIBILIDAD
Hematíes	230-330 ml/U	Hto: 55-65% Hb: >40 gr	35-42 días Tª: 2-6ºC	90-120min Máx. 4 hs	- ABO y Rh - Pruebas cruzadas
Plaquetas	250-300 ml/U	Plaquetas: >2,5 x 10^{11}	5-7 días Tª: 20-24ºC en agitación contínua	20-30 min Máx: 4 hs	No requiere
Plasma	200-300 ml ST 300-600 ml aféresis	Factores coagulación	Congelado: -30ºC Tras descongelar 6-8 hs Tª 1-6ºC	30-60 min	- ABO - No pruebas cruzadas

RAT

Reacciones hemolíticas inmunes:

- A. inmediatas : Causadas por incompatibilidad grupo clásico ABO.
  - Es altiro ,calor y dolor local, disnea, fiebre,calofrios , hipotensión.
  - Tto: suspender Tr. , cristaloide, mandar bolsa y muestra sangre de pacte a Bco. sangre.
- B. tardías :Causadas por anticuerpos preexistentes contra otros grupos antigénicos eritrocitarios.
  - Hemolisis 3-13 días postranfusion. Tto con pr. cruzadas

RAT

- 2. Reacciones no hemolíticas inmunes:
  - A. reacción febril transfusional : Por anticuerpos antileucocitarios, y anti-HLA. o presencia de citoquinas . Tto. detener Tr y usar filtro
  - B. reacción anafiláctica: Por anticuerpos contra proteínas, anti-Igs. Aumenta riesgo en pacte. con déficit Ig A. Tto. Antihistamínicos , corticoides , adrenalina y Tr lavadas
  - . enfermedad de injerto versus huésped: Linfocitos de donante responden contra aloantígenos del receptor. Tto. Irradiados. Factor riesgo:familiares.

RAT

- F. injuria pulmonar aguda inducida por transfusión (TRALI) Por anticuerpos anti HLA
- TRALI (Transfusión Related Acute Lung Injury) es grave, considerada una importante causa de muerte asociada a transfusión. Se han reportado casos de TRALI con todos los tipos de hemocomponentes

RAT TRALI

- la activación (priming) de neutrófilos o del endotelio vascular pulmonar por mecanismos inmunológicos .
- Diagnóstico : edema pulmonar no-cardiogénico con disnea, hipoxemia, hipotensión y ocasionalmente fiebre. La radiografía de tórax revela infiltrados bilaterales.
- Los síntomas aparecen entre 1 a 6 horas luego de la transfusión y se resuelven dentro de 48 horas.

RAT TRALI

- Tratamiento y prevención :
  - de soporte y debe ser manejado en una UCI . Puede requerir de ventilación mecánica.
  - No existe tratamiento específico
  - Sin embargo, considerando que el principal factor patogénico es la presencia de anticuerpos anti-HLA en los componentes transfundidos es recomendable no utilizar plasmas de donantes de sexo femenino.

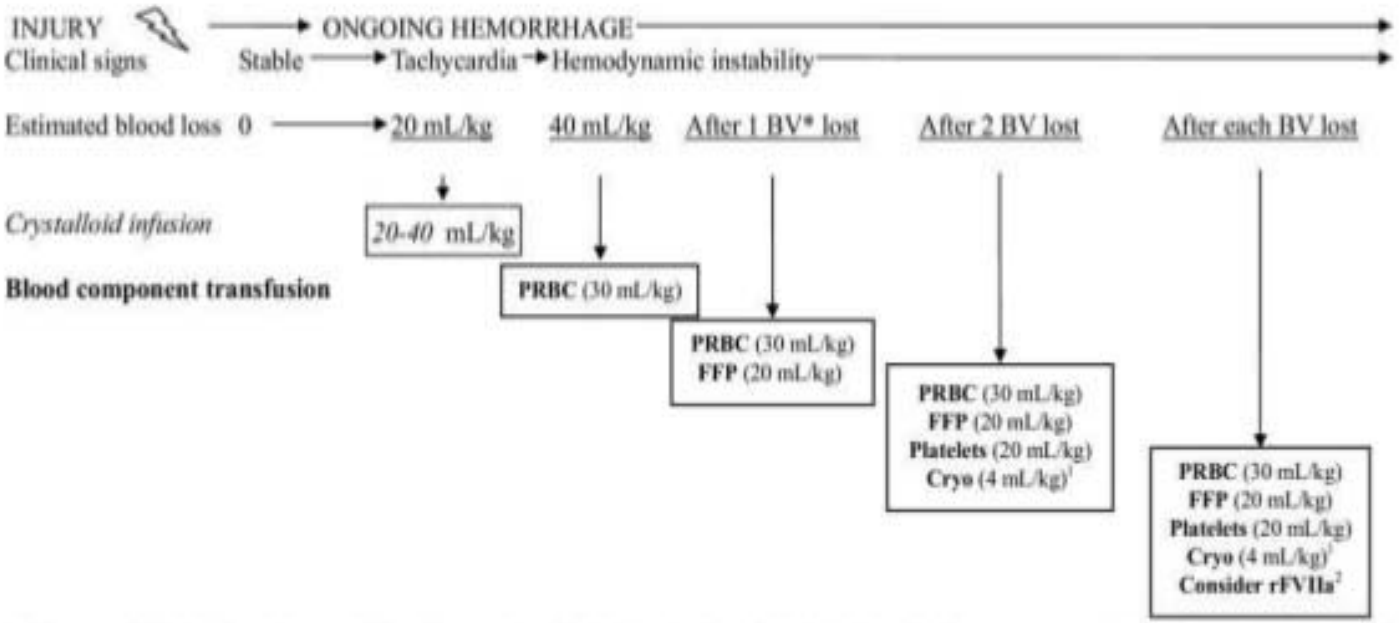
- 3. Reacciones no hemolíticas no inmunes:
  - A. Metabólicas : Hipocalcemia, Hiperpotasemia
  - B. Hemodinámicas : Sobrecarga circulatoria, edema pulmonar agudo cardiogenico, insuficiencia cardíaca congestiva
  - C. Infecciosas :HIV, Hepatitis B y C, Chagas, Sífilis, otras

RAT

ANTE LA SOSPECHA DE UNA REACCIÓN ADVERSA DURANTE LA TRANSFUSIÓN (AGUDA):

1. Detener la transfusión
2. Comunicarse con la Unidad de Medicina Transfusional (UMT)
3. Mantener vía venosa permeable
4. Tomar signos vitales
5. Verificar identidad del paciente versus etiqueta de la unidad
6. Conservar la unidad que será retirada por personal de la UMT
7. Comenzar con el tratamiento pertinente
8. Completar hoja de registro de reacción transfusional

Transfusión masiva



1. **Cryoprecipitate** at a volume of 4 mL/kg may be administered after administration of all three components (after estimated loss of two blood volumes) or if fibrinogen levels fall below 1-1.5 g/L.

2. Consider off-label use of recombinant factor VIIa (**rFVIIa**), 90 µg/kg, if ongoing bleeding persists after loss of 3 blood volumes.

For patients who weigh more than 30 kg, a 1:1:1 algorithm should be followed. Transfuse blood component volumes of 1 unit of **PRBCs** to 1unit of **FFP** to 1 unit of pooled **platelets**, as in adult protocols (see text).

Seminars in Pediatric Surgery (2010) 19, 286-291

J Pediatr Hematol Oncol. 2013 Apr;35(3):221-6. doi: 10.1097/MPH.0b013e318286d27e.

Predicting response to rFVIIa in neonates with intractable bleeding or severe coagulation disturbances.

Gkiougki E[1], Mitsiakos G, Chatziioannidis E, Papadakis E, Nikolaidis N.

⊕ Author information

Abstract

BACKGROUND: To date, clinical experience with recombinant factor VIIa (rFVIIa) in neonates is rather limited because of the lack of controlled studies. AIM: The objective of this study was to present further experience from our center with regard to the use of rFVIIa in newborns with severe bleeding or coagulopathy resistant to conventional therapy and to determine factors affecting the clinical outcome.

METHODOLOGY: We performed a retrospective data analysis of 29 neonates with intractable bleeding or severe coagulation disturbances. All patients received 100 μg/kg of rFVIIa per dose bolus intravenously (maximum of 23 doses), as rescue procedure after other interventions had failed to achieve hemostasis.

RESULTS: Fourteen neonates survived (group A), whereas 15 died (group B). There was no difference in birth weight, gestational age, and bleeding site and causes between the 2 groups. In the neonates who survived, rFVIIa had been administered earlier in the disease process (<24 h of beginning of bleeding) compared with those who died (P=0.009). In all 29 neonates, international normalized ratio was directly restored (from 2.99±1.4 before rFVIIa administration to 1.6±1.1 afterward, P<0.001) and prothrombin time and activated partial thromboplastin time were significantly decreased after administration of rFVIIa (from 28 to 16.4 and from 180 to 67, respectively; P=0.001 and 0.05, respectively). Blood products administered were significantly less in group A than in group B, as time from the beginning of bleeding to the administration of rFVIIa was significantly less in group A than in group B. Neither acute adverse events nor thromboembolic complications were observed.

CONCLUSIONS: In this neonatal group with intractable bleeding and/or severe coagulation disturbances, rFVIIa was more effective in early intervention as rescue therapy, without any adverse events in all neonates. Upon failure to achieve hemostasis with initial administration of blood products, fast intervention with rFVIIa could be considered in neonates with serious bleeding and coagulation disorders.

Anesthesiology. 2015 Apr;122(4):746-58. doi: 10.1097/ALN.0000000000000570.

Pharmacokinetics of tranexamic acid in neonates, infants, and children undergoing cardiac surgery with cardiopulmonary bypass.

Wesley MC[1], Pereira LM, Scharp LA, Emani SM, McGowan FX Jr, DiNardo JA.

Author information

Abstract

BACKGROUND: Tranexamic acid (TXA) is one of the most commonly used antifibrinolytic medications in children undergoing repair of congenital heart defects. However, a pharmacokinetics analysis of TXA has never been performed in neonates or young children undergoing complex cardiac surgeries using cardiopulmonary bypass, hypothermia, circulatory arrest, and ultrafiltration. A comprehensive pharmacokinetics study was performed in this patient population.

METHODS: Fifty-five patients ranging from 2 days through 4 yr old were categorized into three groups: children less than 2 months old, infants 2 months to 1 yr old, and children greater than 1 yr old and weighing up to 20 kg. TXA was given as a bolus of 100 mg/kg followed by an infusion of 10 mg · kg · h throughout the surgery. A dose of 100 mg/kg was placed in the cardiopulmonary bypass prime. A total of 16 to 18 samples were obtained from all patients throughout surgery. Plasma TXA concentrations were measured by high-performance liquid chromatography and modeled under a nonlinear mixed-effects framework with a two-compartment structural model.

RESULTS: Cardiopulmonary bypass had a statistically significant impact on all pharmacokinetic parameters. Age was a better covariate than body weight, affecting both the distribution and the elimination of TXA. However, weight performed well in some cases. Other covariates including body surface area, pump prime volume, ultrafiltrate volume, and body temperature did not improve the model.

CONCLUSIONS: This TXA pharmacokinetic analysis is reported for the first time in neonates and young children undergoing complex cardiac surgeries with cardiopulmonary bypass. Dosing recommendations are provided as guidance for maintaining desired target concentrations.

AUDITORIA TRANSFUSION

- 60 TRANSFUSIONES: abril-mayo-junio 2015
- 90% de acuerdo a norma.
- Hemoderivados:
    - 87 % gl. Rojos.
    - 5 % plaquetas,
    - 5 % PFC ,
    - 3 % Gl. Rojos+ plaquetas : (exsanguineotransfusion)
- Falta datos de Tr. Previas y RAT.
- Diagnósticos mas precisos y Fi O2.
- Fecha de nacimiento: mejor edad?

PROTOCOLO TRANSFUSIONAL PACIENTE PEDIATRICO Y NEONATAL 2015-2019

- Similar a la anterior .
- Agrega paciente con hemorragia.
- Protocolo Transfusión masiva (>40 ml/kg)
- RAT.

NORMA 2015

Database of Abstracts of Reviews of Effects (DARE): Quality-assessed Reviews [Internet].

Restrictive versus liberal red blood cell transfusion thresholds in very low birth weight infants: a systematic review and meta-analysis

Review published: 2014.

Bibliographic details: Ibrahim M, Ho SK, Yeo CL. Restrictive versus liberal red blood cell transfusion thresholds in very low birth weight infants: a systematic review and meta-analysis. Journal of Paediatrics and Child Health 2014; 50(2): 122-130. [PubMed]

Abstract

AIM: A systematic review was conducted to examine the effects of restrictive versus liberal red blood cell (RBC) transfusion thresholds on clinically important outcomes in very low birth weight (VLBW) infants.

METHODS: Randomised controlled trials (RCTs) of varying RBC transfusion thresholds in VLBW infants were identified by searching MEDLINE, EMBASE, CINAHL, all of the Cochrane Library and other supplementary sources. Selected studies included one of the following outcomes: total number of red blood cell transfusions, donor exposure rate, cranial ultrasonographically diagnosed brain injury, retinopathy of prematurity, bronchopulmonary dysplasia, necrotising enterocolitis or death. Studies to be included were selected by two reviewers who also assessed the risk of bias of each trial. Data extraction and analyses were independently performed by two reviewers. All data were analysed using RevMan 5.

RESULTS: Six RCTs were identified. One trial did not meet the inclusion criteria, while two had inadequate methodological quality. Pooled analysis of two trials showed that the restrictive transfusion group received a significantly lower mean number of transfusions per infant (mean difference (MD) -1.35, 95% confidence interval (CI) [-2.61, -0.09]) and donor exposure rate (MD -0.54, 95% CI [-0.93, -0.15]). No other statistically significant differences were observed.

CONCLUSION: Restrictive RBC transfusion thresholds in VLBW infants may be utilised without incurring clinically important increases in the risk of death or major short-term neonatal morbidities.

NORMA 2015

Cochrane Database of Systematic Reviews: Plain Language Summaries [Internet].

Early erythropoietin for preventing red blood cell transfusion in preterm, low birth weight infants, or preterm infants with low birth weight

This version published: 2014; Review content assessed as up-to-date: July 01, 2013.

Plain language summary

In newborn infants, the number of red blood cells in the circulation decreases after birth. In infants born before term this decrease is exaggerated by frequent withdrawal of blood, which may be necessary to monitor the infant's clinical condition. Therefore, infants born before term are likely to require transfusions of red blood cells. Low levels of erythropoietin (EPO), a substance in the blood that stimulates red blood cell production, in preterm infants provide a rationale for the use of EPO to prevent or treat anaemia. EPO can be given 'early' (before the infant reaches eight days of age) in order to prevent or decrease the use of red blood cell transfusions. A total of 2209 infants born before term have been enrolled in 27 studies that used this approach. Early EPO treatment reduced the number of red blood cell transfusions and donor exposures following its use. However, the overall benefit of EPO may not be clinically important as many of these infants had been exposed to red blood cell transfusions prior to entry into the trials. Treatment with early EPO did not have any important effects on mortality or common complications of preterm birth with the exception that EPO may increase the risk for retinopathy of prematurity, a serious complication that can cause blindness in babies born before term. Based on our findings EPO is not recommended for routine use in preterm infants.

NORMA 2015

Placental transfusion strategies in very preterm neonates: a systematic review and meta-analysis

Review published: 2014.

Bibliographic details: Backes CH, Rivera BK, Haque U, Bridge JA, Smith CV, Hutchon DJ, Mercer JS. Placental transfusion strategies in very preterm neonates: a systematic review and meta-analysis. Obstetrics and Gynecology 2014; 124(1): 47-56. [PubMed]

Abstract

OBJECTIVE: To investigate the effects of interventions promoting placental transfusion at delivery (delayed cord clamping or umbilical cord milking) compared with early cord clamping on outcomes among premature neonates of less than 32 weeks of gestation.

DATA SOURCES: A systematic search was conducted of PubMed, Embase, and ClinicalTrials.gov databases (January 1965 to December 2013) for articles relating to placental transfusion strategies in very preterm neonates.

METHODS OF STUDY SELECTION: Literature searches returned 369 articles with 82 considered in full. We only included data from studies with an average gestational age of less than 32 weeks of gestation enrolled in randomized trials of enhanced placental-fetal transfusion interventions (delayed cord clamping or umbilical cord milking) compared with early cord clamping.

TABULATION, INTEGRATION, AND RESULTS: We identified 12 eligible studies describing a total of 531 neonates with an average gestation of 28 weeks. Benefits of greater placental transfusion were decreased mortality (eight studies, risk ratio 0.42, 95% confidence interval [CI] 0.19-0.95, 3.4% compared with 9.3%, P=.04), lower incidence of blood transfusions (six studies, risk ratio 0.75, 95% CI 0.63-0.92, 49.3% compared with 66%, P<.01), and lower incidence of intraventricular hemorrhage (nine studies, risk ratio 0.62, 95% CI 0.43-0.91, 16.7% compared with 27.3%, P=.01). There was a weighted mean difference of -1.14 blood transfusions (six studies, 95% CI -2.01-0.27, P<.01) and a 3.24-mmHg increase in blood pressure at 4 hours of life (four studies, 95% CI 1.76-4.72, P<.01). No differences were observed between the groups across all available safety measures (5-minute Apgar scores, admission temperature, incidence of delivery room intubation, peak serum bilirubin levels).

CONCLUSIONS: Results of this meta-analysis suggest that enhanced placental transfusion (delayed umbilical cord clamping or umbilical cord milking) at birth provides better neonatal outcomes than does early cord clamping, most notably reductions in overall mortality, lower risk of intraventricular hemorrhage, and decreased blood transfusion incidence. The optimal umbilical cord clamping practice among neonates requiring immediate resuscitation remains uncertain.

NORMA 2015

Crit Care Med. 2014 Mar;42(3):675-90. doi: 10.1097/CCM.0000000000000176.

Transfusion in critically ill children: indications, risks, and challenges.

Parker RI[1].

⊕ Author information

Abstract

OBJECTIVE: To provide a concise review of transfusion-related issues and practices in the pediatric patient population, with a focus on those issues of particular importance to the care of critically ill children.

DATA SOURCE: Electronic search of the PubMed database using the search terms "pediatric transfusion," "transfusion practices," "transfusion risks," "packed red blood cell transfusion," "white blood cell transfusion," "platelet transfusion," "plasma transfusion," and "massive transfusion" either singly or in combination.

STUDY SELECTION AND DATA EXTRACTION: All identified articles published since 2000 were manually reviewed for study design, content, and support for indicated conclusions, and the bibliographies were scrutinized for pertinent references not identified in the PubMed search. Selected studies from this group were then manually reviewed for possible inclusion in this review.

DATA SYNTHESIS: Well-designed studies have demonstrated the benefit of "restrictive" transfusion practices across the entire age spectrum of pediatric patients across a wide spectrum of pediatric illness. However, clinician implementation of the more restrictive transfusion practices supported by these studies is variable. Additionally, the utilization of both platelet and plasma transfusions in either a "prophylactic" or "therapeutic" setting appears to be greater than that supported by published data.

CONCLUSIONS: The preponderance of prospective, randomized trials and retrospective analyses support the use of a restrictive packed RBC transfusion policy in most clinical conditions in children. Neonatal transfusions guidelines rely largely on "expert opinion" rather than experimental data. Current transfusion practices for both platelets and coagulant products (e.g., fresh-frozen plasma and recombinant-activated factor VII) are poorly aligned with recommended transfusion guidelines. As with adults, current transfusion practices in children often do not reflect implementation of our current knowledge on the need for transfusion. Greater efforts to implement current evidence-based transfusion practices are needed.

NORMA 2015


Tenemos la configuración diferente...
Si. Tú estás equipado con antena Wifi y yo con puerto USB