

# Paediatric Case Studies

2020-2022

You are free to use these examples in your teaching material or other presentations, but please do not alter the details as the copyright to this material belongs to SHOT

# Preterm baby received an adult platelet component

- *A preterm baby who had sepsis and low platelets required an emergency platelet transfusion*
- *An adult platelet component was incorrectly collected from the transfusion laboratory*
- *The neonatal intensive care unit team noted that the unit was much larger than usual and did not have the standard compatibility label*
- *As it was the same blood group as the patient it was decided to transfuse to the baby*
- *Part way through the transfusion the laboratory rang to inform the ward team of the error*
- *Of note the unit was not cytomegalovirus-negative*

# Failure to provide irradiated blood component for a potentially immunodeficient infant with DiGeorge syndrome

- *Clinicians failed to communicate the diagnosis of DiGeorge syndrome to the laboratory for a child who was a few months of age, and they did not receive irradiated red cells*
- *Of note the transfusion was urgent due to haematemesis*
- *The child had not previously been known to the hospital and no assessment of immune function was recorded*

# Management of abnormal results following exchange transfusion

- *A term neonate received an exchange transfusion for hyperbilirubinemia*
- *Following the procedure, the fibrinogen was found to have dropped to 0.8g/L*
- *The neonate was given cryoprecipitate but was well with no bleeding and with no invasive procedure planned*

# Failure to activate the major haemorrhage protocol (MHP)

- *A teenage patient was admitted with major bleeding*
- *There was a delay in provision of fresh frozen plasma due to the switchboard team activating two trauma calls rather than activating the MHP call*
- *This meant that a porter was not sent to collect the blood components*

# Management of iron deficiency

- *A teenager presented with symptomatic iron deficiency anaemia with a haemoglobin of 65g/L*
- *There was a delay in obtaining red cells due to problems with sample labelling, which resulted in the need for repeat samples and failure to request the red cells*
- *This caused many hours of delay before the first unit was commenced*

# Delay to provision of platelets

- *There was a delay in provision of platelets to a child with an acute lymphoblastic leukaemia*
- *This delay was due to communication issues around when the unit was required*
- *The prescriber had specified that apheresis platelets should be provided*

# Delay in provision of red cells for a child with sickle cell disease (SCD) due to incorrect exchange unit ordered

- *A young child with SCD required a red cell exchange*
- *A neonatal exchange unit was erroneously requested for the child*
- *This resulted in a delay in provision of the red cells*



# Error with infusion line clamps resulted in overtransfusion following cell salvage

- *During transfer from theatres to the paediatric intensive care unit the clamps on the infusion line were left open which resulted in an overtransfusion and at too high a rate*
- *The child required venesection/dilutional exchange to reduce the haemoglobin from 173g/L to 148g/L over the next 12 hours*

# Overtransfusion due to prescription of incorrect volume

- *One unit of red cells was prescribed for a child with neuroblastoma*
- *The increased volume compared to usual was noticed by the parent*
- *The reporter commented that a full red cell unit had been prescribed rather than 15mL/kg*
- *The child had received 290mL (25mL/kg)*

# Infusion pump programming error in a neonate

- *A preterm baby received red cell transfusion at only 1.4mL/hour instead of 5mL/hour for the first 2.5 hours of a transfusion*
- *The member of staff had not followed the unit policy of having a second check for pump programming*

# Transfusion-associated circulatory overload (TACO) following transfusion for severe anaemia in a neonate

- *A term neonate was born with a haemoglobin of 44g/L secondary to severe fetomaternal haemorrhage*
- *The neonate received an initial 18mL (5mL/kg) red cell transfusion via 'slow bolus' followed by 18mL/hr for 3 hours*
- *Between 2-6 hours following transfusion the neonate developed increasing respiratory distress requiring intubation and ventilation*
- *Furosemide was given with improvement in clinical status*

# Abdominal pain during transfusion

- *A young child developed abdominal pain part way through a transfusion and was subdued and lethargic*
- *No other symptoms were reported, and the pain had settled following defaecation and 30 minutes after the end of the transfusion the child was back to normal*
- *The team decided to give both chlorpheniramine and hydrocortisone prior to subsequent transfusions*

# Communication failure resulting in delay in provision of red cells

- *A preterm baby was born in a poor condition and required resuscitation*
- *The haemoglobin (Hb) on a blood gas was 50g/L*
- *Due to a communication error, the call for emergency blood was not received by the transfusion laboratory and no red cell units were provided before attempts at resuscitation were abandoned*

# Case of necrotising enterocolitis following transfusion

- *An extremely preterm baby with respiratory distress, sepsis (site unspecified) and hypoglycaemia developed falling oxygen saturation and became pale with distended, tense abdomen 7 hours following a red cell transfusion for severe anaemia*
- *The baby continued to deteriorate despite resuscitation and abdominal x-ray showed a perforation*
- *Death was felt to be possibly related to transfusion*
- *This was a suspected case of transfusion-associated necrotising enterocolitis*

# Hypotension during methylene blue-treated fresh frozen plasma (MB-FFP) infusion in child with pre-existing cardiac condition

- *A preterm baby developed significant hypotension and drop in oxygen saturation 5 minutes into an infusion of MB-FFP*
- *The baby responded to resuscitation*
- *Of note the baby had pre-existing fetal arrhythmia and reduced ventricular function so it is difficult to know the contribution of the pre-existing condition to the episode of hypotension*



# Alloimmunisation in a patient with thalassaemia resulting from failure to provide phenotype matched red cells

- *A teenager with thalassaemia had previously had red cell phenotyping performed*
- *There was no alert on the laboratory system indicating that this patient required phenotyped red cells and they were transfused with E-positive red cells*
- *The patient developed an anti-E*

# Lack of awareness of paediatric major haemorrhage protocol (MHP)

- *The paediatric MHP was activated in the emergency department (ED)*
- *The laboratory scientist was not aware that there was a separate protocol for children and advised the ED to contact the on-call consultant paediatric haematologist instead of preparing packs, resulting in a 20-minute delay in provision of the blood components*

# Calculation error that illustrates the pitfalls but also safety mechanisms that worked

- *An infant received an overtransfusion due to a calculation error*
- *The haemoglobin (Hb) was 68g/L and there was an error in calculating the required dose (mL) of red cells*
- *The registrar used g/L (68) to calculate the volume rather than g/dL still in use in this department (6.8)*
- *The intended amount therefore was a tenfold error (432mL rather than 43.2mL)*
- *A safety net on the formula states a maximum transfusion volume of 20mL/kg (170mL) therefore this is how much was prescribed*
- *The nurses checking prescription both stated they did not check the formula themselves*
- *After handover a different nurse realised patient had received 110mL (12mL/kg) and paused the pump as it is unusual to give more than 10mL/kg to a patient with liver disease*
- *Repeat testing showed Hb was 96g/L*

# Communication issues resulted in confusion about whether to utilise salvaged blood

- *Autologous re-transfusion was not performed for a teenager following scoliosis surgery despite the haemoglobin (Hb) being below the local postoperative transfusion threshold*
- *On review there had been uncertainty as to whether to give the transfusion of the salvaged blood to this patient and the blood expired before it could be transfused*

# Overtransfusion of a young child resulted in transfusion-associated dyspnoea (TAD)

- *A child with leukaemia had been correctly prescribed 10mL/kg of red cells over 1 hour*
- *However due to an error in the pump programming 40mL/kg was administered over 4 hours*
- *This resulted in tachycardia and increased respiratory rate*
- *This settled without any specific treatment and no chest X-ray was performed and thus did not meet the criteria for transfusion-associated circulatory overload (TACO)*
- *Both the nurses checking the transfusion were inexperienced in checking transfusions and one had not performed this role at the hospital before*

# Iatrogenic hyperkalaemia secondary to transfusion of large volume of irradiated red cells

- *An infant with Di-George syndrome with lymphopenia was taken to theatre for washout of infected cardiothoracic surgical wound*
- *The infant had a surgical complication and required urgent large volume, rapid red cell transfusion due to significant bleeding*
- *The red cell unit had been irradiated approximately 7 days previously*
- *The child developed abnormal electrocardiogram (ECG) secondary to hyperkalaemia from the transfused blood with an arterial blood gas showing a potassium of 8.5*
- *This was managed appropriately and the infant recovered and survived*

# Transfusion delay and death due to multiple factors

- *A young infant had a liver biopsy performed*
- *Post procedure they developed internal bleeding, and this was not noticed*
- *There was then a delay activating the major haemorrhage protocol and a delay in recognising the need for the neonatal O D-negative blood, which was available*
- *This resulted in a delay of over 3 hours before the infant received any red cells. This was partly due to communication issues*
- *The patient did not survive*

# Delay in recognising major haemorrhage

- *A 2kg infant was admitted to the emergency department (ED) overnight with rectal bleeding following a suction rectal biopsy which had been performed the day before*
- *There was history of 2 blood filled nappies at home and a further nappy in the ED which was filled with blood and clots*
- *There was a nearly 2-hour delay in obtaining intravenous (IV) access, including a delay in escalation to intra-osseous access*
- *The major haemorrhage protocol was not activated. The baby became significantly acidotic.*
- *During resuscitation the baby suddenly developed bleeding from the mouth and nose and had a cardiopulmonary arrest*
- *A chest X-ray performed shortly afterwards showed a 'white out'. Overall significant volumes of red cells and Octaplas® were given*
- *The child was transferred to Paediatric intensive care unit but did not survive*
- *Delays in recognising the severity of the bleeding and activation of the major haemorrhage protocol contributed to patient death*



# Infant with Di George syndrome received non-irradiated components

- *A young infant was transferred to a cardiac surgical centre for repair of a ventricular septal defect (VSD)*
- *Red cells were ordered in preparation for the surgery and the biomedical scientist (BMS) asked the clinicians if irradiated components were required. The conclusion was that there was a low risk of Di George and so non-irradiated units were issued*
- *The next morning the laboratory was informed that genetic testing had confirmed Di George syndrome and that the clinicians wanted components for future transfusions to be irradiated*

# Multiple non-irradiated components given to an infant with severe combined immunodeficiency (SCID)

- *An infant with suspected SCID, on paediatric intensive care unit (PICU) with seizures, diarrhoea and a cytomegalovirus (CMV) infection, was given five red cell transfusions before the transfusion laboratory were informed of the need for irradiated blood*
- *The intensive care medical staff were not aware of the need for irradiated components in this patient group*

# Overtransfusion of solvent detergent fresh frozen plasma (FFP) to a neonate

- *A bleeding neonate on cardiopulmonary bypass received 105mL of solvent detergent FFP instead of 15mL*
- *The reporter describes that the unit was not clamped after the bolus*

# Use of gravity for red cell transfusion in an infant

- *A neonate received an emergency red cell transfusion*
- *The unit was administered by gravity rather than via an infusion pump and the child was transferred to another hospital with a nurse escort who had no paediatric training*

# Use of anti-D Ig in a D-negative neonate who had received a D-positive platelet unit

- *A 500g neonate received a transfusion from an adult-specification unit of D-positive platelets due to clinical urgency*
- *Multiple discussions took place regarding the requirement for anti-D Ig for the baby*
- *The baby received 500IU of anti-D Ig via two intramuscular injections*
- *The neonatal team had given the standard adult prophylactic dose of anti-D Ig and the message that haematology and transfusion experts had been consulted had not reached the treating consultant*
- *No harm occurred; however, the team were not aware of the window of time that could be taken before administration and also that an intravenous (IV) formulation was available*

# **Incorrect blood results viewed for a child resulting in overtransfusion and transfusion-associated circulatory overload (TACO)**

- *A stable neonate whose haemoglobin (Hb) had been between 140g/L and 160g/L for several days was accidentally given a 10mL/kg transfusion based on the Hb results from a different child*
- *Following the transfusion, the neonate became hypertensive and desaturated. The Hb post transfusion was 211g/L on the gas machine and 177g/L in the laboratory*
- *The child underwent venesection/dilutional exchange and recovered*
- *During incident investigation, it was noted that the electronic records of several neonates were open at the same time, the hospital uses an electronic system which means a laptop on wheels is taken to each cot space*
- *The margin of error for looking at the wrong screen for the wrong patient is therefore quite high*