Annual SHOT Report 2017 – Supplementary information

Chapter 18c: Transfusion-Associated Dyspnoea (TAD)

Additional case studies not included in the main 2017 Annual SHOT Report

Case 18c.10: An elderly man with respiratory symptoms after transfusion

A man in his 90s developed fever during transfusion of red cells (2 units for anaemia, and 3 units of platelets) from 36.7 to 37.9°C but after medical review they decide to observe more carefully and slow the rate. After approx. 30-40 minutes he was heard to be working hard to breathe with wheezing, the respiratory rate had increased to 48/min so the transfusion was stopped. On examination he was found to have an upper airway wheeze, oxygen saturation of 96% on air, unable to talk due to increased respiratory rate, but no stridor. He was started on 1L of oxygen. He was very clammy, tachycardia of 120/min, an increase from baseline of 100. This patient was under urgent medical review in the medical admissions unit. He had a very complex medical history with multiple problems including dizziness and confusion. Investigations for several conditions were underway: possible opioid overdose, immune thrombocytopenia, possible intracranial haemorrhage, haematuria and non-ST-elevation myocardial infarction (NSTEMI). After review of patient notes it was noted he had multiple shortness of breath (SOB) episodes after exertion which settled with rest, oxygen and continued observation.

Further information from the hospital notes a similar episode the next day which was attributed to cardiac cause and it is now uncertain that this first episode was transfusion-related.

Case 18c.11: An elderly woman with reduced oxygen saturation during transfusion

A woman in her 80s with chronic obstructive airways disease, ovarian carcinoma receiving chemotherapy, ischaemic heart disease and hypertension was on treatment for a chest infection (baseline saturation 91% on 1L oxygen). She developed a reaction 15 minutes into the transfusion with a fall in her oxygen saturation to 80%. There was no change in respiratory rate; pulse increased from 75 to 90/min. After increased oxygen her saturation improved and she recovered. She had a moderate positive fluid balance of about 1L and was treated in addition with diuretic but there is no record of the impact of this. The Chest X-ray (CXR) before and after transfusion did not support a diagnosis of TACO.

Case 18c.12: A young woman reacts to a granulocyte infusion

A teenage girl, underlying diagnosis acute myeloid leukaemia with neutropenia and sepsis (positive blood culture before transfusion), had a reaction to a granulocyte infusion. She had already received 23 units in the previous 2 weeks. She was on IV antibiotics and had serious perianal inflammation.

She developed a reaction to two units of granulocytes, given in one transfusion episode. She was pyrexial pre transfusion and her temperature was broadly unchanged during the reaction 38.0 to 38.2°C at time of reaction (38.3 at 15 minutes). Her pulse rate did not change, pre 118 to 117 at time of reaction. Her blood pressure rose from 118/68 to 138/90 and her respiratory rate increased from 20 to 24/min. Oxygen saturation reduced to 95%. She reported chest tightening. There was

no serological evidence of red cell incompatibility. Blood culture was negative post transfusion. The clinical team felt that the signs and symptoms were related to the granulocyte transfusion and not to underlying condition/infection. She made a full recovery. This was not reported to the Blood Service. (Another reaction to granulocytes was reported separately as an allergic/febrile reaction). The outcome was to cease giving granulocytes 3 days later.

Case 18c.13: A young man with underlying lung disease (transfer from transfusion-associated circulatory overload (TACO))

A man in his 20s with a history of acute lymphoblastic leukaemia received a sibling allograft in 2010 complicated by chronic graft versus host disease (GvHD). He suffered a severe gastrointestinal (GI) bleed requiring transfusion support. Over a 16-hour period he received 6 units of red cells, 7 units of platelets, 4 units of fresh frozen plasma (FFP) and 1 unit of cryoprecipitate. He developed a tachycardia of 130/min and an increased respiratory rate to 40/min. His oxygen saturation (SaO_2) was 96% on 3L of oxygen which differed from baseline of P 100, SaO_2 96%. His respiratory rate was 18 after initial 4 units of platelets and 2 units of red cells. He was sedated and ventilated. He continued to have large GI bleeds. He had multiple existing lung pathologies related to GvHD and was ventilator-dependent until his death 9 days later.

The conclusion was chronic GvHD lung disease - fungal infections, aspergilloma, atypical mycobacterium. Multiple antifungal/antimicrobial/antiviral treatments. Poor respiratory reserve and long-term immunosuppressant treatment. Death was considered unrelated to the transfusion.

Case 18c.14: An elderly man with underlying lung disease developed dyspnoea during transfusion (transfer from TACO)

A man in his 70s was transfused after 5 days of haemoptysis. He was known to have pulmonary fibrosis diagnosed in 2015, which was progressive on CXR, and iron deficiency. Two thirds of the way through a third bag of red cells he complained of chest tightening and started to experience rigors, became short of breath, hypertensive, with pyrexia. His oxygen saturation dropped to 85% and crepitations could be heard on auscultation. The transfusion was stopped. He received 40 mg of IV furosemide with improvement, and 10 litres of oxygen. He recovered within 6 hours.

This was not considered strong evidence for TACO as pulmonary oedema was not proven (no CXR) but with unanticipated cardiovascular changes. There was no information about the fluid balance and improvement with diuretic. Could fulfil TACO criteria but low volume of blood given without other fluids or evidence of pre-transfusion overload.

Case 18c.15: Non-specific reaction to transfusion (transfer from TACO)

A woman in her 70s with known carcinoma of the lung was admitted after falling at home due to a stroke. She was bleeding from fungating lesion on the buttock. She was transfused (Hb 78g/L) 2 units of red cells. She developed an increase in pulse and blood pressure and but with no change in oxygen saturation or respiratory rate after the first unit. She had no specific treatment other than transfusing the second unit at a slower rate. She was in positive fluid balance to 500mL.

Comment: Difficult to attribute TACO with no CXR or clinical diagnosis of pulmonary oedema. Insufficient positive criteria for TACO and unable to exclude exacerbation of underlying condition.

Case 18c.16: An elderly woman develops respiratory problems postoperatively

A woman in her 90s with fractured neck of femur received a red cell transfusion for intraoperative bleeding (Hb 75g/L). She had pre-existing cardiac failure and was already in the intensive therapy unit (ITU). Ten minutes following the start of the unit she developed dyspnoea with a fall in oxygen saturation from 95% to 78%, rise in respiratory rate from 18 to 30/min and an increase in blood pressure (BP). Her temperature increased from 36.5 to 37.4°C but pulse rate changed from 100 to 80/min. The transfusion was stopped, the doctor attended, who noticed decreased air entry but no ankle oedema. She received furosemide with no change. She appeared agitated. The unit was stopped and returned to the laboratory for investigation but no abnormality was found. Diuretic therapy had no effect and the following day she was found to have a pulmonary embolus (PE) on computerised tomography (CT) scanning.

It is not known what the interval was between admission and surgery (high risk of thrombosis) so that it is possible that the PE contributed to the symptoms. However, the timing was in relation to the transfusion and she made a full recovery. Imputability: possible

Case 18c.17: A sick woman develops respiratory symptoms

An overweight (110kg) woman in her 30s, previously treated for acute promyelocytic leukaemia in 2006 (which might have resulted in some cardiac toxicity) was admitted to ITU after an out-of-hospital cardiac arrest related to myocarditis. She was intubated but not ventilated. She had renal failure, cardiac failure and was receiving total parenteral nutrition. She experienced a transfusion reaction with fever (38.4°C), increased respiratory rate (18 to 24/min), decreased oxygen saturation to 90%, increased systolic BP and a rash.

Although initially reported as TACO, there was no information about fluid balance or CXR findings. She was treated with diuretics the next day but not at the time. She made a full recovery and subsequently was transfused two more units each over 4 hours with no problems. The original transfusion was prescribed over 2 hours. The learning from this case locally was to ensure cardiac function was taken into account when planning transfusion.

Case 18c.18: Chest pain and breathlessness during platelet transfusion

A man in his 60s with acute myeloid leukaemia (AML) was receiving frequent platelet and red cell transfusions and was on ITU. He was being treated for sepsis with IV antibiotics and antifungal agents. The pre-transfusion CXR showed 'widespread infiltrate and patchy consolidation' the same as on the previous day. He had a reaction to platelets 3 days before of a similar nature and has since been premedicated with chlorphenamine and hydrocortisone. A platelet transfusion was started 20 minutes after premedication. The baseline observations were: temperature 36.6°C, BP 145/79; the respiratory rate was 20/min on 70% oxygen; pulse 65/min. Ten minutes after starting, the patient had chest pain. The respiratory rate increased from 20 to 44/min and the oxygen saturation dropped to 86%. Oxygen was increased to 100%. A doctor was informed and the platelet transfusion was stopped 15 minutes after the start. No other treatment was given and the patient stabilised within 30 minutes. The patient is known to be platelet refractory but has had no human leucocyte antigen (HLA) antibodies identified. The pre- and post-transfusion samples were compatible. The direct antiglobulin tests were positive both pre and post transfusion with IgG being weaker in the post result. Culture of the pack has shown no growth and patient blood cultures were negative. He recovered after increasing oxygen flow only.

Case 18c.19: An elderly lady becomes unwell during transfusion

A woman in her 80s with severe left ventricular failure and pericardial effusion was transfused as a day case. She became breathless with rise in respiratory rate from 16 to 35/min, her pulse rate increased from 88 to 94/min and she had a slight increase in BP (systolic 114 to 121) and a fever of 38.2^{o}C. Blood culture was negative. She was admitted and remained dyspnoeic for 9 hours and improved with furosemide. Fluid balance was not recorded and there was no evidence of pulmonary oedema on the CXR. The heart was noted to be extremely large but no change from 3 months previously. She died 4 days later unrelated to the transfusion.

Case 18c.20: A reaction that might have been TACO

A man in his 90s developed dyspnoea while waiting for transport home following transfusion so was admitted. He had received 2 units of red cells each over 2 hours. He had renal impairment, peripheral oedema and heart failure. His pulse increased from 71 to 86/min, his systolic BP 143 to 191, his oxygen saturation fell from 100 to 80% and his respiratory rate increased from 20 to 26/min. Crackles were heard on auscultation of the lungs. He improved after antihistamines and steroids and did not require diuretics. The outcome was to transfuse more slowly in future.

There was no information about fluid balance and no CXR, so not enough information to classify as TACO.