

Transfusion-Associated Dyspnoea (TAD) n=10

18c

Author: Paula Bolton-Maggs

Definition:

TAD is characterised by respiratory distress within 24 hours of transfusion that does not meet the criteria for transfusion-related acute lung injury (TRALI) or transfusion-associated circulatory overload (TACO) or allergic reaction. Respiratory distress in such cases should not be adequately explained by the patient's underlying condition (International Society of Blood Transfusion (ISBT) definition).

Key SHOT messages

- Most patients classified as TAD are very unwell with complicating pathology. Some of these had features suggestive of TACO but not enough reported detail to meet the SHOT criteria
- The pathophysiology of this group of complications requires further elucidation (Badami et al. 2015). There is some evidence that patients with sepsis are more at risk of respiratory complications following transfusion (Roubinian et al. 2015), a reminder that every transfusion, particularly of platelets, a rich source of biological response modifiers, (Garraud et al. 2013; Garraud et al. 2016), should be reviewed to ensure it is indicated

Ten cases are included, 2 reported as TAD, 3 transferred from TACO, 1 from acute transfusion reactions (ATR) and 4 from TRALI. Three cases were transferred from TAD to other categories, one to TACO and 2 to ATR.

Deaths n=0

There were no deaths related to transfusion in this category.

Major morbidity n=6

Six patients suffered major morbidity and are described in the case studies below.

Case details

Case 18c.1: A sick man reacts to a platelet transfusion

A 70-year-old man with acute myeloid leukaemia on chemotherapy with renal impairment became unwell at the end of a platelet transfusion (second pool) for epistaxis. He developed pyrexia and rigors and was considered to have possible sepsis. His respiratory rate (RR) increased from 17 to 36/min and he received oxygen (O₂) and bronchodilators with improvement in his clinical condition. He had a negative blood culture. His chest X-ray (CXR) was normal.

Case 18c.2: Respiratory distress with transfusion after surgery

A 66-year-old man developed acute respiratory distress, tachycardia and raised blood pressure (200/100mmHg) during red cell transfusion following elective surgery.

Around 01:30 he screamed for a nurse and was holding his abdomen. Analgesics were prescribed. At the same time he became wheezy and had chest pain. The RR was 40/min, blood pressure

202/100mm/Hg, pulse rate increased from 97 to 138 beats per minute, temperature was 37°C and oxygen saturation reduced to 90%. He was treated with oxygen and a bronchodilator and settled. A CXR showed signs of 'flash pulmonary oedema' thought to be associated with the transfusion of red cells.

Case 18c.3: A cardiac patient developed respiratory symptoms during transfusion

A 72-year-old man was transfused two units of red cells for a low haemoglobin (Hb) on the critical care unit (under care of cardiology). He had a history of ischaemic heart disease with three stents and a previous myocardial infarction, and was now generally unwell with diarrhoea. He had renal impairment and some evidence of heart failure. Changes to respiratory function and increased oxygen requirement were noted. A CXR showed early pulmonary oedema. Transfusion was completed at 19:00 and at 23:00 pO₂ dropped to 6.9. His oxygen requirement increased from 40% via facemask to 60% and then to 15L via facemask. He was given 40mg intravenous (IV) furosemide x 3 and passed 1580mL urine. TRALI was considered as a possible cause for the patient's ongoing symptoms following discharge from critical care. The TRALI expert panel concluded that the respiratory failure was more likely to be explained by the presence of heart failure, sepsis and TACO but there were not sufficient criteria for this latter diagnosis.

Case 18c.4: Influenza, septic shock and respiratory deterioration

A 30-year-old woman who was in intensive care with bilateral pneumonia related to H1N1 influenza and group A streptococcus septic shock developed respiratory distress during a second unit of red cells. She had some evidence of left ventricular and renal dysfunction related to her sepsis. Her CXR showed 'appearance compatible with overwhelming atypical pneumonia' and was the same after the reaction. Her pulse rate increased from 100 to 160bpm, her blood pressure increased and her respiratory rate increased from 19 to 50/min. She required oxygen and support with continuous positive airway pressure (CPAP). She had a diuresis of more than a litre after furosemide and was also treated with nitrates and diamorphine.

Case 18c.5: Unusual and unexplained respiratory deterioration after fresh frozen plasma (FFP) and cisplatin for malignancy

A 41-year-old woman was admitted with wheeze and cough and respiratory failure requiring admission to the intensive therapy unit (ITU) two days after treatment with two units of FFP and cisplatin. She initially had been treated for tumour-related (no detail given of primary) disseminated intravascular coagulation with raised d-dimers. The cause of the respiratory symptoms was unclear. A computerised tomography (CT) scan showed diffuse ground glass appearance. She responded to non-invasive treatment with a bronchodilator, oxygen and dexamethasone.

Case 18c.6: Respiratory complications with features of circulatory overload and infection

A 70-year-old woman with aplastic anaemia became unwell with shortness of breath following a platelet and a two-unit blood transfusion and required nebuliser and oxygen support 4.5 hours after completing the transfusion. Her oxygen saturation deteriorated from 95 to 84% with little change in respiratory rate, pulse, or blood pressure. She had mild fever of 37.4°C. She was treated with oxygen to 2L and her saturation improved to 94%. She was in positive fluid balance (1978mL) and had a diuresis of 4700mL following furosemide. Her respiratory rate remained between 18 and 20/minute and she continued on oxygen to maintain her saturations.

The donors of red cells and platelets were investigated and the results did not support antibody-mediated TRALI. The transfusion service also reported that the patient had strong human leucocyte antigen (HLA) antibodies and platelet autoantibodies. Pre-transfusion CXR three days prior to transfusion showed shadowing of right upper lobe 'query lung infection'. Post-transfusion CXR showed widespread pulmonary infiltrates and CT scan concluded that there was interstitial disease, possibly due to infection and other causes. HLA-matched blood was recommended for the patient due to poor platelet increment. However she died, unrelated to the transfusion events, eight days later.

Case 18c.7: A reaction to platelets probably associated with HLA antibodies

An elderly lady with myelodysplastic syndrome experienced breathlessness with reduced oxygen saturation 45 minutes after a platelet transfusion (pooled, in additive 70%). This necessitated admission to the ITU. There were no details of fluid balance; there was no improvement with furosemide. The donor was an untransfused male and the patient was found to have HLA antibodies which were thought to be responsible. Since this episode she has received HLA-matched platelets.

Case 18c.8: Respiratory deterioration after massive haemorrhage with some features of TACO

A 41-year-old woman developed signs of intraperitoneal haemorrhage three days following oocyte retrieval. This operation had been covered with IV heparin because she was known to have thrombophilia (factor V Leiden) and was on long term oral anticoagulation prior to surgery. The heparin was stopped on the day of haemorrhage. She experienced major haemorrhage and during resuscitation received four units of red cells, eight of FFP, a unit of platelets and 766mL of salvaged blood. In addition she received 1900mL of other fluids. She developed reduced oxygen saturation and tachypnoea within six hours and required CPAP, was transferred to the high dependency unit for seven days. CXR showed 'pneumonia in both midzones and fluid on the left indicating possible transfusion-related acute mediastinal lung injury'. TRALI investigations were negative. She was febrile without tachycardia. She improved with the IV fluids and did not receive diuretics. She improved slowly and was on CPAP for four days.

Case 18c.9: Respiratory deterioration after transfusion of red cells

A 71-year-old man (who had a hemihepatectomy for metastatic carcinoma) developed a reaction 25 minutes after starting a transfusion of red cells. At the first assessment there were no objective abnormal signs, but after restarting the transfusion further symptoms resulted in cessation of the unit. His oxygen saturation fell for several hours. A CXR showed some increased shadowing. He deteriorated despite treatment with bronchodilators and oxygen and required transfer to the ITU for two days. No further details were given.

Case 18c.10: Probable fluid overload in a man with severe liver disease

A 48-year-old man with serious alcoholic liver disease was awaiting transplant. He had refractory ascites and hydrothorax which was drained every week. Following difficulty with ascitic drainage he developed abdominal pain and was admitted the next day to the intensive care unit. He was thought to have internal bleeding. Siting of a chest drain was followed by massive haemorrhage (requiring transfusion of 12 units of red cells, 10 of FFP, three platelet doses, eight units of cryoprecipitate and additional albumin solution). The day following this fluid balance (excluding blood components) was +2.5L. Later in the day he was noted to have a low platelet count of $55 \times 10^9/L$ and international normalised ratio (INR) of 2, so one unit of FFP and one of cryoprecipitate were administered using pressure bags. He then developed respiratory compromise. His oxygen saturation fell from 93 to 80% (on 35% FiO₂), respiratory rate increased from 16 to 30 breaths per minute and his pulse rate was 130 beats per minute. A CXR afterwards showed left-sided pulmonary oedema. He had 1.5L drained via a surgical chest drain 2.5 hours before the reaction. He was put on CPAP and continuous veno-venous haemofiltration to remove fluid as he had inadequate renal function. He improved with this treatment but died 10 days later from his underlying disease. This may have been transfusion-associated circulatory overload but there was not sufficient information to classify as this at the time of reporting.

References

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