Background

Transfusion-associated circulatory overload (TACO) is the leading cause of death following transfusion reported by the UK Serious Hazards of Transfusion (SHOT) report in 2016. Risk factors for TACO include older age, heart failure, treatment with diuretics, pre-existing pulmonary or peripheral oedema or positive fluid balance, undiagnosed respiratory symptoms, renal and liver impairment and hypoalbuminaemia. We sought to identify whether patients with risk factors for TACO were identified and managed appropriately and whether those who developed features of TACO were diagnosed, treated and reported accordingly.

Methods

Hospitals throughout the UK were invited to participate. Inpatients and outpatients aged 60 years and over who had received a red cell transfusion were audited in 153 sites throughout the UK during March and April 2017. Data were collected on: patient demographics, indication for transfusion, rate and volume of transfusion, risk factors for TACO and any subsequent features of TACO.

Results

80% (122/152) NHS Trusts in England participated: 2428 inpatient and 2075 outpatient transfusion episodes were audited. Mean age of transfused patients was 78 years. Inpatient transfusions were predominantly in general medicine (48%) and general surgery (29%) with 9% occurring on ITU. Outpatient transfusions occurred most commonly in haematology (67.4%) and oncology (16.4%). The most common indication for transfusion was symptomatic anaemia in a stable patient (inpatients, 31%) and chronic transfusion dependent anaemia (outpatients, 46.7%). Excluding patients with active bleeding and haemodynamic instability (20.3% of all transfusions) and exchange transfusions (0.1% of all transfusions), the median number of red cell units transfused per transfusion episode was 2.

Only 61% of inpatients and 23% of outpatients had a weight documented pre-transfusion. 32% of inpatients had a completed fluid balance in the 24 hours prior to transfusion. Notably, 84% (2032/2428) of inpatients had an additional risk factor for TACO (over and above age). 1409/2032 (69%) of inpatients at risk had at least one measure taken to reduce risk of TACO. Fewer than 1% (21/2428) of inpatients were documented by their own medical teams as being at risk of TACO.

3214 patients had more than 1 unit of red cells transfused and for 13% (433/3214) there was evidence of clinical review after every unit.

38% (932/2428) of inpatients and 59% (1228/2075) of outpatients had a complete set of observations, including respiratory rate and oxygen saturations pre transfusion, at 15-20 minutes and following the transfusion.

2% (34/2075) of outpatients were admitted within 24 hours of the transfusion; 7/34 (21%) with respiratory symptoms. 135/2428 (6%) inpatients and 13/2075 (0.6%) outpatients developed features indicative of TACO (using SHOT criteria). 13/148 (9%) of these patients were diagnosed with TACO, but none were reported to SHOT as having developed TACO.

Overall mortality at a median of 45 days follow up (range 0 to 117 days) was 276/2428 (11%) in inpatients and 7/2075 (0.3%) in outpatients. Transfusion was not thought be implicated in 263/276 inpatient deaths but thought possible in two cases (unknown for 11). Transfusion was not thought to be implicated in any of the 7 deaths occurring in patients who had their transfusion as outpatients.

Discussion

This national audit shows patients with risk factors for TACO were not identified as high risk prior to transfusion. The majority of audited patients had at least 2 risk factors for TACO but <1% were identified as such. Most patients did not have additional measures taken to reduce the risk of TACO, such as careful fluid balance monitoring and a clinical review after each unit. In those developing features of TACO, few were diagnosed by clinical teams and even fewer were reported to SHOT. Despite the under-recognition of TACO, transfusion was not felt to be contributory in any death that occurred during the audit.

TACO continues to be an under recognised complication of transfusion. The recent 2016 SHOT report includes a checklist for TACO and subsequent measures to reduce the risk. Improved awareness of TACO among clinical teams is required which will require national and local measures including better education, electronic decision support and better reporting.

Disclosures: No relevant conflicts of interest to declare.