**Transfusion-associated circulatory overload (TACO)**

**Draft revised reporting criteria**

*International Society of Blood Transfusion*

*Working Party on Haemovigilance*

*in collaboration with*

*The International Haemovigilance Network*

**These proposed surveillance reporting criteria represent a revision of the previous international TACO definition published by the International Society for Blood Transfusion Haemovigilance working party and International Haemovigilance Network:** <http://www.isbtweb.org/fileadmin/user_upload/Proposed_definitions_2011_surveillance_non_infectious_adverse_reactions_haemovigilance_incl_TRALI_correction_2013.pdf>

**Rationale for the revision**

At the Amsterdam meeting of the ISBT haemovigilance working party (2013), a number of members requested revision of the TACO definition. Notably, strict application of the definition leads to non-acceptance of cases which would be accepted as TACO by clinicians and by some haemovigilance systems.

A draft revised version was circulated in December 2014 and tested by contributors from haemovigilance systems in several countries and continents by applying it to their own cases. This definition was found to be more inclusive than the 2011 version but limited by the weight placed on enlargement of the cardiac silhouette and increase of BNP – both are often not investigated or not recorded in haemovigilance reports.

The revision group recognises that the chief priority is to adopt standard reporting criteria which will enable professionals to raise awareness of TACO and lead to improved reporting, research and reduction of transfusion complications. The revision group includes representatives from AABB, and this opens possibilities for harmonisation. In future, the criteria may need to be adjusted in the light of accumulating evidence.

**The revision group** (listed alphabetically)

Chester Andrzejewski, Paula Bolton-Maggs, Sharran Grey, Kevin Land, Harriet Lucero, Mark Popovsky, Philippe Renaudier, Pierre Robillard, Matilde Santos, Martin Schipperus, Dafydd Thomas, Barbee Whitaker, Johanna Wiersum-Osselton (convenor).

**Proposed standard reporting criteria (2017)**

**Transfusion-associated circulatory overload (TACO)**

**Context**

* The term transfusion-associated circulatory overload or TACO indicates that there is a *temporal* association with blood transfusion. The imputability, the *causal* contribution of the transfusion, is assessed separately.
* Certain clinical conditions, e.g. cardiovascular, renal, pulmonary diseases and severe anemia, are risk factors for TACO. These conditions do not preclude a diagnosis of TACO.
* Other fluids given before or around the time of the transfusion contribute to and can exacerbate the fluid challenges posed by transfusion. The volume of transfused products may constitute only a percentage of fluids administered overall.
* Patients with TACO cardinally manifest respiratory system-related signs and symptoms such as tachypnea, dyspnea, and decreased oxygen saturations, typically occurring during or within 12 hours of transfusion.
* Close monitoring of the patient and the vital signs during transfusion are important; review of vital sign values/net fluid balance for at least 24 hours prior to the transfusion of the unit identified with the reaction may be of value.
* An increase of blood pressure and tachycardia may be warning signs; appropriate clinical management may prevent development of TACO.
* Radiographic chest imaging of adequate quality at the time of the reaction is an important means of gaining diagnostic information and should be considered. However, cases without chest imaging may be reported as TACO providing other features are present.

Patients with TACO may experience an increase in body temperature. An increase of body temperature should be investigated according to protocol and clinical judgement. Increased body temperature does not exclude TACO if the reporting criteria are met.

Patients receiving ventilatory support: In ICU patients who may be receiving varying degrees of PEEP (positive end expiratory pressure) ventilatory support, pulmonary oedema may be difficult to diagnose at higher PEEP settings with TACO becoming apparent only if PEEP settings are reduced or ventilation is discontinued.

**TACO reporting criteria\***

Patients classified with a **TACO (surveillance diagnosis)** should have acute or worsening respiratory compromise during or up to 12 hours after transfusion and should exhibit two or more of the criteria below:

* **Evidence of acute or worsening pulmonary oedema based on:** 
  + **clinical physical examination (see Note 1), *and/or***
  + **radiographic chest imaging and/or other non-invasive assessment of cardiac function e.g. echocardiogram (see Note 2)**
* Evidence for cardiovascular system changes not explained by the patient’s underlying medical condition, including development of tachycardia, hypertension, jugular venous distension, enlarged cardiac silhouette and/or peripheral oedema(see Note 3)
* **Evidence of fluid overload including any of the following: a positive fluid balance; response to diuretic therapy combined with clinical improvement; and change in the patient’s weight in the peri-transfusion period (see Note 4)**
* Elevation in B type natriuretic peptide (NP) levels (e.g., BNP or NT-pro BNP) to greater than 1.5 times the pretransfusion value. A normal post-transfusion NP level is not consistent with a diagnosis of TACO; serial testing of NP levels in the peri-transfusion period may be helpful in identifying TACO.

**\***These criteria establish a surveillance definition based on a complete description of an event, including information that becomes available well after onset. This is for reporting and tracking purposes and the criteria do not constitute clinical diagnosis for the purpose of real-time clinical interventions.

**Notes**

1. **Clinical findings could include crackles on lung auscultation, orthopnea and cough, cyanosis and decreased oxygen saturation values in the absence of other specific causes.**
2. **Diagnostic radiographic imaging**

**Findings consistent with pulmonary oedema from circulatory overload could include presence of new or worsening pleural effusions,** progressive lobar vessel enlargement, peribronchial cuffing, bilateral Kerley lines, alveolar oedema with nodular areas of increased opacity and/or **cardiac silhouette enlargement.**

1. **Blood pressure monitoring**

**Often the arterial pressure is raised, often with widened pulse pressure; however hypotension** may be a presenting feature, e.g. in patients in a state of acute cardiac collapse.

B**lood pressure should be monitored especially if multi-unit transfusions are given.**

1. **Change in the patient’s weight**

Typically the patient’s weight will increase. However there may be a decrease following diuretic therapy.

**Imputability**

The imputability, the *causal* contribution of the transfusion, is assessed separately.