SHOT Bite No. 27
Solid Organ Transplants (SOT)

SHOT Serious Hazards of Transfusion

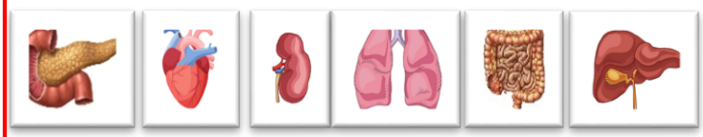
October 2023

This SHOT Bite provides a summary of all transfusion error reports related to patients with solid organ transplants (SOT) submitted to SHOT between 2013-2022. SOT patients are likely to require intensive transfusion support and have specific transfusion requirements. Key points to note include:

1. The ABO/D group of the donor may differ from the recipient's, transfusion of the incorrect ABO group of red cells components may cause passenger lymphocyte syndrome (PLS)
2. Transplant recipients are ineligible for electronic issue (EI) of red cells for 3 months post-transplant
3. Failure to administer anti-D immunoglobulin (Ig) where the recipient is D-negative and the donor D-positive

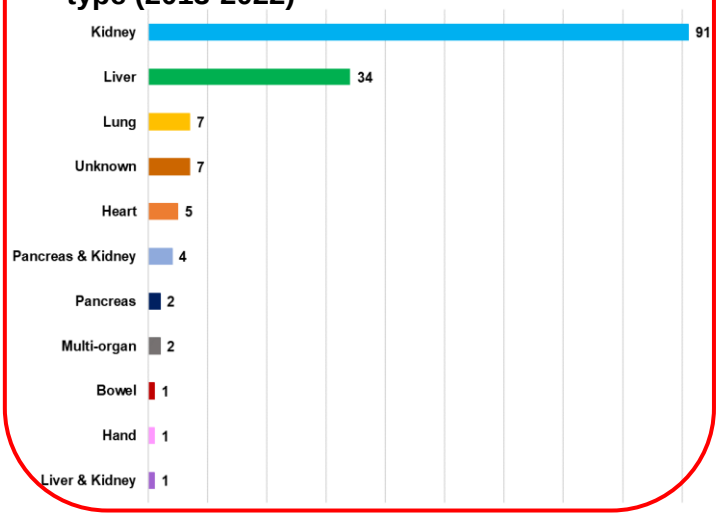
SHOT has been collecting data relating to SOT since 2013. The organs most transplanted in the UK are kidneys and livers (Figure 1). The number of SHOT reports received between 2013-2022 involving SOT is shown according to SOT type (Figure 2) and SHOT reporting category (Figure 3).

Figure 1: The proportion of solid organ transplants in the UK (taken from the NHSBT https://www.nhsbt.nhs.uk/organ-transplantation/)



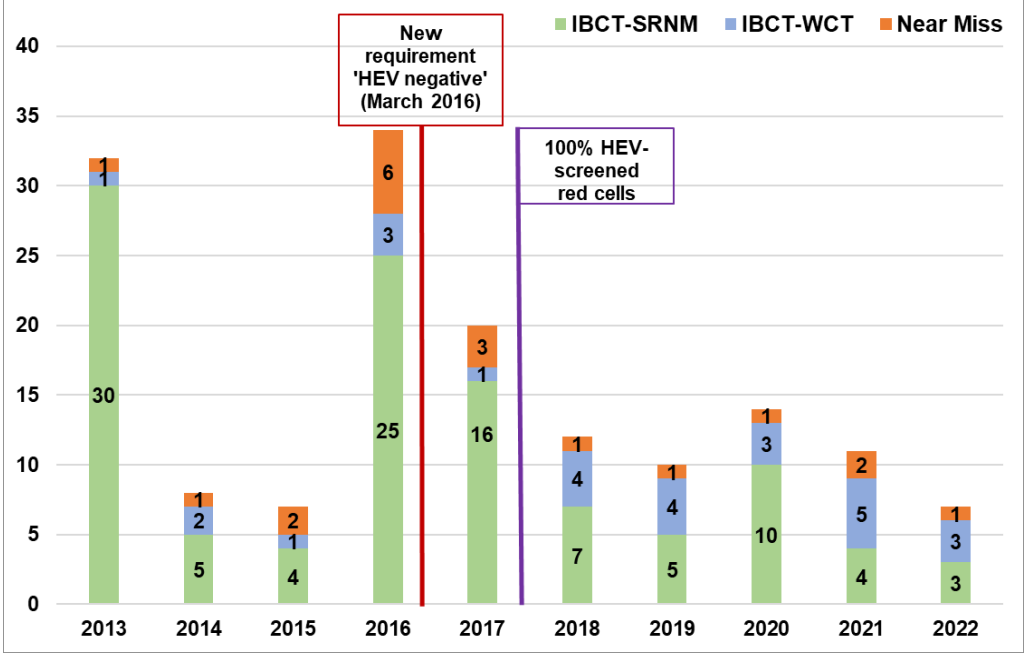
Pancreas	Heart	Kidney	Lung	Small bowel	Liver
3.8%	3.6%	71.0%	2.6%	0.5%	18.5%

Figure 2: The number of SHOT reports received according to solid organ transplant type (2013-2022)



SHOT SOT reports according to reporting category: a 10-year period

Figure 3: Number of SHOT reports related to SOT per SHOT category 2013-2022



IBCT – Incorrect Blood Component Transfused
SRNM – Special Requirements Not Met
WCT – Wrong Component Transfused

The number of near misses reported have been constant

Key points to note

Majority of the SOT cases reported to SHOT were events where the **specific transfusion requirements were not met**. This accounted for more than half of the total SOT reports, ranging from 50%-81%. An increasing trend is evident over the last 2 years (36%of SOT reports in 2021 and 43% in 2022).

Paediatric SOT
5 liver transplants
2 patients were 1 year old
2 patients were 4 years old
1 patient was 16 years old

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HEV Negative

Introduction of a new requirement for HEV-screened components for transplant patients in 2016 resulted in an increase in SOT related SHOT reports for specific requirement not met.
From 2017, all UK Blood Services have provided 100% HEV-screened negative blood components.

Learning case– Inappropriate use of Electronic Issue (EI) excludes essential crossmatch

Two units of group A red cells were electronically issued for a group A solid organ transplant recipient. Prior to transfusion a full blood count (FBC) sample showed evidence of haemolysis on a blood film and was direct antiglobulin test (DAT)-positive. A recall of blood components issued to the patient was initiated. One unit already being transfused was stopped. Further group A red cell units were crossmatched by indirect antiglobulin test (IAT) and were found to be predominantly incompatible. The Blood Centre reference laboratory testing found no alloantibodies, but the patient's eluate demonstrated anti-A as a result of passenger lymphocytes from the group O lung transplant. The SOP was not compliant with the BSH guidelines on pre-transfusion compatibility procedures in blood transfusion laboratories (BSH Milkins et al. 2013). This patient should have been excluded from EI. A serological IAT crossmatch would have demonstrated the incompatibility and then group O red cells selected as the alternative.

Learning point and recommendation: BSH guidelines state that patients who have received solid organ transplants should be excluded from electronic issue for 3 months to enable the detection of IgG isoagglutinins produced by passenger lymphocytes
Case-study from Chapter 7 – Laboratory Errors of the 2016 Annual SHOT Report (https://www.shotuk.org/wp-content/uploads/myimages/7.-Laboratory-Errors.pdf)

SOT	What to do? Why? Where?
ABO incompatible	**Action:** Transfusion of blood components compatible with the donor and recipient blood group until SOT has fully engrafted. **Reason:** If incompatible blood components transfused there is a risk of transfusion reaction or organ rejection caused by Passenger Lymphocyte Syndrome (PLS) i.e., presence of reacting donor ABO antibodies (for more information about PLS see doi: 10.1016/j.tmrv.2020.06.004)
JPAC Transfusion Handbook – section 8.5: Transfusion and organ transplantation	
Crossmatch and issue of red cells	**Action:** SOT cases are temporarily ineligible for EI (3 months following transplant). The LIMS algorithm should be able to identify these cases and prevent blood components issued by EI. When a transfusion is required, the red cells must be crossmatched bi IAT to establish compatibility. **Reason:** PLS i.e., presence of donor ABO antibodies capable of reacting with incompatible red cells
BSH Guidelines for pre-transfusion compatibility procedures in blood transfusion laboratories	
D mismatch Donor D+ Recipient D-	**Action:** An EDTA sample should be taken 24 hours post-transplant to be tested by flow cytometry to determine the volume of residual donor red cells present in circulation. Administration of anti-D Ig dose required within 72 hours post-transplant. **Reason:** Potential D sensitisation in patients of childbearing potential imposes a risk in future pregnancies.
BSH Guidelines for the Estimation of Fetomaternal Haemorrhage NHSBT document - SPN216/7 Management of D Negative Female Patients with D Positive: Inadvertent Red Cell or Platelet Transfusion; Bone Grafts; Solid Organ Transplant or Large Volume Fetomaternal Haemorrhage	

Key SHOT messages and recommendations

Shared care

- Transplant centres and referring organisations should ensure there are robust processes in place for transfer of information across sites and between all clinical teams and transfusion laboratories involved in the care of the patient
- The transplant timetable, need for specific transfusion requirements and ABO/D groups of the transplant recipient and donor should be shared between clinical teams and transfusion laboratories

IT 'fit for purpose'

- Transfusion laboratories should ensure appropriate flags are added to LIMS in a timely fashion. The flags and alerts should be relevant and appropriate to reduce risk of alert fatigue
- LIMS alert overrides should include a requirement for justification that can be audited
- The LIMS should contain algorithms to support appropriate component release for ABO/D compatibility and special requirements.

Patient involvement

- Patient involvement in all decision-making should be encouraged and discussions should include information about their specific transfusion requirements
- Healthcare professionals should encourage patient involvement, be open and receptive to patient's questions and views

Specific guidelines needed

- National guidelines covering safe transfusions in SOT patients especially with ABO/D mismatched SOT are needed
- D-mismatched SOT has a potential sensitisation risk in patients of childbearing potential if anti-D immunoglobulin (Ig) is not given

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Recommended resources

- BSH Guidelines for the Estimation of Fetomaternal Haemorrhage: https://b-s-h.org.uk/guidelines/guidelines/the-estimation-of-fetomaternal-haemorrhage
- BSH Guidelines for pre-transfusion compatibility procedures in blood transfusion laboratories: https://b-s-h.org.uk/guidelines/guidelines/pre-transfusion-compatibility-procedures-in-blood-transfusion-laboratories
- NHSBT document - SPN216/7: https://nhsbtdbe.blob.core.windows.net/umbraco-assets-corp/25228/spn216.pdf
- JPAC Transfusion Handbook – section 8.5: https://www.transfusionguidelines.org/transfusion-handbook/8-effective-transfusion-in-medical-patients/8-5-transfusion-and-organ-transplantation
- SHOT Bite No. 20: IBCT-SRNM https://www.shotuk.org/resources/current-resources/shot-bites/
- SHOT UK Collaborative Reviewing and reforming IT Processes in Transfusion (SCRIPT) surveys and resources: https://www.shotuk.org/resources/current-resources/script/