Risks and benefits from the use of electronic issue

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BACKGROUND

Electronic issue (EI) is the selection of red cells where compatibility is dependent on the Laboratory Information Management System (LIMS) without the need to serologically crossmatch. EI depends on 4 main factors:

1. Having a fit for purpose IT system with appropriate algorithms that require no manual intervention
2. Current blood group is identical to the historical record and current antibody screen is negative (with no previously known irregular antibody) and results have been fully authorised on the LIMS
3. No manual editing made to automated results
4. Patient not excluded on clinical grounds

EI is increasingly used in the UK; 153/253 (60%) in 2016, up from 151/280 (54%) in 2012 data from UK NEQAS-BTLP. Benefits include: timely provision of red cells for transfusion; reduction in red cell wastage; reduction in hands-on work, freeing staff to undertake other tasks and quality improvements. Automated pre-transfusion testing and result-transfer to the LIMS reduces the risk of transcription error. EI also allows remote issue of red cells using computer-controlled satellite fridges located closer to the patients.

AIM

To determine human errors resulting in inappropriate use of EI and to review acute haemolytic transfusions reactions (AHTRs) due to antibodies to low frequency antigens (LFAs).

METHODS

A retrospective analysis of cases (n=432) where specific requirements were not met (SRNM) between 1/01/2012-31/12/2016 was performed to distinguish where electronic issue was used inappropriately. A search was made for cases of AHTRs caused by antibodies to LFAs which would have been detected by serological crossmatch.

RESULTS

A total of 54/432 (13%) cases demonstrated specific requirements had not been met due to inappropriate use of EI.

In these 54 cases the patient should have been excluded from EI:

- In 26 cases historical records containing important information were not heeded: 19 patients known to have clinically-significant red cell antibodies, 4 patients within 3 months of an ABO-incompatible solid organ transplant, 3 patients with an ABO-incompatible haemopoietic stem cell transplant (Figure 1)

- In 28 cases there were laboratory testing errors: 13 incorrect procedure followed, 8 antibody interpretation errors, 7 transcription errors (Figure 2)

- Over a 5 year period there were 2 serious AHTRs caused by antibodies to LFAs, (both anti-Wr⁺) not present on screening cells, therefore missed in standard group and antibody screen tests. One patient died (2015) and another required resuscitation and admission to ITU (2012). Although anti-Wr⁺ is a well-recognised cause of HTR, reactions are rarely severe, with no reported deaths found in the literature.

CONCLUSION

Selection for patients suitable for EI requires a human decision not controlled by the LIMS. The main difficulty is managing patient records for acceptance for EI. This requires a human decision not controlled by the LIMS, and depends on correct clinical information being provided and updated. HTR due to antibodies to LFAs are an acknowledged, but small risk of EI, estimated at 1 in 500,000 to 1 in 1,000,000 transfusions (Garratty 2002). This possibility should always be considered when a patient develops an AHTR following transfusion where the blood was issued by EI. Retrospective crossmatch should be undertaken to confirm the presence of a red cell antibody. Patients with these antibodies should be flagged as being unsuitable for EI, to prevent future AHTR.

Figure 1.

Failure to heed patient historical information n=26

3. Patient with an ABO-incompatible haemopoietic stem cells transplant

4. Patient within 3 months of an ABO-incompatible solid organ transplant

19. Patient with clinically significant antibodies

Figure 2.

Laboratory testing errors n=28

7. Interpretation error

8. Transcription error

13. Incorrect procedure followed