

Transfusion Management Of An *RHCE*ceMO/ceMO* Patient Undergoing Liver Transplantation

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Introduction

- 37-year-old female listed for deceased donor liver transplant due to primary sclerosing cholangitis
- History of anti-C, anti-e-like specificity, and anti-K from outside facility
 - Anti-e not demonstrating in current specimen
 - RHCE* genotyping performed due to anti-e-like specificity in an e+ patient.
- Homozygous *RHCE*ceMO/RHCE*ceMO*
- Predicted phenotype C-, E-, partial c+, partial e+w, V-, VS-, hr^{B-}, hr^{S-}, CEVF(Rh61)-
- At risk for anti-E, anti-c, anti-hr^B, anti-hr^S, anti-CEVF production
- Anticipate a minimum of 6 RBC needed for surgery
- Not a candidate for autologous donation, and no genotype matched donors could be located
- Plan to give C-, e-, K- for transplant based on known antibody history
- Two frozen -D- units on hold for potential post-transplant complications

Materials and Methods

- Antibody history and *RHCE* variant genotype results obtained from outside facility
- Antibody identification (ID) performed by Solid Phase Red Cell Adherence (SPRCA) and gel column agglutination test (CAT).
- ABORh determined by automated microplate method using commercial reagents.
- Compatibility testing performed by manual CAT

Results

- ABORh was A positive.
- Antibody ID by SPRCA identified anti-C and anti-K (Figure 1)
 - All additional antibody specificities ruled out
- Twelve C-, e-, K- volunteer donor RBC units crossmatched on day of surgery were incompatible
- Antibody ID repeated by CAT identified anti-E (Figure 2)
- Decision was made to give E- (presumed e+) for transplant due to new anti-E
- Twelve C-, E-, K- volunteer donor RBC crossmatched by CAT were compatible

Results

Figure 1: Pre-Operative specimen – Solid Phase Red Cell Adherence

Historical anti-K demonstrating. Equivocal results on cell #1 (attributed to anti-C) and cell #6 may have been due to anti-E reactivity, though cell #3 (R₂R₂) was non-reactive. PC = positive control, NC = negative control, ? = equivocal result.

| Cell | D | C | c | e | K | k | Kp ^a | Kp ^b | Js ^a | Js ^b | Fy ^a | Fy ^b | Jk ^a | Jk ^b | Le ^a | Le ^b | P ₁ | M | N | S | s | Lu ^a | Lu ^b | Xg ^a | Results |
|------|---|---|---|---|---|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|---|---|---|---|-----------------|-----------------|-----------------|---------|
| 1 | + | + | 0 | + | + | 0 | + | 0 | + | 0 | + | + | + | + | 0 | + | 0 | + | + | + | 0 | 0 | + | + | ? |
| 2 | + | + | 0 | 0 | + | 0 | + | 0 | + | 0 | + | + | + | + | 0 | + | 0 | + | 0 | + | + | + | + | + | 0 |
| 3 | + | 0 | + | / | 0 | 0 | + | 0 | + | 0 | + | + | + | + | w | + | + | 0 | + | 0 | + | 0 | + | 0 | 0 |
| 4 | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | 0 | + | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | 0 |
| 5 | 0 | + | + | 0 | + | + | 0 | + | 0 | + | + | w | + | + | 0 | 0 | 0 | + | + | + | 0 | 0 | + | + | 1+ |
| 6 | 0 | 0 | + | + | + | 0 | + | 0 | + | 0 | + | + | + | 0 | + | 0 | + | + | + | + | + | 0 | + | + | ? |
| 7 | 0 | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | + | + | + | 0 | + | + | 0 | + | 0 | + | 0 | + | 0 | 0 |
| 8 | 0 | 0 | + | 0 | + | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | ? |
| 9 | 0 | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | 0 | + | 0 | + | + | + | + | 0 | + | 0 | + | + | 0 |
| 10 | 0 | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | 0 | + | 0 | + | + | 0 | 0 | + | 0 | + | 0 | + | 0 |
| 11 | 0 | 0 | + | 0 | + | + | 0 | + | 0 | + | + | 0 | 0 | + | 0 | 0 | + | 0 | + | 0 | + | + | + | + | 2+ |
| 12 | 0 | 0 | + | 0 | + | 0 | + | + | 0 | + | + | + | + | 0 | 0 | + | + | + | + | + | + | 0 | + | + | 0 |
| 13 | 0 | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | + | 0 | + | 0 | + | + | + | + | + | + | 0 | + | + | 0 |
| 14 | + | + | + | + | 0 | + | 0 | + | 0 | + | + | 0 | 0 | + | 0 | + | 0 | + | 0 | 0 | + | 0 | + | + | 0 |
| 15 | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | PC 4+ |
| 16 | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | NC 0 |

Figure 2: Pre-Operative specimen – Column Agglutination Test

Positive reactivity with cells #3 and #TC consistent with anti-E. Anti-C and anti-K also demonstrable on CAT ID panel. AC-Autocontrol

| Cell | D | C | c | E | e | K | k | Kp ^a | Kp ^b | Js ^a | Js ^b | Fy ^a | Fy ^b | Jk ^a | Jk ^b | Le ^a | Le ^b | P ₁ | M | N | S | s | Lu ^a | Lu ^b | Xg ^a | Results |
|------|---|---|---|---|---|---|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|---|---|---|---|-----------------|-----------------|-----------------|---------|
| 1 | + | + | 0 | 0 | + | + | 0 | + | 0 | + | 0 | + | + | 0 | 0 | + | + | + | + | 0 | 0 | + | 0 | + | 0 | 2+ |
| 2 | + | + | 0 | 0 | + | 0 | + | 0 | + | 0 | + | + | + | 0 | 0 | + | + | + | + | + | 0 | + | 0 | + | 0 | 2+ |
| 3 | + | 0 | + | + | 0 | 0 | + | + | 0 | + | 0 | + | + | + | 0 | 0 | 0 | + | + | 0 | + | 0 | + | + | + | 2+ |
| 4 | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | 0 | + | 0 | 0 | + | 0 | + | 0 | 0 | 0 | + | + | 0 | 0 |
| 5 | 0 | + | + | 0 | + | 0 | + | 0 | + | 0 | + | + | + | + | 0 | + | 0 | 0 | + | 0 | + | 0 | + | + | + | 1+ |
| 6 | 0 | 0 | + | + | 0 | + | 0 | + | 0 | + | + | w | 0 | + | 0 | + | + | + | 0 | + | 0 | 0 | + | + | 0 | 0 |
| 7 | 0 | 0 | + | 0 | + | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | + | + | + | + | 0 | + | + | + | + | 2+ |
| 8 | 0 | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | + | 0 | + | + | 0 | 0 | 0 | + | + | + | 0 | + | 0 | + | 0 |
| 9 | 0 | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | + | 0 | 0 | + | 0 | + | + | + | 0 |
| 10 | 0 | + | 0 | 0 | + | 0 | + | 0 | + | 0 | + | + | 0 | 0 | + | 0 | + | 0 | + | 0 | + | 0 | + | + | + | 0 |
| TC | + | 0 | + | + | 0 | 0 | + | 0 | + | 0 | 0 | 0 | 0 | + | 0 | + | + | + | + | + | + | + | + | + | 0 | 2+ |
| AC | | | | | | | | | | | | | | | | | | | | | | | | | | 1+ |

Figure 3: Hemoglobin Trend Peri-transplant

Hemoglobin levels pre- and post-transplant. Day 0 is day of transplant. Day 0 value was collected post-operatively.

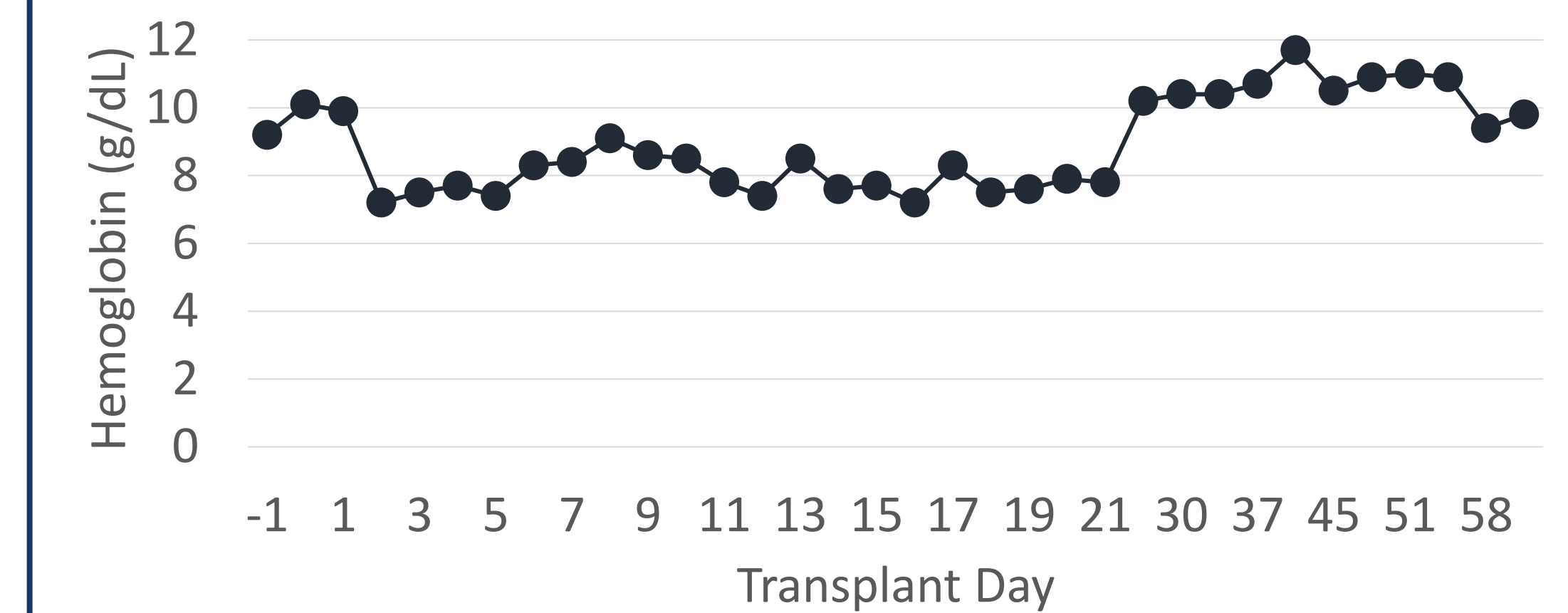
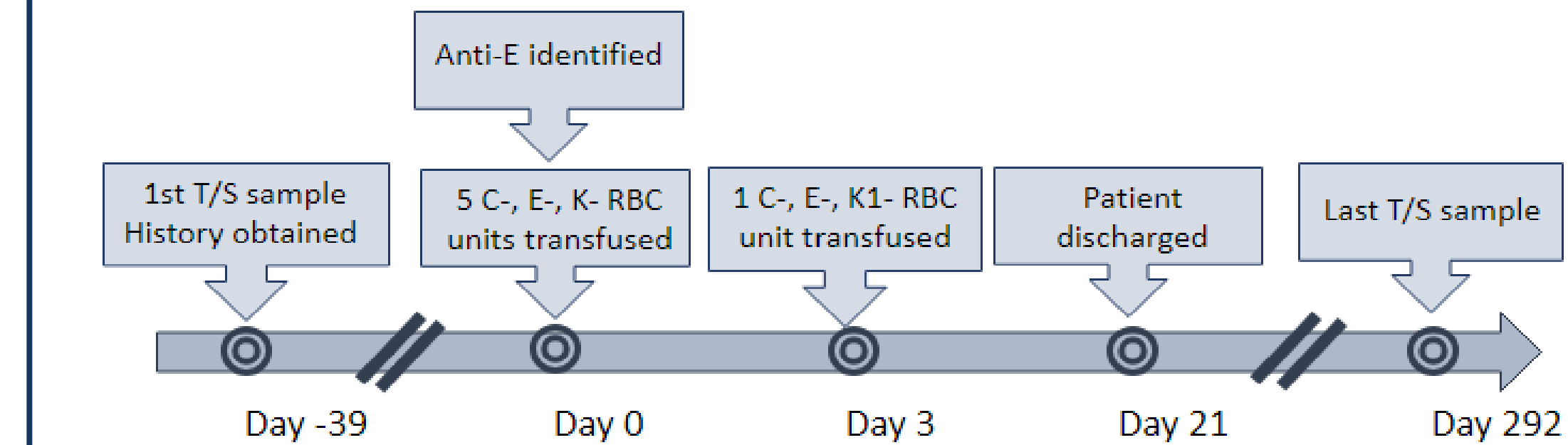


Figure 4: Timeline of Events

Sequence of events from first Type and Screen (T/S) sample to most recent post-transplant follow up. Day 0 is day of transplant.



Conclusion

- Six C-, E-, K- volunteer donor RBC units transfused during/after transplant. The patient tolerated transfusion with no reported adverse events.
- The historical anti-e specificity was not detected in any post transfusion samples.
- At follow up 10 months post-transplant the antibody detection test was negative.
 - Possible antibody evanescence or immunosuppression
- If rare units are not available, it may be necessary to transfuse unmatched RBC in circumstances where life-saving procedures are necessary.
- Consideration of antibody specificity, expected clinical significance, need for transfusion and associated transfusion risks should be considered when giving unmatched products.