O Rh Negative Tips from Your Coach
Time for Practice!

Think Positive

Case 1

A 58 year old male with an aortic aneurysm is admitted and scheduled for surgery later this evening. Two units of leukocyte-reduced red blood cells (LRBC) are ordered for the procedure. You have no record of this patient. He types as group A Rh Positive and the antibody detection test (screen) is negative. Your hospital policy requires a second sample be drawn when you have no previous record. While waiting for the second sample you receive a STAT request for 2 LRBCs because the patient has started to bleed. You explain you are waiting for the second type but the floor needs blood NOW!

What ABO group, Rh type would you issue? O Rh Positive

The intent of the second sample draw is to confirm ABO type; thus, the reason for selecting group O. Rh Positive is fine in this instance as you already have one type indicating Rh Positive. Even if the wrong patient was drawn, the prevalence of Rh Positive is 85% so the odds are with you. The likelihood that this man was previously transfused is low. It is estimated that only 0.5% or less of individuals age 55-59 have been transfused.[1] And, even more importantly, for every 100 trauma patients seen in the ED about 2 or less have a positive antibody detection test and clinically significant RBC antibodies.[2] Finally, if the patient is really Rh Negative the likelihood of forming an anti-D is about 20% and any reaction that may occur would be delayed by 4 weeks or more.[3] *Think Positive!*

Case 2

A 19 year old African American female with sickle cell disease comes in to the Emergency Department in pain crisis. Her hemoglobin is 5.7 g/dl. One unit LRBC is ordered for transfusion. A review of blood bank records shows she is group B Rh Positive. Your hospital policy is to provide Rh and K matched LRBCs for transfusion. Her phenotype is C+E-c+e+; K-. The current ABO, Rh type confirms she is B Rh Positive and her antibody detection test (screen) is negative.

What ABO group, Rh type would you select for antigen typing? B Rh Positive, E-,K- or O Rh Positive, E,-K-

While Rh Negative individuals have a higher probability of being E-, 70% of Rh Positive individuals are E-. You will have a great chance of finding E- whether you use Rh Positive or Rh Negative. To preserve our rare O Rh Negative donors, *Think Positive*!

Case 3

There is a 45 year old Caucasian male who sustained multiple injuries in a motor vehicle accident and just arrived in the Emergency Department. The first trauma cooler was issued with 4 group O Rh Negative LRBCs. A sample is received and you find the patient is group O Rh Negative. An additional 4 units of LRBCs are issued and then you receive a call from the Trauma Team that they are initiating a Massive Transfusion Protocol (MTP).

What ABO group, Rh type would you consider issuing? O Rh Positive

It is clear the patient is hemorrhaging since they have already used 4 LRBCs; they want 4 more and on top of that they've activated the MTP. You are going to be issuing 4-6 more units in addition to the 4 they have transfused; you might as well switch now. *Think Positive!*

The risk of alloimmunization is dependent on several factors - number of RBC units administered, patient's genetic predisposition to form an immune response to nonself antigens, and patient's clinical condition. Traumatic injury has been known to induce major immune dysregulation. Whether or not such injury potentially decreases the body's ability to mount antibody formation against transfused red cells remains unclear.[4,5] However, it is know that the rate of anti-D formation in Rh Negative trauma patients is much lower than in healthy individuals.[3,6]

Case 4

The lab manager is aware of the increasing demand for O Rh Negative RBCs with declining supply and decides it is time to evaluate the use of O Rh Negative RBCs across their system of hospitals. The flagship medical center is a 300-bed tertiary care facility with a level 2 trauma center. There is 1 refrigerator in the operating room for storing blood products ordered for scheduled surgical procedures.

What Does the Coach Think?

There are 4 acute care facilities, each with <50 beds, each keeps approximately 40 RBC units and provides products for both inpatient and outpatient transfusions. The lab at the small hospitals perform ABO/Rh testing but all antibody ID is sent to the flagship hospital. In addition, an off-site outpatient surgery center has 2 O Rh Negatives in a refrigerator at all times.

What factors should be considered in determining how many O Rh Negative RBCs should be available at each location?

Distance between the acute care facilities and the flagship medical center. In an urgent situation, how quickly can blood be transferred between facilities?

Medical services provided at each location. A large outpatient clinic where hematology/oncology patients are served will affect the number of units transfused. Is the facility located close to an Interstate highway where the likelihood of motor vehicle accidents is more likely?

In the case of the off-site surgery center, what type of surgeries are performed? Have they ever transfused the readily available units? How many and for what surgical procedures/what surgeons? How close are they to one of the hospitals?

What can be done to manage the supply of O Rh Negative RBCs across the system?

Share the inventory with the larger hospital, the O Rh Negatives that are shorter outdate are more likely to be transfused at the larger facility and to a Rh Negative individual.

The flagship hospital could act as the distribution center for the smaller facilities. This could include ABO, Rh retyping the units before sending them to the 50-bed hospitals.

Consider stocking B Rh Positive and AB Rh Positive units even though you do not see patients of this ABO very often. This will alleviate the need for selecting O Rh Positive or Rh Negative LRBCs. Again, sharing inventory with the 300-bed hospital will allow for improved utilization when units are within 2 weeks of outdate.

The outpatient surgery center could stock O Rh Positive versus O Rh Negative LRBCs.

Do you know ABO?

Case 5

You receive a STAT request for 4 units of LRBCs for a 72 year old female with a GI bleed. She types as group A Rh Positive but her antibody detection test (screen) is positive. Blood bank records show she is A Rh Positive with no antibodies detected. While you are working on the antibody identification the patient's physician calls wanting the blood NOW and does not care about the antibody. You call the Transfusion Service medical director who approves emergency release LRBCs.

What ABO group, Rh type should you issue? A Rh Positive

You *do know the patient's ABO* even if the patient has an antibody. Remain calm and issue A Rh Positive blood. ABO group will have no impact on whether the corresponding antigen to the antibody (ies) being identified is present. Proceed with your antibody identification.

If a Guy, Don't Cry!

Case 6

A 36 year old Caucasian male is brought to the ED as a result of a farming accident. He is bleeding profusely and the trauma cooler has been sent with 4 O Rh Negative LRBCs. You receive a sample and find he is group A Rh Negative with a negative antibody detection test (screen). There is no previous type in the computer. He continues to bleed and the request comes for 4 additional units and a warning they are going to need more.

What ABO group, Rh type would you issue first? O Rh Positive

If your policy is to collect a second sample to confirm ABO group you must select group O. This is a *guy, don't cry*, you can provide Rh Positive blood.

If additional LRBCs are needed and you are 4 hours from your blood supplier what would you select next?

In this situation, after you have confirmed the patient's ABO as per your Transfusion Service policy, select A Rh Positive LRBCs since he is a group A. Remember, he is *a guy, don't cry*!

Case 7

A massive transfusion protocol has been called for a 48 year old male who has been admitted to ED with a gunshot wound. You have no record of this patient in your transfusion service laboratory information system.

What ABO group, Rh type would you consider issuing? O Rh Positive

You must provide group O until you can obtain an ABO type. This is a *guy,* because you can provide Rh positive LRBCs. The prevalence of Rh Positive is 85% so the odds are with you. If the patient is really Rh Negative and they have anti-D, it is very unlikely they will experience an acute transfusion reaction. Most examples of adverse reactions with anti-D are delayed with extravascular hemolysis. In this case, the patient is bleeding profusely so it is also likely the antibody level will decrease because of blood loss and replacement therapy.

Approximately 20% of hospitalized Rh Negative patients' transfusion with Rh Positive blood will make anti-D.[3]

If Older, Think Bolder!

Case 8

A 67 year old female who is group O Rh Negative is undergoing open heart surgery. You have already issued 6 units of O Rh Negative LRBCs and a panicked call from surgery says "Things aren't going well" and they are requesting 6 more LRBCs.

What ABO group, Rh type would you set-up next? O Rh Positive

Since the patient is 67 years old and there is no indication of anti-D present in her plasma, *She's Older, Think Bolder*! She can safely receive Rh Positive LRBCs. Even if she does make anti-D, it will be in weeks to months after transfusion and there is no worry of future pregnancies. It is more important to get her through the surgery and preserve O Rh Negative LRBCs for those of childbearing age (<50).

References:

1. Schonborn L, et al. Longitudinal changes in the blood supply and demand in north-east Germany 2005-2015. Transfus Med Hemother. 2017; 44(4):224-231.
2. Saverimuttu J et al. Implications for urgent transfusion of uncrossmatched blood in the emergency department: The prevalence of clinically significant red cell antibodies within different patient groups. Emerg Med (Fremantle) 2003;15:239-243.
3. Selleng K, et al. Emergency transfusion of patients with unknown blood type with blood group O Rhesus D positive red blood cell concentrates: a prospective, single-centre, observational study. Lancet Hematol 2017;4:e218-24.
4. Jackman RP. Immunomodulation in transfused trauma patients. Curr Opin Anaesthesiol. 2013; 26(2): 196–203.
5. Zalpuri S, et al. Immunosuppressants and alloimmunization against red blood cell transfusions. Transfusion 2014;54:1981-1987.
6. Pollack W, et al. Studies on Rh Prophylaxis II. Rh Immune prophylaxis after transfusion with Rh-positive blood. Transfusion 1971;11(6):340-344.