

Critical Care Mailbag: Critical Transfusions

Scott Weingart and Anand Swaminathan

- Type + Screen versus Type + Crossmatch
 - “Type”: the ABO group for the patient.
 - “Screen”: evaluates if the patient has any of the common minor antibody groups (such as Rh, Kell, Duffy, etc).
 - “Crossmatch”: takes blood that matches the patient for both major and minor antibody groups and reserves it for the patient, essentially taking it out of the pool of available blood.
 - Blood bank performs a final confirmatory screen for major antibody compatibility.
 - Take Home #1: There is no need to routinely obtain Type + Cross on every patient who may need blood.
 - If the patient screens “negative” for any minor antibody groups, crossmatch is unnecessary.
 - If the patient needs immediate transfusion (eg, in the event of massive GI bleed or trauma with shock), you can transfuse without having the minor antibody groups known.
 - See EM:RAP 2021 November Mailbag
 - If the patient screens “positive” for minor antibody groups, crossmatch can be helpful in ensuring compatible blood is available.
 - Take Home #2: Every hospital should have a system where the blood bank notifies the clinician when the patient screens positive for minor antibodies.
 - In this situation, taking a number of units out of circulation is important to ensure that when the patient with minor antibodies needs a transfusion, they have the right blood available.

- Intermediate Transfusion Strategy
 - In most hospitals, massive transfusion protocol is the only way to rapidly get blood.
 - However, this approach is often more than is needed and can be wasteful as it utilizes a lot of resources and can shut the blood bank down to other patients.
 - Many bleeding patients will stabilize after 1-2 units making massive transfusion protocol unnecessary.
 - An intermediate pack can be considered
 - These are immediate-release “universal donor” blood products.
 - Scott recommends the pack consists of 2 units pRBCs and 2 units FFP.
 - Advantages
 - Enables rapid release of blood products.
 - If a patient stabilizes after 1-2 units, the blood bank hasn’t over-activated and unnecessarily used resources.
 - This can act as a screen for massive transfusion protocol.
 - If the patient remains unstable after 2 units pRBCs, then the massive transfusion can be activated while administering the 2 units of FFP.
 - Role of plasma prior to procedure:
 - Target INR < 1.5 for delicate procedures like neurosurgery or lumbar punctures
 - In cirrhosis, INR is not an accurate measure of the patient’s bleeding risk.
 - There is no specific target INR for central lines, chest tubes, thoracentesis or paracentesis.
 - There is no INR value that precludes the procedure.
- Calcium supplementation in massive transfusion
 - Citrate and other chelators in the blood can lower serum calcium levels. This is important as calcium is involved in hemodynamics as well as in the clotting cascade.
 - In an exsanguinating patient requiring massive transfusion:
 - Administer 1 g CaCl (or 2-3 g calcium gluconate) immediately.
 - Administer 1 g CaCl (or 2-3 g calcium gluconate) for every 2-4 units of product administered.
 - In non-massive transfusion in patients with a functional liver, there may not be a need to supplement calcium routinely as the liver can keep up with metabolizing citrate and other calcium chelators.

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Rural Medicine: Second Opinion

Vanessa Cardy and Mel Herbert

Case: A 45-year-old man presents to the rural ED. He has no past medical history, medications, or known allergies. He reports slipping on ice and landing on his elbow. He is now unable to straighten the arm, and has swelling and tenderness to the elbow. The patient is neurovascularly intact, but there is some numbness in the forearm. An x-ray reveals a radial head fracture with some displacement, comminution and questionable intra-articular involvement. The closest orthopedic surgeon is 1000 km away and reviews cases remotely. When called the consultant was terse and rude and recommended splint, sling and early range of motion. He recommended clinic follow up in 2-3 weeks. The ED physician found this recommendation not to be the usual standard of care for the injury pattern.

- Modified Mason classification for radial head fractures
 - Mason I – Non-displaced fractures (majority of cases)
 - Mason II - >2mm of displacement
 - Mason III – comminuted
 - Mason IV – fracture + dislocation
 - This patient had a Mason III
 - The plan was to apply splint and sling and to consult ortho again during the day in the hopes of getting a different consultant and a second opinion

Case continued: It was a 4-day weekend and this case occurred on day 1. The consulted surgeon happened to be on-call all weekend. Daily follow-up calls to the patient revealed he was doing fine. On day 5, a different surgeon was on-call and reviewed the case. The patient was referred to see the orthopedist face-to-face in the clinic.

- Interpersonal issues with consultants on-call are frequent but important in their impact.
- It is more common in isolated environments where there is literally no one else to reach out to when disagreements and poor interactions occur.
- The patient always needs to be the priority and redirecting the conversation to the patient can be helpful.
- Remember that the ED physician is also on the receiving side of calls at times and we need to be collegial to paramedics or referring doctors, just like we want consultants to treat us.
- Trying to meet consultants in person is often beneficial to improve relationships.

- CT myelogram can be used but may underestimate abscess size.
- Perform history and physical exam to determine pretest probability.
 - Low risk (no or few risk factors): No further workup.
 - Moderate risk (no motor deficits, but risk factors present): Obtain inflammatory markers.
 - If elevated markers, obtain an MRI.
 - If negative, workup can be concluded.
 - High risk (eg, motor deficit present): Obtain an MRI
- Management focuses on source control, blood cultures, and antibiotics. Discuss with a spine specialist early.
- Surgery indications:
 - Developing or worsening neurologic deficits
 - Paralysis upon presentation may be treated with antibiotics alone due to low likelihood of improvement with surgery.
 - Cervical or thoracic involvement
 - This poses a greater risk of neurologic sequelae.
 - Phlegmon
 - May not benefit from surgery.
- CT-guided needle aspiration and antibiotics can be considered for posterior spinal epidural abscess, lack of neurologic deficit, or those who are at a high surgical risk.
- Antibiotics
 - Most common causes are *Staphylococcus aureus*, followed by gram negative bacilli, streptococcal species, coagulase negative staph
 - If the patient is stable: obtain blood cultures and consult a specialist. They may want to obtain cultures of material in OR prior to antibiotic initiation.
 - If the patient is unstable: obtain blood cultures and give broad-spectrum antibiotics
 - Vancomycin 20 mg/kg IV
 - Metronidazole 500 mg IV, and a
 - Third generation cephalosporin (cefotaxime 2 g IV, ceftriaxone 2 g IV, or ceftazidime 2 g IV)

Related content:

CorePendum: Infections of the Spinal Column: <https://www.emrap.org/corependium/chap-ter/recb5odLT6WOKJxP/Infections-of-the-Spinal-Column>

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