



COMBAT MEDIC/CORPSMAN
TACTICAL COMBAT CASUALTY CARE

MODULE 11:

HEMORRHAGIC SHOCK FLUID RESUSCITATION IN TACTICAL FIELD CARE

10 MAY 2021



**Committee on
Tactical Combat
Casualty Care
(CoTCCC)**

TACTICAL FIELD CARE (TFC) BLOOD TYPING INSTRUCTION

TASK:	Determine blood type using an EldonCard®
CONDITION:	Given a scenario in the TFC where you need to confirm the blood type of a donor and/or recipient
STANDARD:	Determine donor and/or recipient blood type using an EldonCard
EQUIPMENT:	Eldon Blood Typing Kit and water

PERFORMANCE MEASURES: step-by-step instructions

NOTE: Consider body substance isolation.

NOTE: If a Combat Lifesaver is available, direct them to assist.

- 01** Gather the equipment needed:
 - (a) A water source (e.g., canteen with water)
 - (b) Eldon Blood Typing Kit: lancet, alcohol pad, water dropper, instruction card (EldonCard chart), EldonSticks (four or more), and plastic cover
 - (c) Appropriate personal protective equipment (e.g., gloves)
- 02** Inspect Eldon Blood Typing Kit/EldonCard for:
 - (a) Physical appearance
 - (b) Expiration dates
 - (c) Contents
- 03** Document donor and/or recipient information on EldonCard :
 - (a) Name
 - (b) Address
 - (c) Birthdate
 - (d) Date
 - (e) Donor's/recipient's signature
- 04** Locate, secure, and fill water dropper.
- 05** Place one drop of water in each circle of the EldonCard.
- 06** Using an alcohol pad, disinfect the donor's/recipient's fingertip (preferably their nondominant hand).
- 07** Locate and uncap lancet by twisting off the protective cap.
- 08** Firmly press the lancet into the fleshy portion of the donor's/recipient's fingertip to draw blood and dispose of lancet in sharps container.
- 09** Squeeze the fingertip at the puncture site, use one of the EldonSticks to scoop up a small amount of the donor's blood.
- 10** Place the blood from the EldonStick within the first circle on the EldonCard and mix with the drop of water, spreading it out all the way to the edge of the circle (filling the circle while mixing the blood and water with the reagent impregnated on the circle of the EldonCard).

NOTE: Mix for approximately 10 seconds.

NOTE: Repeat steps 9-10 three more times, once for each circle of the EldonCard.

NOTE: Use a new EldonStick for each circle; do not reuse the EldonSticks, or it will invalidate the test by mixing reagents that are on the card and meant to be kept in each separate circle.
- 11** Tilt the card gently at each plane for 10 seconds. All four planes will be tilted for a total of 40 seconds to encourage mixing/agglutination.
- 12** After all four EldonSticks are used and blood is mixed with agents impregnated on the EldonCard, locate the blood matching chart.
- 13** Compare the four circles (anti-A, anti-B, anti-D, and control) on the EldonCard with the chart provided

in the Eldon Blood Typing Kit, observing for either the presence or absence of agglutination.

NOTE: Try to read the EldonCard while it is still wet.

NOTE: The control circle should always have no agglutination or the test is invalid. If the pattern of agglutination on the EldonCard matches the pattern for an invalid test, the test should be repeated using a different Eldon Blood Typing Kit.

- 14** Annotate A-B-O and Rh blood type on the EldonCard.
- 15** Place the plastic cover over the used EldonCard and ensure it accompanies the DD 1380.
- 16** Document all findings and attach to a DD Form 1380 TCCC Casualty Card for the recipient (if applicable).

DONOR BLOOD COLLECTION INSTRUCTION

TASK:	Collect blood from a donor
CONDITION:	Given a Tactical Field Care scenario in which blood must be collected from a donor
STANDARD:	Collect blood from a donor in the proper sequence and without causing any harm
EQUIPMENT:	Constricting band, antiseptic swab/wipe, 450-500 ml blood collection bag (with attached tubing and needle), blood donation bag label, permanent marking pen, 4x4 gauze dressing, 3-inch tape, clamp, personal protective equipment (gloves, eye protection, etc.), donor bag measuring device, and a sharps container

PERFORMANCE MEASURES: step-by-step instructions

NOTE: Consider body substance isolation.

NOTE: If a Combat Lifesaver is available, direct them to assist.

- 01** Gather the equipment needed: constricting band, antiseptic swab/wipe, 450-500 ml blood collection bag, permanent marker, blood bag label, 4x4 gauze dressing, 3-inch tape, a donor bag measuring device, and a sharps container.
- 02** Confirm the donor's blood type (if not previously documented, use the EldonCard® – Tactical Field Care (TFC) Blood Typing Instruction).
- 03** Have the donor sit or recline, and inspect veins to choose the arm before application of the band (if possible).
NOTE: Do not collect blood from a donor that is standing upright as some donors transiently lose consciousness during venipuncture.
- 04** Apply a constricting band at least 2 inches above the intended venipuncture site.
- 05** Identify the vein that will be used.
NOTE: The vein should be large enough to sustain at least a 16-gauge needle.
- 06** Disinfect the intended venipuncture site with antiseptic swabs/wipes (iodine or chlorhexidine).
NOTE: Allow the disinfectant to dry before venipuncture.
- 07** Remove the blood bag with attached tubing and the needle from the package and place them next to the casualty.
NOTE: Keep the collection bag clean and insulated from the ground, below the level of the donor's heart.
- 08** Clamp the tubing 12–18 inches from the needle.
- 09** Apply **one** of the following field expedient donor bag volume measure tools:
 - (a) Beaded cable tie marked at 6.5 inches around center of the bag
 - (b) Zip tie marked at 6.5 inches around the center of the bag
 - (c) Clamping bottom of the bag with folded overlap of 1-1.5 inches
 - (d) Parachute 550 cord cut at 10 inches wrapped around center of bag so ends slightly overlap
- 10** Twist off the cap of the 16-gauge needle.
- 11** Insert the needle bevel up, at a 15 to 30-degree angle through the skin.
NOTE: Remind the donor not to bend their arm (the needle is in the vein, not a flexible catheter).
- 12** Once the blood is visualized in the collection line, unclamp the tubing.
- 13** Visualize to ensure the blood is flowing into the blood collection bag. Once the blood is flowing into the bag, remove the constricting band from the donor's arm and ask them to open and close their fist every 10–15 seconds to keep the blood flowing.
- 14** Secure the needle and tubing in place with tape.
- 15** Once the blood is flowing into the collection bag, rock the bag back and forth (every 60–90 seconds)

to mix the blood with the anticoagulants in the blood collection bag.

- 16** Continually monitor the donor and the donated blood throughout the donation process.
 - (a) Assess the donor for signs/symptoms of blood loss (sweating, pallor, complaints of feeling lightheaded, nausea, etc.)
 - (b) Assess the venipuncture site for signs of hematoma.
 - (c) If blood flow into the bag stops, you may need to reposition the needle.
- 17** Watch the bag to ensure it does not overfill.
- 18** Determine when the bag of blood is full using a field expedient method:
 - (a) If a 6.5-inch beaded cable tie or zip tie was used, or the bottom of the bag was clamped with an overlap of 1-1.5 inches, the bag will be restricted from filling beyond recommended capacity.
 - (b) If parachute cord was cut at 10 inches and wrapped around center of bag, the ends will meet when the bag has reached its recommended capacity.
- 19** Once the bag is full, clamp off the line.
- 20** Remove the tape holding the tubing and needle in place.
- 21** Place a 4x4 gauze dressing over the venipuncture site while removing the needle and have the donor hold pressure over the site.
- 22** Release the clamp and allow the blood in the tubing to flow into the collection bag.
- 23** Adjust the clamp to the end of the tubing to allow enough tubing to tie overhand knots.
- 24** Tie one overhand knot as close to the blood bag as possible, ensuring proper control of the needle as you tie.
- 25** Tie a second overhand knot closer to the needle so when the needle is cut off, it will have minimal tubing attached (while still maintaining proper control of needle).
- 26** Once you have both knots completed, cut below the knot close to the needle and dispose of the needle and tubing in a sharps container, as appropriate.
- 27** Ensure the blood collection bag label is filled out with the correct donor information and placed on the collection bag.
 - (a) Ensure the donor's information is annotated.
 - (b) Ensure the correct A-B-O blood type is annotated.
 - (c) Ensure the collection date and time and name of the medic collecting the blood are annotated.

NOTE: Fresh whole blood should be transfused within 6–8 hours of collection.
- 28** Monitor the donor after blood donation is complete:
 - (a) Ask the donor to remain laying down or sitting for a few minutes.
 - (b) Inspect the venipuncture site; if it is not bleeding, apply a bandage to the site. If it is bleeding, apply a pressure bandage.
 - (c) Ensure that the person can stand up without dizziness or lightheadedness.
- 29** Document all findings and treatments on the casualty's DD Form 1380 TCCC Casualty Card and attach it to the (blood) recipient.

ADMINISTRATION OF BLOOD PRODUCTS INSTRUCTION

TASK:	Administer blood products
CONDITION:	Given a scenario in the Tactical Field Care phase with a casualty that has a patent IV access in shock, (with significant injuries, altered mental status in the absence of head injury and weak or absent peripheral pulses) requiring blood products
STANDARD:	Administer blood products in accordance with Tactical Combat Casualty Care Guidelines in 5 minutes without causing further injury to the casualty
EQUIPMENT:	Blood products, blood administration set and blood warming unit, if available

PERFORMANCE MEASURES: step-by-step instructions

NOTE: Consider body substance isolation.

NOTE: If a Combat Lifesaver is available, direct them to assist.

- 01** Before administering blood products, ensure:
 - (a) External hemorrhage is controlled.
 - (b) The IV or IO line with fluid is in place and functioning properly.
 - (c) Tranexamic acid has been administered.

NOTE: Begin hypothermia prevention and treatment measures if not already initiated.
- 02** Secure blood products and blood administration set (ensuring the blood tubing has a filter).

NOTE: If you are using cold-stored whole blood, an IV fluid warmer should be secured and set to warm blood to 38 degrees Celsius (100.4 degrees Fahrenheit), if possible.
- 03** Close off tubing with all clamps.
- 04** Peel back the port opening on the blood product bag, exposing the port.
- 05** Remove the cap from the spike of the IV tubing and insert it into the blood product bag, pushing the spike to the hub.
- 06** Turn the blood product bag right side up, release clamp(s), and observe the blood flowing through the line.
- 07** Squeeze the drip chamber/filter, ensuring it is filled halfway, and hang the blood bag above the casualty.

NOTE: If you are using the Y tubing, ensure the line that is not attached to the blood remains clamped off.
- 08** Release the distal clamp, allowing blood flow to the end of the IV line. Then, clamp the line shut.
- 09** If you are using a blood product warmer, connect to the IV tubing in accordance with manufacturer's guidelines.
- 10** Clean the IV or IO port with alcohol or povidone-iodine pad.
- 11** Secure the Luer adapter of the IV blood line into the IV or IO port if you are using a Luer lock set or place a 16-gauge needle on the end of the IV tubing and insert it into the saline lock if you are using a standard saline lock set.
- 12** Release all clamps on the blood products line and begin transfusion.
- 13** Secure the IV tubing to the casualty.
- 14** The preferred resuscitation blood products of choice for casualties in order of precedence are:
 - (a) Cold-stored low-titer type O whole blood
 - (b) Prescreened low-titer type O fresh whole blood
 - (c) Plasma, red blood cells (RBCs), and platelets in a 1:1:1 ratio
 - (d) Plasma and RBCs in a 1:1 ratio
 - (e) Reconstituted dried plasma, liquid plasma, or thawed plasma and/or RBCs alone

- 15** Assess for and treat blood transfusion reactions:
- (a) Anaphylactic reaction (hives, itching, stridor/shortness of breath, and/or hypotension):
 1. Stop blood infusion.
 2. Initiate normal saline or lactated Ringer's IV infusion.
 3. Administer epinephrine 0.3 ml of 1:1000 intramuscular (IM).
 4. Administer diphenhydramine 25 mg slow IV push or IM.
 5. Monitor airway.
 6. If available, consider methylprednisolone 10-40 mg IV push over several minutes.
 7. Immediately find another compatible blood product or donor and repeat steps 1-15.
 - (b) Acute hemolytic reaction (arm pain, chest pain, back pain, nausea, disseminated intravascular coagulation, and/or fever):
 1. Stop blood infusion.
 2. Initiate normal saline or lactated Ringer's IV infusion.
 3. Administer diphenhydramine 25 mg slow IV push or IM.
 4. Immediately find another compatible blood product or donor and repeat steps 1-15.
- 16** Administer one gram of calcium (30 ml of 10% calcium gluconate or 10 ml of 10% calcium chloride) IV/IO after the first unit of blood products.
- CAUTION:** Calcium chloride has been associated with severe necrosis and skin sloughing when extravasation occurs during peripheral IV administration, monitor infusion closely.
- 17** Continuously monitor the patient throughout administration of blood products.
- 18** If the post-transfusion systolic blood pressure is <100 mmHg, and the heart rate is >100 bpm, then another unit of blood product(s) should be administered.
- 19** If another unit of a blood product is given, continue to monitor the casualty for blood transfusion reactions.
- NOTE:** If infusing through a saline lock, flush with 10 ml of an appropriate fluid.
- NOTE:** Discontinued blood product(s) and used equipment should be disposed of properly.
- 20** Document all findings and treatments on a DD Form 1380 TCCC Casualty Card and attach it to the casualty.

Developed by the

JOINT TRAUMA SYSTEM

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