

VASCULAR SUPPORT

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SHOCK

Shock is a condition where the circulation is inadequate to meet the needs of the metabolizing organs. Clinically, paramedics should suspect shock when the following conditions apply:

1. One or more of the following signs:
Pulse > 100 / ↓ capillary refill / clammy skin / pallor / confusion / yawning / agitation
*****PLUS*****
2. Blood pressure lower than normal by history OR
3. Systolic pressure < 100 in a male > 10 years OR
4. Systolic pressure < 90 in a female < 30 years OR
5. Systolic pressure < 100 in a female > 30 years or obese OR
6. Systolic pressure < 60 in a child < 10

SHOCK IS ONE OF THE FEW CONDITIONS IN PREHOSPITAL CARE WHERE THE ETIOLOGY CAN MAKE A GREAT DIFFERENCE IN THE MANAGEMENT. Thus, it is important to recognize the general categories noted below. Since proper identification of the categories is difficult and because shock, regardless of cause, precipitates multiple organ failure beyond the capabilities of prehospital care, **EARLY RAPID TRANSPORT IS CRITICAL!**

CATEGORIES OF SHOCK

NON-CARDIOGENIC SHOCK

ALL SHOCK EXCEPT CARDIOGENIC AND ANAPHYLACTIC. Includes shock due to hypovolemia, spinal disruption or sepsis. It can also be produced by drugs, hypoglycemia or as a pre-terminal event in severe brain injury. Unless caused by spinal disruption, the patient is expected to be hypotensive with decreased pulse pressure (see vital signs chart), cool, clammy, pale, tachycardic and tachypneic, possibly with decreased mental acuity. For the purposes of quick, prehospital assessment, spinal shock exists when there is hypotension in the setting of suspected spinal disruption.

In the child, non-cardiogenic shock may frequently be due to dehydration. Examination will reveal dry tongue and mucous membranes and lack of tears when crying. The eyes may appear sunken and the infant may have depressed fontanelle. There is commonly a history of vomiting, diarrhea, dry diapers and lack of food and fluid intake.

UNLESS THE SHOCK CAN BE DEMONSTRATED TO BE CARDIOGENIC OR ANAPHYLACTIC, IT IS ASSUMED TO BE NON-CARDIOGENIC.

Since shock may be caused by hypoglycemia, 50% dextrose in water may be administered.
ALL NON-CARDIOGENIC SHOCK IS TREATED WITH OXYGEN AND IV FLUIDS

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NON-CARDIOGENIC SHOCK (continued)

1. Maintain airway and breathing, CONTROL BLEEDING.
2. Pulse Oximetry, high flow oxygen.
3. EKG Monitor (if DYSRHYTHMIAS begin ACLS protocols).
4. Antishock trousers (if no pulmonary edema).
5. IV two large bore Normal Saline Wide-Open rate, blood draws.
6. Glucose check.
7. Rapid transport.
8. Monitor ABC's.

CARDIOGENIC SHOCK

CARDIOGENIC SHOCK is circulatory failure due to inadequate cardiac function. For purposes of prehospital care, cardiogenic shock exists when patient is suspected of having a myocardial infarction. This shock also occurs in association with pulmonary edema (as may be uncommonly found in children with congenital heart defects).

Although marked tachy and brady dysrhythmias produce cardiogenic shock, these are covered in the ACLS section. MAST TROUSERS AND IV FLUIDS MAY WORSEN CARDIOGENIC SHOCK.

TREAT AS PER ACLS PROTOCOLS/ Consider Dopamine (Intropine)

Administer Dopamine (Intropine): 5-20 mcg/kg/min. Titrate to effect (BP > 90)

Simple calculation for approx 5 mcg/kg/min (must be 1600 mcg/ml concentration)

*Take the Patients weight in lbs and remove the last digit (175lbs = 17)

* Subtract 2 from that figure (17-2=15)

*This gives you the number of drops per min using a 60gtts set. (titrate to desired effect)

Example: 175lbs patient.

175 remove the 5 is 17

17 - 2 = **15 drops per min** (approx 5 mcg/kg/min)

DRUG RELATED SHOCK

In the intentional overdose patient or drug abuser, awakening the patient may result in combative or uncooperative patient enroute. However, if circumstances indicate that severe shock, unresponsive to usual measures may be caused by drug overdose, Narcan (Naloxone) may be administered

****TREAT AS PER NARCOTIC OVERDOSE PROTOCOL****

UNCONTROLLED BLEEDING

1. Maintain airway, breathing and circulation.
2. Direct pressure
3. Elevate
4. Ice
5. Pressure points
6. Tourniquet

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HYPOVOLEMIA

PARAMEDICS WILL PROCEED AS FOLLOWS:

1. Secure patient's airway and assist ventilation's if necessary.
2. Pulse Oximetry, high flow oxygen.
3. EKG monitor (if dysrhythmias, begin ACLS protocol).

IF PATIENT IS HYPOTENSIVE:

4. Start one or two large bore IVs with Normal Saline, infusion rate dependent upon the severity of the patient's condition, blood draws.
5. Rapid Transport.
6. Monitor ABC's.

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HYPOVOLEMIA

Fluid and Intravenous Treatment

Fluid Resuscitation

1. IV's will be established at the earliest possible time.
2. Large-bore IV catheter will be utilized
3. Isotonic Fluids will be administered at a rate of 20-ml/kg fluid bolus.
4. Fluid resuscitation treatment will be aimed at keeping a systolic blood pressure of 90.
5. Fluid considerations will also take into account the level of consciousness.

Vascular Access

1. Peripheral IV's will be attempted on all hypotensive patients.
2. For unresponsive patients without IV peripheral access, an IO will be placed.

Adult IO

1. Adult IO's will be established on all cardiac arrests where peripheral line cannot be placed.
2. Adult IO's are to be established in any adult patient where a peripheral line cannot be accessed and the Glasgow coma score is ≤ 8 .
3. Adult IO's are to be use on adult patients only. (Ages 16 and up or 37 kg)
4. Contraindications to Adult IO's are as follows:
 - Skin damage /compromise at the infusion site
 - Severe osteoporosis
 - Fractures at the site or above
 - Tibial IO in patients with a history of knee replacement

THINGS TO REMEMBER:

- a. All bolus drugs are flushed after addition with a 10 cc Normal Saline bolus.
- b. If during the infusion you notice any swelling about the insertion site, DISCONTINUE THE INFUSION IMMEDIATELY.
- c. Any drug than can be given peripherally can be given via IO.

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INTRAVENOUS FLUIDS

INDICATIONS

- a. Secure a route for medication administration.
- b. Replacement of fluids

FLUIDS AND RATES

- a. In cases where the patient is experiencing a medical emergency, an intravenous solution of Normal Saline should be administered.
- b. This will be delivered through an 18 or 20-gauge over-the-needle catheter at a KVO rate
- c. All medications administered via intravenous infusion will be mixed in a 100/250/500 ml solution of Normal Saline. All intravenous drips will be piggybacked into a primary IV line with a 60 gtt set so that the drip may be discontinued without jeopardizing the primary line.
- d. In cases where the patient is traumatized, < 65 years old 20cc/kg of Normal Saline will be infused with a macrodrip administration set. > 65 years old 10cc/kg of Normal Saline will be infused with a macrodrip administration set. This will be delivered through the largest practical catheter at an initial unregulated “wide open” rate, and then titrated to the result.

INTRAVENOUS CANNULATION ATTEMPTS AND SITES

- a. The preferred sites for all prehospital infusions are the dorsal surface of the hand, the antecubital fossa external jugular. In order to minimize the risk of extravasation and phlebitis, the largest suitable vein will be utilized. Splints will be used to stabilize the infusion site when indicated.

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Saline-lock Indications

See indications for Intravenous fluids.

1. Any situation in which intravenous indication or fluid resuscitation might be indicated applies.
2. Any keep open IV may be substituted with a SALINE-LOCK

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ADULT INTRAOSSEOUS INFUSION

Fluid Resuscitation

1. IV's will be established at the earliest possible time.
2. Large-bore IV catheter will be utilized
3. Isotonic Fluids will be administered at a rate of 20-ml/kg fluid bolus.
4. Fluid resuscitation treatment will be aimed at keeping a systolic blood pressure of 90.
5. Fluid considerations will also take into account the level of consciousness.

Vascular Access

1. Peripheral IV's will be attempted on all hypotensive patients.
2. Adult IO's will be established on all cardiac arrests where peripheral line cannot be placed.
3. Adult IO's are to be established in any adult patient where a peripheral line cannot be accessed **and** the Glasgow coma score is 8 and under

IO access

1. Adult IO's are to be use on adult patients only. (Ages 16 and up) F.A.S.T.1
2. EZ IOs can be utilized on pediatric patients.
3. Contraindications to the Sternal IO are as follows
 - a. Trauma to the chest suspected Sternal fracture
 - b. Skin damage /compromise at the infusion site.
 - c. Previous Sternotomy
 - d. Extremely small adult
 - e. Severe osteoporosisContraindications to the Adult IO are as follows (EZ IO)
 - f. Trauma to the leg / suspected fracture
 - g. Skin damage / compromise at the infusion site.
 - h. Extremely small adult
 - i. Severe osteoporosis

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EXTERNAL JUGULAR CANNULATION

INDICATIONS

- a. In the absence of suitable upper and lower extremity veins, external jugular cannulation is an acceptable alternative in selected patients.

CONTRAINDICATIONS

- a. Patients younger than 8 years of age.
- b. Patients with suspected cervical spine injuries.
- c. Patients actively seizing.
- d. Concurrent intubation attempt.

PROCEDURE

1. Place patient in supine position or reclining position.
2. Turn patient's head to face away from the side of the neck where cannulation attempt will be made.
3. From behind the patient, use your index finger to apply gentle pressure to the proximal end of the vein, just above the medial portion of the clavicle (to assist with visualizing the vein).
4. Insert IV catheter into the vein at the mid-portion of the neck.
5. Immediately attach IV tubing.
6. If the patient will tolerate it, apply rigid cervical collar to prevent inadvertent catheter crimping or dislodgment.

*****THE POTENTIAL FOR AN AIR EMBOLISM MUST BE OF CONCERN.***
THEREFORE, BE SURE TO CAP THE CATHETER WITH YOUR FINGER***
UNTIL THE IV TUBING OR HEP-LOCK CAN BE PLACED**