

D03: Vascular Access and Fluid Administration

Adam Greene and Mike Sugimoto

Updated: December 07, 2020

Reviewed:

Introduction

Peripheral venous cannulation, among the most common medical procedures, has revolutionized the practice of medicine. Peripheral intravenous (IV) catheters allow for the safe infusion of medications, hydration fluids, blood products, and nutritional supplements.

Essentials

- Vascular access should only be performed when there is an indication for use in the prehospital environment. See [→PR26: Venipuncture - Ethical decision making](#) for more information.
- Catheter and site selection varies according to the patient's condition and intended use

General Information

- Initiation of peripheral vascular access is contraindicated when appropriate therapy can be provided through a less invasive route (e.g., intramuscularly, intranasally, or orally).
- Paramedics must make informed decisions with respect to a patient's need for vascular access, with consideration given to:
 - Current clinical status and stability
 - Expected prehospital interventions, such as the need to administer medications or fluid en route to hospital
 - Anticipated in-hospital clinical course. Note that a general expectation that the patient may require IV access at some point during their hospital stay is not, by itself, grounds to attempt IV cannulation.
- Intravenous devices can become dislodged or pulled out during patient movement. Paramedics should consider the timing of patient movements when contemplating IV cannulation.
- Intraosseous access should be considered on critically ill or injured patients who cannot be successfully cannulated in a short period of time.
 - Higher flow rates have been reported when intraosseous needles are placed in the humeral head instead of the tibial plateau; the humeral head is therefore the preferred site in cardiac arrest.

Interventions

Primary Care Paramedic – All FR and EMR interventions, plus:

- Obtain peripheral vascular access
- Consider need for fluid or fluid replacement. If signs or symptoms of hypotension, hypoperfusion, or hypovolemia are present (including based upon history):
 - **In general, give normal saline in 500 mL increments**
 - Target a systolic blood pressure of 90 mmHg or better. Caution: major trauma, and head and spinal cord trauma have different fluid resuscitation targets. Consult appropriate CPGs for guidance.
 - [→ H01: Principles of Major Trauma](#)
 - [→ H03: Head Trauma](#)
 - [→ H05: Spinal Cord Injuries](#)
- Reassess patient after every 500 mL bolus for blood pressure and presence or absence of pulmonary edema
- Do not exceed 2 L of fluid. If additional fluids are required, consult CliniCall.
- In children, consider increments of 5-10 mL/kg normal saline. Do not exceed 20 mL/kg.

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

If unable to obtain peripheral vascular access:

- Consider external jugular access
 - → [PR13: External Juglar Cannulation](#)
- Consider intraosseous access
 - → [PR12: Intraosseous Cannulation](#)

Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Ultrasound-guided peripheral venous access
- Ultrasound-guided central access

Evidence Based Practice

[Hemorrhagic Shock](#)

References

1. Alberta Health Services. AHS Medical Control Protocols. 2020. [[Link](#)]
2. Ambulance Victoria. Clinical Practice Guidelines: Ambulance and MICA Paramedics. 2018. [[Link](#)]
3. Chopra V. (2019). Central venous access devices and approach to device and site selection in adults. In UpToDate. 2019. [[Link](#)]
4. Frank R. Peripheral venous access in adults. In UpToDate. 2019. [[Link](#)]
5. Heffner A, et al. Overview of central venous access. In UpToDate. 2019. [[Link](#)]
6. Lairet J, et al. A comparison of proximal tibia, distal femur, and proximal humerus infusion rates using the EZ-IO intraosseous device on the adult swine (Sus scrofa) model. 2013. [[Link](#)]
7. Perron C. Intraosseous infusion. In UpToDate. 2019. [[Link](#)]
8. Sabado J, et al. Principles of ultrasound-guided venous access. In UpToDate. 2019. [[Link](#)]
9. Smith, S. Vascular (venous) access for pediatric resuscitation and other pediatric emergencies. In UpToDate. 2019. [[Link](#)]

