

# Intravenous Cannulation and Infusion Protocol

revised October 2008



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## Preamble

Intravenous cannulation and infusion has two major roles in the EMS workplace:

1. administration of fluids as primary therapy
2. provide access for administration of medications

This protocol includes protocols for intravenous cannulation and infusion for pediatric, adolescent, and adult patients.

## Patient Categorization by Age

- age 0 to 9 years – refer to pediatric section
- age 10 to 15 years – refer to adolescent section
- age 16 years or greater – refer to adult section

## Requirements

1. Fully licensed Technician-Paramedic.
2. Certification in intravenous cannulation and infusion protocol by the Medical Director.

### **Indications**

1. patients who have suffered cardiac arrest
2. patients with clinically significant chest pain
3. patients with clinically significant respiratory distress
4. patients with depressed levels of consciousness
5. patients who have suffered significant traumatic injury
6. patients who have suffered significant burns
7. patients displaying symptoms or signs of shock
8. patients who are actively seizing

### **Contraindications**

1. transport time less than time required to initiate intravenous line.

### **Infusion Solutions, Rates, and Intravenous Catheter Sizes**

abbreviations used:           NS – normal saline  
  TKVO – to keep vein open

note: there will be circumstances when a large bore intravenous catheter is desirable but not possible – a smaller bore intravenous catheter may be used under these circumstances

#### **Pediatric patients – 20 or 22 gauge catheter**

1. patients who have suffered cardiac arrest:  
  NS, TKVO
2. patients with depressed levels of consciousness:  
  NS, TKVO
3. patients who have suffered significant traumatic injury:  
  NS, TKVO if no evidence of shock  
  NS 20 ml / kg bolus, wide open, if evidence of shock

- reassess when half bolus is completed
- decrease to TKVO when response noted
- may repeat 10 ml / kg bolus if shock persists despite initial bolus

4. patients who have suffered significant burns:

NS 20 ml / kg bolus to run in transit, if no evidence of shock

NS 20 ml / kg bolus, wide open, if evidence of shock

- reassess when half bolus is completed
- decrease to TKVO when response noted
- may repeat 10 ml / kg bolus if shock persists despite initial bolus

5. patients displaying symptoms or signs of shock:

NS 20 ml / kg bolus, wide open, if evidence of shock

- reassess when half bolus is completed
- decrease to TKVO when response noted
- may repeat 10 ml / kg bolus if shock persists despite initial bolus

**Adolescent patients – 16 or 18 gauge catheter**

1. patients who have suffered cardiac arrest:

NS, TKVO

2. patients with depressed levels of consciousness:

NS, TKVO

3. patients who have suffered significant traumatic injury:

NS, TKVO if no evidence of shock

NS 20 ml / kg bolus, wide open, if evidence of shock

- reassess when 500 ml has been infused
- decrease to TKVO when response noted
- may repeat bolus if shock persists despite initial bolus

4. patients who have suffered significant burns:

NS 20 ml / kg bolus to run in transit, if no evidence of shock

NS 20 ml / kg bolus, wide open, if evidence of shock

- reassess when half bolus has been infused
- decrease to TKVO when response noted
- may repeat bolus if shock persists despite initial bolus

5. patients displaying symptoms or signs of shock:
  - NS 20 ml / kg bolus, wide open, if evidence of shock
  - reassess when half bolus has been infused
  - decrease to TKVO when response noted
  - may repeat bolus if shock persists despite initial bolus
6. patients who have had a seizure or are actively seizing:
  - NS, TKVO

### **Adult patients – 16 gauge catheter**

1. patients who have suffered cardiac arrest:
  - NS, TKVO
2. patients with clinically significant chest pain:
  - NS, TKVO
3. patients with clinically significant respiratory distress:
  - NS, TKVO
4. patients with depressed levels of consciousness:
  - NS, TKVO
5. patients who have suffered significant traumatic injury:
  - NS, TKVO if no evidence of shock
  - NS 1000 ml bolus, wide open, if evidence of shock
  - reassess when 500 ml has been infused
  - decrease to TKVO when response noted or if evidence of fluid overload
  - may repeat bolus if shock persists despite initial bolus
6. patients who have suffered significant burns:
  - NS 150 ml / hour if no evidence of shock
  - NS 1000 ml bolus, wide open, if evidence of shock
  - reassess when 500 ml has been infused
  - decrease to TKVO when response noted or if evidence of fluid overload
  - may repeat bolus if shock persists despite initial bolus
7. patients displaying symptoms or signs of shock:

NS, TKVO if no evidence of shock

NS 1000 ml bolus, wide open, if evidence of shock

- reassess when 500 ml has been infused
- decrease to TKVO when response noted or if evidence of fluid overload
- may repeat bolus if shock persists despite initial bolus

8. patients who have had a seizure or are actively seizing:

NS, TKVO

### **Procedure**

1. Perform patient assessment and record vital signs.
2. Assess that patient meets criteria for this protocol.
3. Ensure there are no contraindications to use of this protocol.
4. Initiate basic life support treatment measures, including supplemental oxygen.
  - these take precedence over management using this protocol
5. Obtain patient consent if possible. If the patient refuses treatment, intravenous cannulation should not be carried out.
6. Carry out intravenous cannulation and establish intravenous infusion based on established method (see appendix for acceptable method).
7. A maximum of two attempts at intravenous cannulation can be made on each patient.
  - further attempts may be made en route, at the discretion of the medical director or from physician on-line medical control
8. Transport should not be delayed to carry out intravenous cannulation and establish an intravenous infusion. Cannulation may be performed while en route.

### **Documentation Requirements**

The following information must be documented on the patient care report form:

1. Patient's presenting signs and symptoms, including vital signs.

2. Indications for protocol use.
3. Verbal consent; parental in case of a minor patient.
4. Location and catheter size used for each attempt. Indicate which, if any, was successful.
5. Date and time for each cannulation attempt. Indicate which, if any, was successful.
6. Type and total volume of fluid infused.
7. Repeat assessment and vital signs, as indicated.
8. Changes from baseline, if any, that occur during transport.
9. Signature and license number of EMS personnel performing any transfer of function skills.

### **Certification Requirements**

1. Attend in-depth classes and lectures on intravenous fluid therapy.
  - should include criteria for initiation of therapy, choice of catheter size, and choice of intravenous fluid
  - should also include potential reactions to and adverse effects of intravenous fluid therapy (including their management)
2. Demonstrate an understanding of the physiologic effects of intravenous fluid therapy.
3. Demonstrate the correct technique for intravenous starts according to an accepted performance checklist.
4. Demonstrate the correct technique to dispose of sharp biohazardous objects.
5. Perform a minimum of ten successful intravenous starts under supervision of the medical director or designate.
6. Pass both written and oral / practical examinations.
7. Certification is by the Medical Director.

### **Recertification Requirements**

1. Review class and recertification is done every 12 months.

2. A minimum of ten (10) intravenous cannulations every twelve (12) months:
  - there must be a greater than 70% success rate
  - if the minimum of ten (10) is not achieved, additional intravenous cannulations may be carried out in an alternate clinical setting under the supervision of the medical director or physician designate. These must involve use of live patient, as approved by the medical director.
3. A record will be kept to document all cases where this protocol is used.

### **Decertification**

1. Decertification is at the discretion of the Medical Director or the Provincial Medical Director, Emergency Medical Services, Manitoba Health & Healthy Living.

### **Quality Assurance Requirements**

1. Appropriate quality assurance policies must be in place. The Medical Director or designate must review all instances where this protocol is used. As a minimum, the following must be assessed:
  - i) appropriateness of implementation
  - ii) adherence to protocol
  - iii) any deviation from the protocol
  - iv) corrective measures taken, if indicated
2. Appropriate policies for disposal of sharp biohazardous materials must be in place.
3. Appropriate policies regarding needle stick injuries must be in place.
4. Yearly statistics for protocol use compiled and forwarded to Emergency Medical Services, Manitoba Health & Healthy Living.

## **Appendix – Accepted method of intravenous cannulation**

### **Equipment preparation**

1. Hands must be washed and gloves should be worn.
2. Open an intravenous fluid container – ensure its sterility, clarity, and expiry date.
3. Mark the date and time intravenous fluid container was opened.
4. Hang container on a pole.
5. Remove administration set from wrapper.
6. Close clamp on administration set.
7. Attach extension set to administration set (if applicable).
8. Insert administration set drip chamber into intravenous fluid container where indicated.
9. Squeeze and release drip chamber until half full of solution.
10. Release clamp to fill tubing with solution.
11. Raise end of tubing to avoid air bubbles.
12. Invert check valve to clear and allow valve to function.
13. Clamp tubing.

### **Cannulation procedure – note maximum of two (2) attempts**

1. Ensure patient meets criteria.
2. Explain procedure to patient.
3. Select site – antecubital fossa preferred for trauma or unstable patients.
4. Apply tourniquet.
5. Clean area over site with alcohol swabs.
6. Prepare intravenous needle with cannula, adhesive tape, and dressing.
7. Draw skin taut over vein.
8. Insert intravenous needle with cannula, bevel up, through the skin into the vein.
9. Carefully remove needle, leaving cannula in vein.
10. Once vein successfully cannulated, attach intravenous tubing to cannula.
11. Open clamp to ensure flow of intravenous fluid.
12. Apply dressing to site.
13. Anchor intravenous tubing using tape.
14. Label site with date, type and size of cannula, and name of personnel carrying out procedure.
15. Regulate rate of infusion.