Pulmonary Edema Protocol

revised November 2007

Preamble

Acute pulmonary edema is characterized by severe shortness of breath, an elevated jugular venous pressure, and crackles in both lungs. Common etiologies include ischemic heart disease, valvular heart disease, hypertension, and fluid overload.

Requirements

1. Fully licensed Technician-Paramedic.

2. Certification in pulmonary edema protocol by the Medical Director.

3. Certification in intravenous cannulation protocol by the Medical Director.

Indications

1. Patient with shortness of breath **and** crackles in both lungs
    - appendix 1 lists the signs suggesting pulmonary edema

Contraindications

1. Systolic blood pressure less than 100 mm Hg.

2. Known hypersensitivity to drug(s) being used
    - in this situation, the drug to which the patient is sensitive should be omitted

Drug Doses and Frequencies

1. nitroglycerine
   as nitrospray
   0.4 mg sublingually
   repeat q5minutes prn
   maximum of 3 doses
   hold if systolic blood pressure less than 100 mm Hg
   OR
   as nitroglycerine tablets
   0.3 mg sublingually
   repeat q5minutes prn
   maximum of 3 doses
   hold if systolic blood pressure less than 100 mm Hg

2. furosemide
   40 mg IV bolus
   if patient is taking a total daily dose greater than 40 mg:
   - dose equivalent to patient's total daily dose (maximum 160 mg)

3. nitroglycerine patch (0.4 mg/hr)(if available)
   apply 5 minutes after 1st dose of NTG spray/tablets
   hold or remove if systolic blood pressure less than 100 mm Hg

Procedure

1. Perform patient assessment and record vital signs, level of consciousness, and oxygen saturation.

2. Assess that patient meets criteria for this protocol.

3. Ensure there are no contraindications to use of this protocol.

4. Patient placed in semi-fowler's position, if no contraindication.

5. Administer supplemental oxygen by mask.

6. Establish an intravenous line.

7. Administer furosemide.

8. Administer nitroglycerine.

9. Assess the patient, including vital signs, level of consciousness, oxygen saturation, and effect of treatment.

10. Initiate transport.

11. Repeat doses of medications if indicated.

12. Repeat assessment, including vital signs, level of consciousness, oxygen saturation, and effect of treatment after each drug dose.

13. If hypotension occurs, it should be managed based on the appropriate protocol. Do not administer any further medications if the patient is hypotensive.

Note: in the event of prolonged transport times, additional doses of nitroglycerine may be administered with orders via physician on-line medical control or by prior expressed written instructions from the Medical Director.

Documentation Requirements

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

1. Patient's presenting signs and symptoms, including vital signs, level of consciousness and oxygen saturation.

2. History of cardiorespiratory symptoms, their severity, character, and other associated symptoms.

3. Indications for protocol use.

4. Dose, formulation, route, and time for each medication dose administered, and resulting clinical effects.

5. Repeat assessment, including vital signs, level of consciousness and oxygen saturation, as indicated.

6. Changes from baseline, if any, that occur during treatment or transport.

7. Signature and license number of EMT performing any transfer of function skills.

Certification Requirements

1. Attend in-depth classes and lectures on pulmonary edema, including anatomy, physiology, and pathophysiology of the cardiorespiratory system.

2. Demonstrate an understanding of the pharmacology, mechanism of action, and potential side effects of furosemide and nitroglycerine.

3. Pass a written examination.

4. Certification is by the Medical Director.

Recertification Requirements

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

2. 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. Yearly statistics for protocol use compiled and forwarded to Emergency Medical Services, Manitoba Health & Healthy Living.

Appendix 1

Possible signs and symptoms of pulmonary edema.

1. Shortness of breath
2. Crackles in lung bases
3. Apprehension
4. Hypertension (hypotension may be present)
5. Tachycardia
6. Elevated jugular venous pressure
7. Pink frothy sputum
8. Cyanosis