Drug Guideline Title: Adenosine

Summary: Adenosine is an antiarrhythmic agent and vasodilator. It is used in the ICU to convert paroxysmal supraventricular tachycardia to normal sinus rhythm and to help diagnose atrial activity in atrial flutter, atrial fibrillation or ventricular tachycardia.

Approved by: ICU Director

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Replaces Existing Drug Guideline: Adenosine


1. Introduction:
The risk addressed by this policy:

Patient Safety

The Aims / Expected Outcome of this policy:

Adenosine will be administered safely and appropriately without any adverse side effects.

Related Standards or Legislation

- NSQHS Standard 1 Governance
- National Standard 4 Medication Safety

Related Policies
- LH_PD2013_C03.01 Drug Administration
- LH_PD2010_C03.00 Drug Prescribing
- LH_PD2008_C03.12 Administration of IV Medication

2. Policy Statement:

- All care provided within Liverpool Hospital will be in accordance with infection control, manual handling and minimisation and management of aggression guidelines.
- Medications are to be prescribed and signed by a medical officer/authorised nurse practitioner (NP) unless required during an emergency.
• All drugs administered during an emergency (under the direction of a medical officer/authorised nurse practitioner) are to be documented during the event, then prescribed and signed following the event.
• Medications are to be given at the time prescribed (as close to the time as is possible when multiple drugs require ‘same time’ administration and, when the nurse is caring for more than one patient, recognition is given to a possible short delay to administration – antibiotics and other lifesaving drugs are to be prioritised) and are to be signed by the administering nurse.
• Parenteral medication prescriptions and the drug are to be checked with a second registered or endorsed enrolled nurse prior to administration. The “rights of drug administration” must be followed: right: patient, drug, dose, route, administration, time, reason for the drug, documentation, education and evaluation/outcome.
• Adverse drug reactions are to be documented and reported to a medical officer.
• Medication errors are to be reported using the hospital electronic reporting system: IIMS.
• Guidelines are for adult patients unless otherwise stated

3. Principles / Guidelines

Actions
• Adenosine is an antiarrhythmic used in the management of supraventricular tachycardias (SVT).
• Adenosine administered by rapid intravenous injections depresses conduction through the AV node. This action can interrupt re-entry circuits involving the AV node and restore normal sinus rhythm in patients with paroxysmal supraventricular tachycardias and paroxysmal supraventricular tachycardias associated with Wolff-Parkinson-White syndrome. Once the circuit has been interrupted, the tachycardia stops and normal sinus rhythm is re-established.

Indications
• Termination of re-entrant SVT where the AV node forms part of the circuit.
  ➢ AV nodal SVT
  ➢ SVT in WPW (narrow complex)
• To aid the diagnosis in narrow complex tachycardias, where the origin of the tachycardia is unclear. By slowing the ventricular rate, the underlying arrhythmia is easier to determine. Possible causes of narrow complex tachycardia include:
  ➢ Atrial fibrillation (which can look regular when rapid)
  ➢ Atrial flutter (flutter waves can be difficult to see)
  ➢ SVT (which will be terminated with adenosine).
  ➢ Sinus tachycardia

  CAUTION: another agent should generally treat broad Complex tachycardia (eg. Amiodarone) unless positively identified as a SVT with conduction block.

• Termination of exercise-induced RV outflow tract ventricular tachycardia.

Contraindications
• Known hypersensitivity to adenosine
• 2nd and 3rd degree Heart Blocks
• Sick Sinus Syndrome
• Bronchial Asthma
Precautions\textsuperscript{1,2,3}
- As Adenosine exerts its effect by decreasing conduction through the AV node, a transient first, second or third degree heart block may occur. In extreme cases, transient asystole may result. However, these effects are generally self-limiting to several seconds only because of its very short half-life.
- At the time of conversion to sinus rhythm, a variety of new rhythms may appear. These generally last a few seconds, requiring no intervention. They may take the form of premature ventricular or atrial ventricular contractions, sinus bradycardia, sinus tachycardia, and various degrees of AV block. Such findings are seen in up to 55% of patients.

\textit{N.B: Many patients will experience a feeling of “doom” and will experience chest pain and dyspnoea with adenosine. Hence, it is advisable to warn all patients of this possible symptom.}

Significant Interactions\textsuperscript{1,2}
- Adenosine may be used in the presence of all other antiarrhythmic drugs without any interactions.
- Adenosine is antagonised by methylxanthines such as caffeine and aminophylline. Such patients may be relatively resistant to adenosine- may require a larger dose.
- Disopyramide and Carbamazepine potentiate adenosine effects- usually commence with a smaller dose.

Adverse Effects\textsuperscript{1,2,3,4}
- Cardiovascular - severe bradycardia, facial flush, headache, sweating, palpitations, chest pain and hypotension.
- Respiratory - dyspnoea, hyperventilation.
- CNS - light headedness, dizziness, tingling in arms, numbness, apprehension, blurred vision.
- GIT - nausea, metallic taste, tightness in throat, pressure in the groin.

Presentation\textsuperscript{2}
- 6mg in 2 mL ampoule (3 mg/mL)

Administration Guidelines\textsuperscript{2,3,4,5}
- Dose protocol to be determined by medical officer.
- All doses are to be followed immediately by a rapid 20ml 0.9% sodium chloride flush
- Initial Dose: 6 mg rapid IVI
- If no reversion to sinus rhythm occurs in 1-2 minutes 2nd Dose: 12 mg rapid IVI.
- If no reversion to sinus rhythm occurs in 1-2 minutes: 3rd Dose: 12 mg rapid IVI
- Maximum dose is a total of 30mg.

Clinical Considerations\textsuperscript{1,3,4,5}
- Adenosine can only be administered when cardiac monitoring and defibrillation facilities are available.
- A 12 lead ECG should be attended prior to administration and repeated after reversion
- Warn patient of possible side effects & stay with them throughout therapy - although usually transient, these can cause considerable discomfort.
- PVC’s (premature ventricular contraction) commonly accompanies termination of a tachycardia by adenosine.
- Dose must be given as a rapid injection and immediately flushed with 0.9% sodium chloride because of the short half-life.
- Adenosine can only be given in the presence of a medical officer.
- Preferable to be given via IVC in the antecubital fossa.
- If administered via a central venous catheter, the initial dose should be 3mg.
- Patients with cardiac transplants are very sensitive to adenosine – start with 1mg dose.

4. **Performance Measures**

All incidents are documented using the hospital electronic reporting system: IIIMS and managed appropriately by the NUM and staff as directed.

5. **References / Links**

1. MIMS Online, CIAP: NSW Health Department, Copyright MIMS Australia Pty Ltd 2013. [http://www.mims.hcn.net.au/](http://www.mims.hcn.net.au/)

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