Ballarat Health Services

DRUG GUIDELINE

ADENOSINE

SCOPE (Area):	**FOR USE IN:**	Intensive Care Unit, Coronary Care Unit, ED, Theatre General wards **by MET Liaison Nurse** only
	EXCLUSIONS:	Paediatrics (seek Paediatrician advice) and General Wards
SCOPE (Staff):		Medical, Nursing and Pharmacy

BRAND NAMES
Adenocor®and generics.

PHARMACOLOGY AND PHARMACOKINETICS
Adenosine depresses sinus node activity and slows conduction through the atrioventricular node. Adenosine has a rapid onset and short duration of action, with a half-life of less than 10 seconds.

INDICATIONS
- Acute treatment of paroxysmal supraventricular tachycardias, including those associated with Wolff-Parkinson-White syndrome.
- Diagnostic aid for broad or narrow QRS complex supraventricular tachycardias.

Indications NOT covered in this guideline
- **Radionuclide myocardial perfusion imaging**
- **Free fractional reserve measurement – CVS only**

CONTRAINDICATIONS
- **Second and third degree atrioventricular block (without pacemaker).**
- **Sick sinus syndrome (without pacemaker)**.
- **Known hypersensitivity to adenosine.**

PRECAUTIONS
- **Asthma and other obstructive lung disease** – may precipitate severe bronchospasm in reactive airways disease that can last 30 minutes. Use with caution and consider lowering initial dose to 3 mg and observe for bronchospasm.
- **Atrial fibrillation or atrial flutter** - adenosine may rarely accelerate ventricular rate, especially with an accessory conduction pathway e.g. Wolff-Parkinson-White syndrome.
- **Long QT syndrome** – use with caution, increased risk of torsades de pointes.
- **Severe hypotension** – adenosine can worsen hypotension, use with caution.
- **Recent heart transplant (less than one year)** - increased sensitivity to the effects of adenosine, use with caution and lower initial dose to 3 mg.

PREGNANCY AND BREASTFEEDING

Seek specialist advice before prescribing, information may update regularly.

DRUG INTERACTIONS

- **Dipyridamole –** enhances effect of adenosine (especially bradycardia). Lower initial dose to 3 mg, with further doses determined by the response to the first dose. Monitor carefully.
- **Carbamazepine –** may increase the degree of heart block experienced with adenosine. Lower initial dose to 3 mg, with further doses determined by the response to the first dose. Monitor carefully.
- **Digoxin** – may increase adverse effects of adenosine. Most cases of ventricular fibrillation associated with adenosine use occur in patients taking digoxin.
- **Caffeine, theophylline, aminophylline –** antagonises the effect of adenosine – a higher dose of adenosine, or a different drug may be required.
- **Nicotine** – may increase effect and toxicity of adenosine, monitor carefully.
- **Ceritinib, fexinidazole, ivabradine, lacosamide, midodrine ruxolitinib, siponimod, terlipressin, tofacitinib** – may enhance bradycardic effect of adenosine
- **Bradycardia- causing agents** – may increase adverse effects of adenosine.

DOSAGE AND ADMINISTRATION

Requires continuous ECG monitoring and the availability of resuscitation equipment.
For administration only:

- **in Intensive Care Unit, ED or Theatre**
- **in Coronary Care Unit on the order of the Cardiology Advanced Trainee or Cardiologist with the Cardiology Advanced Trainee or Cardiologist in attendance**
- **by MET or Code Blue**
- **on General Wards by MET Liaison Nurse on the order of a Registrar with the Registrar in attendance**

Adenosine is only effective if it reaches the heart as a concentrated bolus (as half-life is less than 10 seconds). To ensure efficacy:

- **give as a rapid IV injection (over 2 seconds)**
- **follow injection immediately with 10-20 mL sodium chloride 0.9% flush to ensure all drug is removed from tubing**
- **use the largest vein available**
- **use the smallest amount of tubing possible**

Note: Some patients who have previously received adenosine and become distressed by the 'impending feeling of doom' associated with its use may require a small IV dose of midazolam prior to administration of adenosine.

IV injection

Initial dose:

Adenosine 6 mg (2 mL from ONE vial) undiluted by rapid IV injection over 2 seconds.
Inject as proximally as possible, and follow dose with an immediate, rapid flush of sodium chloride 10-20 mL.

Initial dose is reduced to 3 mg (1 mL from part vial) if the patient has had a heart transplant in the last year OR adenosine is being administered via central venous access OR the patient is also taking carbamazepine or dypyridamole (+/- aspirin) – see Drug Interactions. Further doses for these patients are determined by the response to this first dose.

Also consider a lower initial dose of 3 mg for patients with asthma and obstructive lung disease - see Precautions.

Leave 1-2 minutes before further dosing (if required).

Second dose: (only if initial dose unsuccessful and well tolerated):
Adenosine 12 mg (4 mL from TWO vials) undiluted by rapid IV injection over 2 seconds.
Inject as proximally as possible, and follow dose with an immediate, rapid flush of sodium chloride 10-20 mL.

Leave 1-2 minutes before further dosing (if required).

Third dose: (only if second dose unsuccessful and well tolerated):
Adenosine 12 mg (4 mL from TWO vials) OR 18 mg (6 mL from THREE vials) undiluted by rapid IV injection over 2 seconds.
Inject as proximally as possible, and follow dose with an immediate, rapid flush of sodium chloride 10-20 mL.

General Administration Information

- **Routes of administration:**
  - IV injection: Yes
  - IV intermittent infusion (15-60 minutes): No
  - IV continuous infusion: No
  - IM injection: No
  - Subcut injection: No
- **Compatible/incompatible IV drugs/fluids:**
  Consult the Australian Injectable Drugs Handbook ('Yellow book') in your ward area. **Assume all unlisted drugs and IV fluids are incompatible – contact Pharmacy for further advice.**

MONITORING (INCLUDING BLOOD TESTS)

- Warn patient prior to administration that they may experience a short period of facial flushing, chest tightness, dizziness, dyspnoea and a sense of impending doom.
- If angina, severe bradycardia, severe hypotension, respiratory failure, high level heart block or asystole occur do not give any more doses of adenosine.
- New arrhythmias may present at the time of conversion (occur in 55% of patients), but generally only last a few seconds.

NURSING PRACTICE POINTS

- Requires continuous ECG monitoring.
- Undertake baseline and post dose blood pressure, heart rate and respiratory rate measurements.
- Monitor patient for adverse effects and reassure due to the feeling of impending doom that often accompanies adenosine administration.
- All injections are to be labelled as per CPP0022 Labelling of Injectable Medicines and Lines.

ADVERSE EFFECTS

Adverse effects usually resolve rapidly (after approximately 15 seconds) after each dose due to its short duration of action.

- **Very common** – bradycardia, sinus pause, skipped beats, atrial extrasystoles, atrioventricular block, ventricular extrasystoles, nonsustained ventricular tachycardia, dyspnoea, flushing, chest pain, sense of impending doom.
- **Common** – nausea, headache, dizziness, arrhythmias at time of conversion.
- **Uncommon** – transient arrhythmias, recurrence of SVT, hypotension, blurred vision, sinus tachycardia, palpitations, metallic taste, head pressure, hyperventilation, sweating, feeling of general discomfort/weakness/pain.

Rare – atrial fibrillation, ventricular fibrillation, torsades de pointes, severe bradycardia, bronchospasm, injection site reaction, reversible worsening of intracranial hypertension.

DRUG PRESENTATIONS AND STORAGE

Adenosine 6 mg/2 mL vials.
Store below 25°C. Do not refrigerate.

RELATED DOCUMENTS

SOP0001 Clinical Care.
CPP0222 Labelling of medications and fluids.
CPP0544 Intravenous Drug Administration and Classification List.
POL0077 Medication Management.