

PHENTOLAMINE

Introduction

Phentolamine is a competitive non-selective α_1 and α_2 adrenergic receptor blocker of relatively short duration of action.

It causes vasodilatation and a fall in blood pressure resulting from blockade of the post-junctional vascular α_1 and α_2 adrenoreceptors.

Its principle uses in the ED include:

- Hypertensive crisis
- Treatment of inadvertent sympathomimetic extravasation.
- A second line coronary vasodilating treatment for cocaine associated myocardial infarction, (after GTN or nitroprusside).

Preparation

Ampoules: 5 mg/mL (1 mL)

Mechanism of Action

Phentolamine is a competitive non-selective α_1 and α_2 adrenergic receptor blocker of relatively short duration of action.

It causes vasodilatation and a fall in blood pressure resulting from blockade of the post-junctional vascular α_1 and α_2 adrenoreceptors in both arterial and venous beds.

It blocks the effects of adrenaline and noradrenaline at the α_1 and α_2 receptors.

Blockade of the pre-synaptic α_2 receptors results in increased noradrenaline release which can result in a reflex tachycardia.

Pharmacokinetics

Absorption:

- Phentolamine is given IV. It may also be infiltrated subcutaneously in cases of sympathomimetic extravasation.

Onset of action IV is around 1-2 minutes.⁵

Phentolamine can be given IM but onset of action is *delayed*, to around 15 -20 minutes.⁵

Duration of action IV is around 10 -30 minutes

Duration of action IM is around 30- 45 minutes.

Distribution:

- Phentolamine 54% bound to proteins

Metabolism and excretion:

- Phentolamine has a half-life in the blood of around 20 minutes after intravenous administration.
- Approximately 13% of a single intravenous dose appears in the urine as unchanged drug.

Pharmacodynamics

The administration of phentolamine intravenously results in:

- Transient fall in the mean systemic vascular resistance
- Transient fall in the mean systemic arterial blood pressure

These effects are accompanied by a reflex tachycardia, triggered by baroreceptor responses and the autonomic nervous system.

Indications

Indications for use in the ED include:

1. Management of hypertensive crises:
 - Including patients with phaeochromocytoma, e.g. during preoperative preparation and surgical manipulation. It is often used with beta-blockers (to reduce reflex tachycardia).
2. Management of inadvertent sympathomimetic extravasation.
3. A second line coronary vasodilating treatment for cocaine associated myocardial infarction, (after GTN or nitroprusside).

Contraindications/ Precautions

These include:

- Hypotension
- Known hypersensitivity to phentolamine or sulphites.
- Caution in Conditions where a sudden reduction in blood pressure is undesirable:
 - ♥ e.g. stroke, coronary artery disease, Heart failure may worsen due to reflex tachycardia.

Pregnancy

Phentolamine is a Class B1 drug with respect to pregnancy.

Class B1 drugs are those drugs which have been taken by only a limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or indirect harmful effects on the human fetus having been observed. Studies in animals have not shown evidence of an increased occurrence of fetal damage.

Breast feeding

Caution, insufficient data available.

Adverse Effects

The important ones include:

- Reflex Tachycardia.
- Hypotension
- Orthostatic hypotension
- Miosis

Dosing

For hypertensive crisis:

Titrate phentolamine **1 mg IV**, repeat every 5 minutes as required, generally to 15 mg as a maximum dose ^{1,5}

For children give 0.1 mg/kg (to a maximum of 1 mg) as a bolus.

For cocaine associated myocardial infection.

Phentolamine may be used as a second line coronary vasodilating treatment for cocaine associated myocardial infarction, (after **GTN** or **nitroprusside**).

Optimal dosing regimens are unknown, but 1 mg IV bolus doses, every 5 minutes as required, (generally to 15 mg as a maximum) titrated to blood pressure and clinical response would be reasonable.

For extravasation ischaemia:

To prevent sloughing and necrosis in areas in which extravasation has occurred, the area should be infiltrated as soon as possible with **10 to 15 mls** of saline solution containing **5 to 10 mg** of phentolamine.

Use a syringe with a fine hypodermic needle, and infiltrate liberally throughout the area.

Infiltration should be done as soon as extravasation is noted but within 12 hours of extravasation will still have some benefit.⁵

References

1. eTG - March 2014
2. Phentolamine in Australian Medicines Handbook, October 2013
4. Phentolamine in MIMs, January 2012.
5. Phentolamine in Up to Date, Accessed Jul7 2014
6. Hsue, W. et al. Management of Cocaine-Associated Chest Pain and Myocardial Infarction: A Scientific Statement From the American Heart Association Acute Cardiac Care Committee of the Council on Clinical Cardiology. *Circulation*. 2008;117:1897-1907.

Dr J. Hayes

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