Aminophylline Intravenous for Adults

Who can administer

May be administered by registered competent doctor or nurse/midwife

Important information

- **Loading dose only given if** patient not previously on oral theophylline or aminophylline (but see Further information below)
- See monitoring requirements below
- To avoid excessive dosage in **obese** patients, dose should be calculated on the basis of ideal body weight for height (patient is obese if actual body weight is 20% or more above ideal body weight or BMI > 30) [ref 1]
- There are numerous important **interactions** - check latest BNF
- For Y-site compatibility see below

Available preparations

Aminophylline 250mg per 10ml ampoule

Reconstitution

Already in solution

Draw up using a 5 micron filter needle

Infusion fluids

Sodium Chloride 0.9% or Glucose 5%

Methods of intravenous administration

Intermittent intravenous infusion (loading dose only) [ref 2]

- Add required dose to 100ml infusion fluid and give over **at least 20 minutes**
- Maximum recommended rate **25mg/minute**
- **Fluid restricted: can be administered undiluted** [ref 5]

Continuous intravenous infusion (administer using an electronically controlled infusion device)

- Add required dose to a suitable volume of infusion fluid e.g. 500mg to 500ml = 1mg/ml

- Administer at a rate as per 'dose' below
- **Fluid restricted: can be administered undiluted** [ref 5]

Dose in adults

Usual dose

Loading dose first (if appropriate)

- Loading doses must **NOT** be given to patients already taking oral theophylline or aminophylline (but see Further information below)
- Doses should be based on **ideal body weight** for height - see Important information
- Give 6mg per kg (usually 250 to maximum 500mg), followed by maintenance dose.
- If patient experiences acute adverse reactions while loading dose is being given, the infusion may be stopped for 5 to 10 minutes, or administered at a slower rate [ref 3]

Maintenance dose

- Doses should be based on ideal body weight for height - see Further information

Patient	Maintenance dose FIRST 12 hours	Maintenance dose BEYOND first 12 hours
Healthy, NON-smokers	0.7mg/kg/hour	0.5mg/kg/hour - adjusted according to plasma theophylline concentrations
ELDERLY patients	0.6mg/kg/hour	0.3mg/kg/hour - adjusted according to plasma theophylline concentrations
Congestive HEART FAILURE/LIVER FAILURE	0.5mg/kg/hour	0.1 to 0.2mg/kg/hour - adjusted according to plasma theophylline concentrations
SMOKERS	Often higher maintenance doses are required [ref 6]	

Monitoring

- The half-life is variable (range 7 to 9 hours) (non-smoking, otherwise healthy asthmatic patient)
- The half-life may be prolonged or reduced in other disease states - for examples see maintenance dose table above
- Monitor **potassium -** may cause hypokalaemia
- Monitor ECG, heart rate and blood pressure [ref 2]
- **Desired levels:** 10 to 20 microgram/mL [ref 3]
- Adverse drug reactions may occur within the range of 10 to 20mg/L. Levels above 20mg/L are more likely to be associated with adverse effects
- Take serum level **30 minutes after the loading dose** has been given ('post-loading dose level')
- Start the continuous infusion once the loading dose is complete, and recheck level after 12 hours- (to determine if levels are increasing or decreasing from post-loading dose level)
- Monitor levels regularly and adjust dose according to levels and adverse effects

Further information

- **Loading doses:** Ideally the loading dose would be deferred until serum theophylline levels are known. If this is not possible, and if the clinical situation requires that the drug be given, a

dose of 3.1mg/kg of aminophylline may be considered, on the basis that it is likely to increase the serum theophylline concentration by about 5 mcg/L when administered as a loading dose

- **Note: while the loading dose may be administered by slow IV injection**- it must be given over 20 minutes- so for practicality, it is best to administer as a short infusion instead
- Patients on intravenous aminophylline need careful monitoring and nursing attention
- Rapid administration has been associated with **acute hypotension, arrhythmias and convulsions**
- Concurrent use of other xanthine derivatives are contraindicated due to the risk of toxicity
- Each 0.5mg/kg aminophylline administered as a loading dose gives rise to a 1mcg/ml increase in serum concentrations of theophylline
- Patient is obese if actual body weight is 20% or more above ideal body weight or BMI > 30 (ref 1)

Ideal body weight (IBW) calculations

- **Male** 50kg + (2.3 x inches over 5 feet) **or** 50kg + (0.9 x cm over 152 cm)
- **Female** 45.5kg + (2.3 x inches over 5 feet) **or** 45.5kg + (0.9 x cm over 152 cm)

Storage

Store below 25^{0}C

References

1: Sanford guide to antimicrobial therapy - online v 7.0.3 (information on obesity extrapolated from data on antimicrobials)

2: Injectable medicines guide Medusa, accessed online 26/03/2025

3: SPC Mercury pharmaceuticals October 2020

4: Uptodate: accessed 27/03/2025

5. Minimum infusion volumes, UKCPA, 2012

6. Martindale- accessed online 27/03/2025

Therapeutic classification

Bronchodilator - Theophylline

BNF
Airway disease, obstructive