Adult Intravenous Aminophylline Protocol for use by Nursing & Medical Staff

Decision to commence documented by Senior (FY[2] and above or NMP Respiratory Specialist Nurse)
Prescribed accordingly (by Medical or Non Medical Prescriber)

Patient receives Maintenance Oral Theophylline?
i.e. Uniphyllin / Phyllocontin / Nuelin SA / Slo-Phyllin

- **Yes** → **Do not Load** → **Proceed to Continuous Infusion**
- **No** → **Proceed to Loading Dose**

Loading Dose: 5 milligrams / Kg* / over 20 mins
In 100ml 0.9% sodium chloride or 5% dextrose
via an infusion pump
* To avoid excessive dosage in obese patients, dose should be calculated on Ideal Body Weight (IBW) for height, please refer to IBW Chart on NHST Formulary

Risk of Adverse Effect with Loading & Continuous Infusion
(Central Nervous, Cardiovascular and Gastrointestinal System disturbance)
Cardiac Monitor is essential: due to risk of arrhythmia with rapid infusion
Also: hypotension, headache, anxiety, twitching, convulsions, vomit / nausea

Loading Dose Reaction?

- **Yes** → **Stop Infusion, seek advice from medical team**
  Following advice: Stop for 10 minutes,
  Re-start at slower rate, observe
  → **Proceed to Continuous Infusion**
- **No** → **Proceed to Continuous Infusion**

Continuous Infusion Details

Reconstitution details: 500 milligrams (mgs) in 500 millilitres (0.9% sodium chloride or 5% Dextrose)

***Adult**: 0.5 mgs / Kg / Hour* ***Elderly/frail/cor-pulmonale**: 0.3 mgs / Kg / Hour* ***Hepatic or Cardiac failure:** 0.3mgs / Kg / Hour*

Monitor NEWS hourly for 1st 4 hours
(↑ Heart rate & ↓ Blood Pressure)

↔ **Check Plasma Theophylline Levels within 4 – 6 hours of commencement**

Titrate dose accordingly - Aiming 10-20 mg/L
See NHST Formulary Guidance regarding Dose Adjustment
Consider influencing factors on theophylline level* e.g. liver impairment, heart failure, smoking, medicines interactions
Common special precautions*:
Influenza vaccination/ active influenza or acute febrile illness
Common interactions*:
Macrolides, quinolones, calcium channel blockers, anti-epileptics

See BNF or eMC for further details
(also for advice regarding pregnancy & lactation)

Monitor NEWS 2 hourly if stable

Intravenous Aminophylline usually continues for 24+ hours

Re-check Theophylline levels 4-6 hours (if dose titrated)
Monitor Theophylline level every 24 hours
Monitor Electrolytes daily
Observe for any adverse effects throughout
Wean frequency of nebulised therapy as able
Ensure inhaled medicines are prescribed / optimised

Decision to Stop Continuous Infusion *following assessment of Stability*

Preferable to discontinue in morning or late afternoon: Aminophylline ½ life 7-9 hours
Allows oral Theophylline dose to be administered in the evening

If oral Theophylline commenced: See table below to calculate suggested dose dependent upon Infusion Rate. Re-check plasma Theophylline level 3 days after dose adjustment (4-6 hours after morning dose).
If oral Theophylline restarted: Return to previous dose - see table for dosing advice. Re-check plasma Theophylline level after dose adjustment (4-6 hours after morning dose). Note: Consider patients smoking history and any quit attempts.

Hourly IV Aminophylline Dose (milligrams per hour)	Recommended Oral Theophylline Regime
20 – 25	Uniphyllin 200mg BD
26 – 30	Slo-Phyllin 250mg BD
31 – 35	Uniphyllin 300mg BD
36 – 40	Nuelin SA 350mg BD
> 40	Uniphyllin 400mg BD

See NHS Tayside Formulary Links
- ☐ Ideal Body Weight
- ☐ Intravenous Aminophylline Dose Titration
- ☐ Oral Theophylline Dose Titration

Notes on Protocol colour code
Actions Monitoring Additional Advice / Information

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(Reviewed by Consultant Team NWH & PRI July 2016 & Medicines Policy Group Nov 2016)

Intravenous Aminophylline Dose Titration

Result mg/L	Symptoms & Dose Tolerance	Action
< 9.9	Not controlled current dosage is tolerated	↑ rate by 25%
10 to 14.9	Controlled current dosage is tolerated	maintain rate
10 to 14.9	Not controlled Current dosage is tolerated	consider ↑ rate by 10%
15 to 19.9	Controlled Current dosage is tolerated	Consider ↓ rate by 10% to provide a greater margin of safety even if current dosage is tolerated.
20 to 24.9	Controlled No adverse reactions are present	↓ infusion rate by 25%
20 to 24.9	Controlled Adverse reactions are present	Stop infusion for 24 hours ↓ subsequent infusion rate at least 25%
25 to 30	Adverse reactions symptoms with risk of further reaction	Stop infusion for 24 hours. Consider if overdose treatment required. ↓ infusion rate by at least 50%
>30 mg/L	Adverse reactions symptoms with risk of further reaction	Stop the infusion for 24 hours. Treat overdose as indicated. ↓ infusion rate by at least 50%

Check Plasma Theophylline Level within 4-6 hours of commencement

Re-Check Plasma Theophylline Level after any dose adjustment, within 4-6 hours.

Check Plasma Theophylline Level every 24 hours, even if levels stable.

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Oral Theophyllines available within NHS Tayside

– **Prescribed by Brand:** Modified release preparations have different release characteristics and are not interchangeable. Oral Theophylline has a narrow therapeutic index.

Brand	Strength available (mg)	Frequency
Uniphyllin	200mg, 300mg, 400mg	12 hourly
Nuelin SA **or**	175mg	12 hourly
Slophyllin	60mg, 125mg, 250mg	12 hourly

Oral Theophylline Dose Adjustment Recommendations:

Before any dose adjustment, it is recommended to check:

- Compliance to treatment
- Medicines interactions
- Change in Smoking Status

After commencement of Oral Theophylline or any dose adjustment:

- If converted from IV Aminophylline to oral Theophylline, check plasma theophylline level within 3 days; 4-6 hours after morning dose
- If oral theophylline is a new medicine (not converted from IV Aminophylline), check plasma theophylline level after 5 days of twice daily dosing; 4-6 hours after morning dose

Result mg/L	Symptoms & Dose Tolerance	Action
< 9.9	Not controlled Current dosage is tolerated	Increase dose to next increment.
10 to 14.9	Controlled Current dosage is tolerated	Maintain on current regime.
10 to 14.9	Not controlled Current dosage is tolerated	Increase dose to next increment.
15 to 19.9	Controlled Current dosage is tolerated	Consider reducing dose to lower increment to provide a greater margin of safety even if current dosage is tolerated
20 to 24.9	Controlled No adverse reactions are present	Reduce to lower increment.
20 to 24.9	Controlled Adverse reactions symptoms	Stop for 24 hours and reduce subsequent dose by one increment.
25 to 30	Adverse reactions symptoms with risk of further reaction	Stop for 72 hours. Consider if overdose treatment required. Reduce subsequent dose by 2 increments.
>30 mg/L	Adverse reactions symptoms with risk of further reaction	Stop for 96 hours. Treat overdose as indicated. Reduce subsequent doses by 2-3 increments.

Increments as per Dose Adjustment Recommendations

Brand	Dose	Frequency
Uniphyllin	200mg	12 hourly
Slophyllin	250mg	12 hourly
Uniphyllin	300mg	12 hourly
Nuelin SA	350mg	12 hourly
Uniphyllin	400mg	12 hourly