

Scope: Adult patients with Parkinson's disease, children with neurodisability, cerebral palsy, long-term ventilation with drooling, and drug-induced hypersalivation.

ASSESSMENT OF SEVERITY/RESPONSE TO TREATMENT:

Severity of drooling can be assessed subjectively via discussion with patients and their carers/parents and by observation. Amount of drooling can be quantified by measuring the number of bibs required per day and this can also be graded using the Thomas-Stonell and Greenberg scale:

- 1 = Dry (no drooling)
- 2 = Mild (moist lips)
- 3 = Moderate (wet lips and chin)
- 4 = Severe (damp clothing)

CONSIDERATIONS FOR PRESCRIBING/TITRATION

No evidence to support the use of one particular treatment over another. Drug choice is to be determined by individual patient factors. When prescribing/titrating antimuscarinic drugs to treat hypersalivation always take account of:

- Coexisting conditions (for example, **history of urinary retention, constipation, glaucoma, dental issues, reflux etc.**)
- Use of other existing medication affecting the total antimuscarinic burden
- Risk of adverse effects

Titrate dose upward until the desired level of dryness, side effects or maximum dose reached.

Take into account the preferences of the patients and their carers/ parents, and the age range and indication covered by the marketing authorisations (see individual [summaries of product characteristics](#), [BNF](#) or [BNFc](#) for full prescribing information).


FIRST LINE DRUG TREATMENT OPTIONS FOR ADULTS

All medicines for this indication in adults are  **Green**

- **Glycopyrronium bromide liquid 400 micrograms/ml (320 micrograms/ml glycopyrronium) ('off-label')**
NB: doses below expressed as glycopyrronium bromide
 200micrograms twice daily; titrate up in weekly increments of 200-400 micrograms until a maximum of 600micrograms three times daily.
- **Hyoscine hydrobromide (Scopoderm®) 1.5mg patch (delivers 1mg over 72 hours, off-label')**
 1 patch applied behind ear every 72 hours; if concerned about cognitive side effects, start at 1/4 patch every 72 hours (Max dose 1 patch every 72 hours)
- **Hyoscine hydrobromide 300microgram tablets ('off-label')** or 100microgram/mL oral mixture (*Special*).
 300micrograms once daily at night; increase by 300 micrograms every 2 to 3 days to a max of 300micrograms three times daily
- **Amitriptyline ('off-label')**
 25mg once at night; titrate by 25mg at weekly intervals to a maximum tolerated/effective dose (maximum 100mg once at night).
- **Atropine 1% eye drops bottles / unit dose vials (UDVs) ('off-label')** 1-2 drops sublingually (or add to 10ml of water and use as a mouth rinse¹¹) once daily in the morning; titrate as necessary/tolerated by 1 drop every 2 days up to a maximum 2 drops four times daily.
Risk of overdose - see other considerations

Not tolerated or is ineffective at maximum tolerated dose

SECOND LINE DRUG TREATMENT FOR ADULTS

Trihexyphenidyl (Benzhexol) ('off-label')  **AR**
 2mg daily, then increased in steps of 2mg every 3-5 days, adjusted according to response; maintenance 5-15 mg daily in 3-4 divided doses

If medication is not-tolerated or is ineffective at maximally tolerated dose

SEEK FURTHER SPECIALIST ADVICE

FIRST LINE DRUG TREATMENT FOR CHILDREN


All medicines for this indication in children are  **AI**

- **Glycopyrronium bromide liquid 400 micrograms/ml (320 micrograms/ml glycopyrronium) (licensed in >3 years of age for hypersalivation in chronic neurological disorders):**
 Dose as per BNFc according to the appropriate age range
NB: doses in BNFc expressed as glycopyrronium bromide
- **Hyoscine hydrobromide (Scopoderm®) 1.5mg patch ('off-label')**
 Dose as per BNFc according to age
Apply to hairless area of skin behind ear. Ensure patch removed prior to applying next patch. The patch can be cut and the remainder kept in the original packaging until required for the next dose
- **Hyoscine hydrobromide 300microgram tablets ('off-label')** or 100microgram/mL oral mixture (*Special*).
 Dose as per BNFc according to the appropriate age range

Re-refer any patient who fails to respond, or is intolerant to treatment, to specialist

Not tolerated or is ineffective at maximum tolerated dose

SECOND LINE DRUG TREATMENT FOR CHILDREN

Children > 3 years:  **AI**
Trihexyphenidyl (Benzhexol) ('off-label') tablets 2mg, oral solution 5mg/5mL
 Initially 1mg twice daily, increase in 2 weeks to 2mg twice daily as necessary and as tolerated; titrate dose every 2 weeks to a maximum 2mg three times daily.

Pharmacological Management of Hypersalivation in Children and Adults

OTHER CONSIDERATIONS

ANTIMUSCARINICS

HYOSCINE HYDROBROMIDE

- Hyoscine (Scopoderm[®]) patch may be advantageous over other treatments; ease of administration, maintenance of steady state concentrations and a lower incidence of systemic side effects relative to other antimuscarinics. It is useful for patients with intractable swallowing difficulties who may be at risk of aspirating on normal saliva production
- Hyoscine 300microgram tablets can be swallowed, chewed or sucked¹³

GLYCOPYRRONIUM BROMIDE

- Slower in onset but causes less tachycardia than hyoscine or atropine
- Has long duration of action and has lower incidence of CNS effects (e.g. sedation, restlessness) due to its inability to cross the blood-brain barrier. NICE recommend glycopyrronium bromide as first line pharmacological treatment in Parkinson's disease¹⁴

SUBLINGUAL ATROPINE 1% EYE DROPS AVAILABLE IN 10ml BOTTLES OR UNIT DOSE VIALS (UDVs)

- Available as ready-made solution (eye drops in bottles or UDVs), reversible/short duration of action
- Risk of overdose as bottle difficult to manipulate
- Ensure patients/carers using UDVs are counselled carefully to use only 1-2 drops per dose, not a full vial**
- Avoid in patients with limited dexterity / support to administer correct dosage and in patients with cognitive impairment, dementia and hallucinations. Using as a mouth rinse may maximise topical absorption, effectiveness and reduce the risk of accidentally administering too many drops sublingually.

TRIHXYLPHENIDYL

- Side effects include tachycardia, constipation, hallucination and memory impairment. Use with extreme caution in elderly patients¹⁵

DRUG-INDUCED HYPERSALIVATION

- The main medication groups that are associated with drooling are antipsychotics, particularly clozapine, and direct and indirect cholinergic agonists that are used to treat dementia of the Alzheimer type and myasthenia gravis.
- The exact mechanism of clozapine-induced hypersalivation is unknown however it is paradoxical to its antimuscarinic action. The treatment of drug-induced hypersalivation is the same as other forms of hypersalivation, with antimuscarinics. Therefore, cumulative antimuscarinic burden (e.g. increased constipation, blurred vision, confusion, tachycardia and arrhythmia) is a particular risk in this patient group.

Cost Comparison (for full list of products see Pan-Mersey formulary)

Drug	Typical Doses	Cost per 28 days (approx.)
Amitriptyline tablets	50mg at night	£2.50
Atropine 1% eye drops	2 drops 4 times daily	£264.50 (2 x 10 ml bottles) £21.14 (28 x UDVs)
Glycopyrronium bromide oral solution 400micrograms/mL	600 micrograms 3 times daily	£161.28
Glycopyrronium bromide tablets (NB—not to be routinely used due to cost)	1mg 3 times daily	£645.85
Hyoscine hydrobromide 300micrograms tablets	300 micrograms 3 times daily	£11.69
Hyoscine hydrobromide 100 microgram/mL liquid (Special)	300 micrograms 3 times daily	£84.17
Hyoscine patch 1.5mg (Scopoderm [®])	1 patch every 72 hours	£64.35
Trihexyphenidyl 5mg/5ml oral solution	5mg 3 times daily	£46.20
Trihexyphenidyl tablets	5mg 3 times daily	£17.91

REFERENCES

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