LRI Children's Hospital

Management of sialorrhea (drooling of saliva) in neurodisabled children

Staff relevant to:	Medical staff caring for neurodisabled children within UHL Children's Hospital presenting with sialorrhoea
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1. Introduction and who this guideline applies to:

Sialorrhoea (drooling) due to hypersalivation or poor swallowing is a common problem in children with neurodisability. Socialization, interpersonal relationships, and integration into school life can be affected due to excessive drooling. Loss of self-esteem and high personal care needs are often ongoing problems for the children and their carers. Secretions may cause the child's skin to become excoriated, as well as may damage computer equipment, books and clothing.

Despite drooling being a common problem in disability, affecting approximately 22% to 40% of children with cerebral palsy, none of the available treatment options are totally satisfactory. Treatment should be aimed at addressing the cause which may be multifactorial and patient specific- this usually involves SALT, physiotherapy, surgery as well as medication.

The most commonly prescribed medications have anticholinergic actions - glycopyrronium bromide (oral) and hyoscine hydrobromide (transdermal patches)

Side effects of anticholinergic drugs include thick mucoid secretions, dehydration, urinary retention, constipation, facial flushing, skin rash, fever, dizziness, drowsiness, headache, dilated pupils, blurred vision, behavioural changes (restlessness, irritability, hyperactivity), xerostomia, and seizures.

Side effects play a major role in the tolerance and usefulness of these medications.

2. Drug treatment choices:

2.1 First line - Glycopyrronium bromide (oral)

Glycopyrronium bromide (Sialanar®) is currently licensed for chronic pathological drooling in children and adolescents aged 3 years and older with chronic neurological disorders. Usage below 3 years is off-label. It may have fewer side effects; however individual patient factors should be considered when choosing treatment option.

- Prescribe as “Glycopyrronium bromide (Sialanar®) 400micrograms/ml”.
- The bottle states it contains 320 micrograms glycopyrronium *base*/ml which is equivalent to 400micrograms glycopyrronium *bromide*.
- As per BNFC Start at 16 micrograms/kg TDS (as bromide), increasing in steps of 16micrograms/kg TDS every 5-7 days according to response. For ease of administration round to the nearest 160microgram (0.2ml) See table below; Maximum dose is 80 micrograms/kg TDS (maximum 2.4mg/dose).

Dosing table for glycopyrronium bromide(Sialanar) (Note maximum dose is 2.4mg (6ml) TDS)

Titrating dose level*	Titrating doses of glycopyrronium bromide (Sialanar) 400microgram/ml				
	Titration 1 ~16micrograms/kg	**Titration 2** ~32micrograms/kg	**Titration 3** ~48micrograms/kg	**Titration 4** ~64micrograms/kg	**Titration 5** ~80micrograms/kg
Weight of child (kg)					
13-17	**0.24mg** (0.6ml)	**0.48mg** (1.2ml)	**0.72mg** (1.8ml)	**0.96mg** (2.4ml)	**1.2mg** (3ml)
18-22	**0.32mg** (0.8ml)	**0.64mg** (1.6ml)	**0.96mg** (2.4ml)	**1.28mg** (3.2ml)	**1.6mg** (4ml)
23-27	**0.4mg** (1ml)	**0.8mg** (2ml)	**1.2mg** (3ml)	**1.6mg** (4ml)	**2mg** (5ml)
28-32	**0.48mg** (1.2ml)	**0.96mg** (2.4ml)	**1.44mg** (3.6ml)	**1.92mg** (4.8ml)	**2.4mg** (6ml)
33-37	**0.56mg** (1.4ml)	**1.12mg** (2.8ml)	**1.68mg** (4.2ml)	**2.24mg** (5.6ml)	**2.4mg** (6ml)
38-42	**0.64mg** (1.6ml)	**1.28mg** (3.2ml)	**1.92mg** (4.8ml)	**2.4mg** (6ml)	**2.4mg** (6ml)
43-47	**0.72mg** (1.8ml)	**1.44mg** (3.6ml)	**2.16mg** (5.4ml)	**2.4mg** (6ml)	**2.4mg** (6ml)
≥48	**0.8mg** (2ml)	**1.6mg** (4ml)	**2.4mg** (6ml)	**2.4mg** (6ml)	**2.4mg** (6ml)

*to be increased every 7 days until efficacy is balanced with undesirable effects

*Food reduces the absorption of glycopyrronium bromide and is therefore advised to be given 1 hour before meals or 2 hours after meals. It is important that the dose is given at consistent times in relation to food intake and not with high fat foods.

*In children and young people with mild to moderate renal impairment (eGFR 30–90 ml/min/1.73m2) discuss with pharmacy as the dose should be reduced by 30%

*Other strengths of Glycopyrronium bromide are available e.g. 200mcirogram/ml – these are not licensed for use in drooling. Patients may present on these products and will need to be coverted to the 400micorgram/ml product. To avoid overdosage parents MUST be counselled that the volume of medicine is less than before. As the potency between the formulations is not exactly the same, keeping the dose the same and halving the volume may result in over drying of secretions; a senior review must be booked 4 weeks after the changeover as the dose may need to be reduced

2.2 Second line -Hyoscine Hydrobromide (transdermal patches).

Transdermal patches (hyoscine hydrobromide) have been used in the management of drooling but it is not licensed for this indication. There is considerable variation in efficacy between individuals; many find them useful, especially for the short term use. Skin reactions at the site of use is not uncommon and troublesome.

One patch is usually placed on a hairless area behind the ear or inter scapular region where it can be observed for adverse skin reactions. Part patches can be used if less than whole patch required either cut with scissors along full thickness ensuring membrane is not peeled away or cover portion to prevent contact with skin.

Refer to BNFC for dosing information.

Typically the patch is replaced every 2-3 days, alternating the sites to minimize the risk of local skin reaction. Note that patches contain 1.5mg hyoscine but release 1mg over 72 hours. Some patients may develop tolerance and need patches changing every 48 hours.

MHRA alert has been issued as there have been a small number of reports of serious and life-threatening anticholinergic side effects, including hyperthermia associated with hyoscine hydrobromide patches, particularly when used outside the licence. This is likely related to the ability of hyoscine to cross blood brain barrier while the glycopyrronium bromide doesn't cross the blood brain barrier. In view of this glycopyrronium bromide (Sialanar®) may be preferred first line as it has licensed use for drooling.

Please also refer to the **Transdermal Patches UHL Policy** **(**B12/2019)

2.3 Trihexyphenidyl (Benzhexol hydrochloride):

This is an oral anticholinergic primarily used in dystonic movement disorders and also controls drooling in these children. It is not usually used as a drug to primarily controlling drooling. It works by reducing the effects of the relative central cholinergic excess that occurs as a result of dopamine deficiency. Discuss with pharmacy before use for dosing information

2.4 Other treatment options:

a) Botulinum Toxin Type A Injections:

Targeted injections of Botulinum toxin type A directly into the salivary glands. Quantitative and qualitative benefit is reported at between one and six months with maximum benefit at four-six weeks, post- injection. Refer to NICE TA 605 for further details

Potential side effects are major, particularly thickening of secretions and dysphagia. Parents/carers should be advised prior to exploring this route that any injection of this toxin into the salivary glands at a high dose can, but rarely do cause swallowing difficulties and to return to the place of injection i.e. the hospital, if breathing or swallowing difficulties are noted

b) Surgery

There are three main types of surgery used to control drooling:

• redirecting the ducts from the salivary glands (towards the back of the mouth)
• tying off the ducts from the saliva glands
• removal of salivary glands.

Surgical intervention is reserved for older children (11-16 years) with mature mouth development. Salivary duct redirection is not recommended in children who have swallowing problems as too much saliva arriving at the back of the mouth could enter the lungs and cause chest infections. Surgery in a young child is thought to lead to a high chance of drooling coming back and reduced long-term benefit. Dry mouth has been seen on occasions.

3. Education and Training

None

4. Supporting References

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3. Reid SM, Westbury C, Guzys AT, Reddihough DS. Anticholinergic medications for reducing drooling in children with developmental disability. Dev Med Child Neurol. 2020 Mar;62(3):346-353. doi: 10.1111/dmcn.14350. Epub 2019 Sep 8. PMID: 31495925.
4. https://www.gov.uk/drug-safety-update/hyoscine-hydrobromide-patches-scopoderm-1-dot-5mg-patch-or-scopoderm-tts-patch-risk-of-anticholinergic-side-effects-including-hyperthermia
5. Product overview | Severe sialorrhoea (drooling) in children and young people with chronic neurological disorders: oral glycopyrronium bromide | Advice | NICE
6. https://www.proveca.com/en/healthcare-professionals/app-dosing-calculator/

5. Key Words

Anticholinergic, Glycopyrronium bromide, Hypersalivation, Scopolamine, Secretions,

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The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

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Details of Changes made during review: New document	