Scopolamine Hydrobromide Transdermal Patch (Transderm-V®) Discontinuation

Sandoz Canada, Inc., the sole Canadian supplier of transdermal scopolamine, has discontinued this product.[1]

Health Canada approved indications for transdermal scopolamine[2,3]

- prevention of symptoms of motion sickness such as nausea and vomiting

Other uses of transdermal scopolamine

- to help prevent nausea and vomiting in postoperative patients[2-4]
- manage hypersalivation and/or drooling in patients with neurologic or neuropsychiatric disturbances or severe developmental disorders[3-7]
- terminal airway secretions (death rattle) [8-12]

Alternate available formulations of scopolamine

- Scopolamine hydrobromide injection 0.4 mg/mL, 0.6 mg/mL (Omega laboratories Ltd)[13]

Therapeutic alternatives for transdermal scopolamine

(Most therapeutic alternatives are off-label.)

1. Prevention of symptoms of motion sickness (nausea and vomiting)[14]

Alternative measures*

- Avoid eating large amounts within 3 hours of travel
- Avoid dairy products and foods high in protein, calories or sodium before travel
- Avoid alcohol, smoking and disagreeable odours during travel
- Increase ventilation and exposure to cool fresh air
- Minimize head movement by pressing head into headrest
- Avoid visual stimuli that commonly precipitate motion sickness, such as reading or watching videos during travel
- Focus on a stable external object or the horizon during travel
- Stay in a central location while on a boat, which is the least susceptible to motion
- Sit in the front seat of a vehicle with a clear forward view and, if possible, drive the vehicle rather than be a passenger

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Pharmacologic agents

Drug (chemical class)	Dose	Comments
Dimenhydrinate (antihistamine)	Adults: : 25-100 mg Q4-6H PRN PO[14,15] (max 400 mg/day)[14] LA: 100 mg Q8-12H PRN PO (max 300 mg/day)[14] Children: 2-5 yr: 15 -25 mg Q6-8h PRN PO[14,15] 6-12y: 25-50 mg Q6-8H PRN PO[14,15]	Take 60 minutes prior to departure For shorter trips[14] Most appropriate agent for children > 2 yr; consider test dose since some children experience paradoxical excitability[14]
Diphenhydramine (antihistamine)	Adults: 25-50 mg T-QID PRN PO up to 200 mg/day[16] Children: 6-12 yr: 12.5-25 mg Q4-6H PRN PO[16]	Take 30-60 minutes prior to travel For shorter trips[14]
Hydroxyzine (antihistamine)	Adults: Initial: 25-100 mg Q4-6H PRN PO (max 100 mg/day)[14]	Take 30-60 minutes prior to travel Adjust subsequent doses to response[14] Maximum daily dose is because of QTc prolongation risk[14]
Promethazine (antihistamine)	Adults: 25mg BID [17] Children ≥ 2 yr: 0.5mg/kg Q12H PRN[17]	Take 30-60 minutes prior to travel (time of onset 2 hours) Longer duration of action than dimenhydrinate; may be beneficial for refractory nausea or when dimenhydrinate is ineffective[14] Considerable sedating, anticholinergic and EPS effects[14,15] Avoid use in children < 2yr or < 9 kg[17]
EPS =extrapyramidal symptoms; LA = long-acting; yr = years old		

Notes

- Persons who travel frequently or suffer persistent symptoms may benefit from habituation: a behavioral therapy that gradually increases exposure over time to increase tolerance to stimuli that cause motion sickness.[16]
- Note that if sedation with an antiemetic is troublesome, ¼-½ of the dose can be given with some preserved efficacy.[16]
- Tips to manage dry mouth side effects: saliva substitute or pilocarpine 2% eye drops PO q6h PRN.[15]
- Exercise caution if any of these agents are taken while driving as all are sedating.[14-16]

2. Prevention of post-operative nausea and vomiting

Alternative measures

- Acupressure, acupuncture,[18,19] ginger root, and aromatherapy may be used as adjuncts to prevent or treat post-operative nausea and vomiting (PONV).[18]

Pharmacologic agents

Drug (chemical class)	Dose	Comments
Dexamethasone (corticosteroid)	**Adults** 4-8 mg IV after induction[18,19] **Children** 0.25 mg/kg IV up to 4 mg[19]	Used alone or with other antiemetics Use is limited by steroid adverse effects[18] Most studied and commonly used agent for PONV in children[19] As effective as ondansetron[15,19]
Dimenhydrinate (antihistamine)	**Adults** 50-100 mg PO/ 50 mg IM/IV pre-op, followed by similar doses PRN post-op; repeat as necessary up to 400 mg/day[4] **Children** 0.5 mg/kg/ dose IV pre-op; max 25 mg/dose[4]	Similar efficacy to metoclopramide[15], dexamethasone, and ondansetron[19] For treatment (only if a different drug class was used prophylactically and failure of prophylaxis): 0.5 mg/kg/dose B-TID IV[4]
Fosaprepitant (Neurokinin-receptor antagonist)	**Adults** 150 mg IV pre-op[18,19]	May be more effective than ondansetron[18,19]
Haloperidol (Dopamine antagonist)	**Adults** 0.5-2 mg PO/IV/IM[18,19] 30 minutes prior to end of surgery[15]	2 mg IV has similar efficacy/tolerability to ondansetron 4mg IV[15] Potential for QT prolongation and EPS[15,19]
Metoclopramide (Dopamine antagonist)	**Adults** 10 mg IV **Children** 0.1 mg/kg IV, max 10mg[19]	Weak antiemetic; prevents delayed gastric emptying from opioid use[18] Neurological effects limit its use[4] May be Less effective than other agents[19] Risk of EPS, especially in children (avoid <1yr)[19] Higher doses have been reported but are associated with increased risk of adverse effects[19]

Ondansetron (serotonin antagonist)	**Adults** 4 mg IV at end of surgery (max 16 mg); 8 mg PO 30-60 minutes prior to surgery[4] **Children** 0.1 mg/kg IV max 4mg[19]	Repeat doses in response to inadequate control of PONV from pre-operative doses are generally not effective[4] Risk of prolonged QT interval[4,18] 4 mg IV = 8 mg PO[4]
EPS = extra pyramidal symptoms; PONV = post-operative nausea and vomiting		

Notes

- Combination therapy may be more effective than the use of a single agent in adults with moderate-high risk of PONV; drugs from different classes with different mechanisms of action can be used.[18]
- Treatment of PONV: if vomiting occurs < 6 hours postoperatively, give an antiemetic from a different class than was used for prophylaxis18 unless the effect has worn off or an inadequate dose was used.[19] If vomiting occurs > 6 hours postoperatively, consider using a second dose of ondansetron, but do not give a second (rescue) dose of dexamethasone.[18]
- Ondansetron is particularly useful for rescue since it is non-sedating.[19]
- Agents with limited evidence: gabapentin, mirtazapine, clonidine.[18]

3. Management of hypersalivation and/or drooling (e.g., in Parkinson disease, amyotrophic lateral sclerosis, and cerebral palsy)

Alternative measures

- Speech and language therapy (Parkinson disease and cerebral palsy)[5,20]
- Chewing gum or hard candy to encourage swallowing (Parkinson disease)[21,22]
- Positioning (to prevent saliva spilling from mouth or collecting in back of the throat)[5,9]
- Botox injections into the salivary gland may be necessary in refractory cases[21,22]

Pharmacologic agents:

Drug (chemical class)	Dose	Comments
Amitriptyline (tricyclic antidepressant)	**Adults** 10-150 mg PO daily[9]	CNS and anticholinergic side effects[4,9]
Atropine (anticholinergic)	**Adults** 1-2 drops of 1% ophthalmic solution SL OD-BID[20] 0.4-0.6 mg B-TID PO/SC or 0.25-0.75 PO mg daily of injectable solution (ALS)[9] **Children** with excessive drooling 1 drop of 1% ophthalmic solution BID[23]	
Glycopyrrolate (antimuscarinic)	**Adults** 1-2 mg/day B-TID PO[20,21] ; 0.1-0.2 mg TID SC (ALS)[9] **Children** with cerebral palsy	Fewer CNS effects (does not cross BBB)[6]

	solution (three doses per day PO; week 1: 40 µg/kg/per dose; week 2: 60 µg/kg/per dose; week 3: 80 µg/kg/per dose; week 4: 100 µg/kg/per dose to a max 2 mg per dose[6]	Oral solution can be given via feeding tube[6]
Hyoscine butylbromide (anticholinergic)	Adults 10 to 20 mg Q4-6H PO/PR[9]	Refer to reference for considerations of rectal administration[23]
Ipratropium bromide (antimuscarinic)	Adults 1-2 sprays of 0.03% nasal spray QID PRN SL (max 8 sprays /day)[24]	In one small study, no change in objective measures; improvements in subjective measures were similar to placebo.[24]
ALS = amyotrophic lateral sclerosis; BBB = blood-brain barrier; CNS = central nervous system		

Notes

- Use of topical agents minimizes cognitive adverse effects.[20]
- Ensure mouth does not become too dry as saliva is necessary for swallowing.[9]

4. Management of terminal airway secretions (death rattle)

General information

- Respiratory congestion is the noise from salivary secretions that collect in the throat because the patient is unable to swallow due to extreme weakness or reduced level of consciousness; death often occurs within 48 hours of onset.[8,10]
- Respiratory congestion is due to bronchial secretions as a result of pulmonary infection, aspiration, or edema may be unresponsive to palliative treatment.[10]
- Reassure family that the sound is not associated with respiratory distress.[8,10,11]
- If the patient is alert, respiratory secretions can be alarming so early management is important.[10]
- There is no evidence that withholding hydration or administering diuretics reduces secretions.[8]
- The use of pharmacologic agents to reduce airway secretions is controversial. No agents have demonstrated clear benefit over placebo, yet have potential to cause adverse anticholinergic effects, and the extent of distress secretions cause patients is unknown.[25]
- If pharmacologic management is chosen, prophylaxis appears to offer greater benefit than treatment of secretions already present.[11,26,27]
- Discontinue if ineffective and/or adverse effects emerge.[11]

Non-pharmacologic management

- Provide good mouth care and hydrating eye drops if necessary as anticholinergic agents can cause dry mouth and eyes.[8,10]
- Position patient on side to promote drainage and prevent pooling of secretions[7-11] (most effective non-pharmacologic intervention[10]).
- Humidify the room and ensure frequent mouth care.[8,10]

Pharmacologic agents

Drug (Chemical Class)	Dose	Comments
Atropine (anticholinergic)	Adults Initial: 1-2 drops of 1% ophthalmic solution Q1-2H PRN SL[7] Injectable solution: 0.4-0.8 mg Q4-6H SC and/or Q1H PRN[7]	More anticholinergic side effects (confusion, agitation, hallucinations, restlessness) Use of ophthalmic drops is based on anecdotal evidence[7]
Glycopyrrolate (antimuscarinic)	Adults 0.1-0.4 mg Q6-8H SC/IV[7], max 1.2 mg/day[22]; or 0.2 mg SC once, then SC/IV infusion of 0.6-1.2 mg/day[11] 0.5 mg TID PO PRN[8] Children 0.04-0.1 mg/kg Q4-8H PRN PO (max initial dose 1-2 mg); 4 mcg/kg Q4H PRN IV (max initial dose 0.1 mg)[12]	Fewer CNS effects (does not cross BBB)[7,11] Reduce dose by 50% in end-stage renal failure[9,10]
Hyoscine butylbromide (anticholinergic)	Adults 20 mg SC Q4-6H PRN[9,10]; or 20 mg SC once, then continuous SC infusion of 20-120mg over 24 hours[10,-12]	Fewer CNS effects than scopolamine[11,12]
Ipratropium (antimuscarinic)	Anecdotal evidence; dose unknown[7]	20 mcg HFA or 0.03%/ 0.06% intranasal solution
Scopolamine hydrobromide (anticholinergic)	Adults 0.4-0.6 mg Q4-6H SC[10]; 0.3 mg PO or SL Q4-6H PRN[11] Adolescents 0.4 mg/dose Q8H PRN PO[12] Children 6 mcg/kg Q8H SC/IV PRN (max initial dose 0.3mg)[12]	Most sedating[7] Avoid in conscious patients (may cause delirium and/or sedation[8] Avoid in end-stage renal failure[10] Use injectable solution for PO and SL administration
BBB = blood-brain barrier; CNS = central nervous system; HFA = hydrofluoroalkane		

Notes

- Onset of effect of SC anticholinergics is within 30-60 minutes.[10]
- Systemic treatment may increase risk of delirium.[9]

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