PALLIATIVE CARE NETWORK OF WISCONSIN

FAST FACTS AND CONCEPTS #109
DEATH RATTLE AND ORAL SECRETIONS
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Background As consciousness decreases in the dying process, patients lose their ability to swallow and clear oral secretions. Air moves over these pooled secretions resulting in noisy ventilation. While there is no evidence that patients find this 'death/inspiratory rattle/gurgle' disturbing, evidence from bereaved surveys suggests the noises can be disturbing to visitors and caregivers who may fear the patient is choking. Similar sounds can occur in patients who are not imminently dying, such as brain injuries or amyotrophic lateral sclerosis (ALS) in which increased production of saliva (sialorrhea), or decreased clearance of secretions occurs. Death rattle can be a good predictor of near death in the terminally ill; one study indicated the median time from onset of symptoms to death was 16 hours.

Causes: Two sub-types of the "death rattle" have been proposed, although the significance regarding treatment has not been established: Type 1 = predominantly salivary secretions; Type 2 = predominantly bronchial secretions. More broadly, the following clinical factors likely contribute to the 'death rattle':

- Sialorrhea due to neuromuscular dysfunction (common in ALS or brain injuries).
- Medications which increase saliva production (e.g., pilocarpine, clozapine), mucosal irritation (e.g., doxycycline), or dose-dependent drooling as a medication side effect (e.g., clobazam).
- Impaired swallowing from depressed consciousness.
- Other medical illnesses such as gastroesophageal reflux, upper respiratory tract infections, esophageal dysmotility.

Non-pharmacological treatments: Since there is no consensus for pharmacologic recommendations for sialorrhea or the 'death rattle', non-pharmacological approaches should be considered first line.

- Discontinue or reduce IV fluid and enteral feeding
- Gentle oropharyngeal suctioning may be used but avoid deep suctioning.
- Reposition the body in a lateral position on either left or right side to facilitate drainage.
- Reposition the body with head down and feet elevated (Trendelenburg position) for a few minutes to move fluid up into the oropharynx for ease of removal. Caution with increased risk aspiration.
- Address family and caregivers with any fears and interpretations associated with the death rattle.
- Counsel caregivers that noisy breathing may not bother the patient even if it bothers them.

Pharmacological treatments Muscarinic receptor blockers (anti-cholinergic drugs) are the most used medication class when pooled oral secretions are refractory to non-pharmacologic measures. They decrease mucous production due to anticholinergic properties. Their effectiveness over placebo has not been consistently established. Patients with noisy breathing from pulmonary disease or infections are less likely to respond to these medications. Examples include scopolamine, hyoscyamine, glycopyrrolate, and atropine. Common adverse effects are blurred vision, sedation, confusion, delirium, restlessness, hallucinations, palpitations, constipation, and urinary retention. The primary difference in these drugs is whether they are tertiary amines which cross the blood-brain barrier (scopolamine, atropine, hyoscyamine) or quaternary amines, which do not (glycopyrrolate). Tertiary amines which cross the blood-brain barrier are more apt to cause more CNS toxicity (sedation, delirium). They are also more likely to affect the heart rate or rhythm and tend to be less expensive.

Drug	Route	Initial Dose	Onset	Duration	Clinical Pearls
scopolamine (hyoscine) hydrobromide	Transdermal patch	1.5 mg q72 hrs	~12 hrs (24 hrs to steady state)	72 hrs	Place 1-3 patches on hairless skin, typically behind ear. Scopolamine is highly sedating, so its use is limited to patients with a short prognosis (e.g., < 3-4 weeks)
scopolamine butylbromide	Sub-cutaneous (Sub-Q)	20 mg QID	1-2 hrs	4 hrs	

hyoscyamine	Oral (PO), sublingual (SL)	0.125 mg q 6 hrs prn	30 min	4-6 hrs	Also, highly sedating. Extended-release formulations available.
glycopyrrolate	PO	0.5-1 mg TID prn	30 min	2-4 hrs	Poor absorption limits oral use; IV/SC more costly and typically limited to inpatient settings; 5-10 times the cost of tertiary amine alternatives
glycopyrrolate	SubQ, IV	0.2-0.4 mg q 4 hrs prn	1 min	7 hrs	
atropine sulfate	SubQ, IV	0.1 mg q4 hrs prn	1 min	1 hr	Contraindicated in asthma due to excessive drying effect in bronchi. More robust literature to support use.
atropine sulfate 1% eye drops	SL	1 drop q4 hrs prn	30 min	2 hrs	

Interventional options:

- Botulism injections may be considered for sialorrhea (e.g., ALS) with onset of effect at 1 week and duration of effect of 3-6 months.
- Antibiotics may be considered for respiratory infections such as pneumonia which can contribute to noisy breathing via mucous hypersecretion.
- Aerosolized N-acetylcysteine may reduce sputum viscosity.
- Surgical interventions such as submandibular gland excision, parotid duct ligation or diversion have been described for patients with longer prognoses.

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