

Literature Review

Sialorrhea with Neurological Diseases in Oral Medicine Fields: A Narrative Review

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ABSTRACT

Background: Sialorrhea also known as drooling, literally means excessive saliva flow. In patients with neurological conditions such as Parkinson's disease, cerebral palsy, and stroke. drooling or sialorrhea conditions can be a problem in their lives. In patients with neurological disorders, they experience impaired coordination of facial and mouth muscle movement. **Purpose:** To describe a review comprehensive management of sialorrhea in neurological, then quality of life can be improved. **Reviews:** literature search was done thorough literature search between 2008-2020 was done using Science direct, Pubmed and Google Scholar. **Conclusion:** Treatment for sialorrhea includes non-medical therapy, medical therapy, botulinum toxin, radiotherapy and surgical treatment. Oral medicine specialist dentists have a role in the care of sialorrhea patients with neurological disorders in terms of oral care related as a result of sialorrhea such as perioral dermatitis.

Keywords: Sialorrhea; Neurological Diseases; Anticholinergic; Medicine; Dentistry

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INTRODUCTION

Whole saliva is a mixture of fluids derived from the salivary glands, gingival sulcus, oral mucosal transudate, mucus from the nasal cavity and pharynx, oral bacteria, food debris, desquamated epithelium and blood cells.¹ Salivary secretion is under control of parasympathetic and sympathetic nervous system. A number of factors influence production of saliva which can alter its quality and quantity.² The normal daily production of saliva varies between 0.75 and 1.5 liters per day.³

Sialorrhea is a condition in which saliva flows from the mouth to the lips, chin, neck, and clothing that usually occurs in infants and young children, especially when a child is learning new motor skills or learning to bite while teething. In a child's developmental period which is usually at 24 months of age, they should have the ability to do most activities without drooling.⁴ Sialorrhea can be a problem for patients who are intellectually disabled, who have various neurologic disorders. In these instances, sialorrhea is probably not caused by overproduction of saliva but by poor neuromuscular control and this is known as drooling.⁵ At this stage of infant development, drooling is normal and by the age of 15-36 months this condition will subside with the formation of salivary continence. If at the age of 4 years

drooling still occurs, it is an abnormal condition⁶ and may be a symptom of a neurological disease.⁷

The swallowing process is divided into two stages, namely the voluntary and propulsion stages and the involuntary stages. The voluntary stage is the stage of oral preparation and propulsion while the involuntary stage is the stage that occurs in the pharynx and esophagus. The swallowing process requires good coordination of the muscles around the mouth, larynx, pharynx and oesophagus. Lack of coordination in these muscles will cause swallowing disorders so that saliva will accumulate in the oral cavity. This situation is getting worse because of the neurological condition of the patient with a lack of ability to control the head due to motor disturbances and the presence of interference with closing the mouth and limited tongue movement so that saliva will come out of the mouth.⁸

REVIEWS

A multidisciplinary approach is urgently needed, conservative measures such as suction, anticholinergic drug therapy, botulinum toxin injection, radiotherapy and surgery can be performed in the treatment of sialorrhea.⁷ There is no single treatment modality that is effective for every patient and a

combination of treatments is needed that is carried out in stages.⁹ In particular, in patients with Parkinson's disease, sialorrhea usually occurs during the cessation of symptom control periods. Then the first step that must be taken is to maximize dopaminergic therapy to optimize the swallowing function of the patient.¹⁰

Non-medical therapy for Sialorrhea

Non-medical treatment of sialorrhea can be a therapist who provides rehabilitation for patients with the aim of maintaining and improving body movement in daily activities, consultation with a nutritionist and speech and language therapy that can help patients control or manage salivary secretions.³

Speech and language therapists can help patients regulate their diet by avoiding acidic foods and drinks that contain alcohol because they can increase salivary secretion. They can also teach how to manage mouth movements such as closing the lips, tongue movements and swallowing while eating and drinking.³ There is a choice of devices that can be considered for patients with symptoms that are resistant to treatment, especially patients who have a build-up of saliva in the throat, namely a portable suction device. Generally, patients will be embarrassed to use this tool.⁷

Non-medical therapy in the treatment of sialorrhea is still not supported by the limited evidence of the effectiveness of the treatment. In addition, this therapy is less suitable in patients with chronic progressive conditions where long-term treatment options are more appropriate.⁵

Medical therapy for sialorrhea

When non-medical treatments do not provide effective results or are not available, drug therapy options can be used to reduce salivary secretion which in turn can improve the quality of life of patients with sialorrhea and can reduce the burden of sialorrhea care.⁵ Anticholinergic drugs work by blocking the action of neurotransmitters on muscarinic receptors resulting in reduced saliva production.⁷ Some of the drugs of choice for the treatment of sialorrhea in patients with severe disability and Parkinson's disease include atropine, hyoscine, glycopyrronium bromide, benztropine and tropicamide.^{6,11-13}

Atropine

Atropine when administered sublingually has the capacity to reduce sialorrhea. Sublingual use of atropine can have the effect of reducing salivation. Sublingual administration is much more effective than parenteral administration. The advantages of atropine include, it is not difficult to use and the price is not expensive and has a reversible effect. Atropine is not recommended in patients with cognitive decline, dementia and hallucinations.¹⁴

Hyoscine

Oral anticholinergic drugs have limitations in the treatment of sialorrhea. Transdermal scopolamine (1.5 mg/2.5 cm²) may be an option in the treatment of sialorrhea. The use of a single dose can maintain a stable serum concentration

for 3 days. In patients with neurologic or neuropsychiatric disorders or severe developmental disorders. Scopolamine works by releasing scopolamine into the bloodstream through the skin.³

Glycopyrronium bromide

One of the anticholinergic drugs of choice is Glycopyrronium bromide which limits its ability to cross the blood-brain barrier. Side effects that can arise from the use of this drug such as drowsiness, perceptual disturbances to severe cognitive impairment that can lead to coma.¹⁵ The study conducted by Arbouw et al., found an increase in the mean sialorrhea score from 4.6 to 3.8 in patients with Parkinson's disease and no adverse side effects were found.¹³ In other studies, anticholinergics have been restricted in their use because of side effects such as xerostomia, skin inflammations, urinary retention, behavioral changes, sleep disturbances, confusion, sleep disturbances and constipation.¹⁶ In Parkinson's and neurodegenerative diseases, the use of anticholinergics has a disadvantage which is not well tolerated. Patients with Parkinson's disease is mostly elderly where the comorbid disorders associated with the disease make the patient susceptible to the cognitive side effects of anticholinergics.⁷

Benztropine

The dose of benztropine is 3.8 mg/day and the side effects that are often encountered include dry mouth, irritability. Benztropine works by crossing the blood-brain barrier which makes its use ineffective in patients sensitive to this side effect. There have been no studies on patients with Parkinson's disease regarding the effectiveness of benztropine drugs.¹⁷

Tropicamide

Tropicamide is a muscarinic receptor antagonist with a pharmacodynamic profile similar to atropine but is more acceptable for use. In a study of 12 patients with Parkinson's disease sialorrhea, it was concluded that tropicamide was very effective with minimal side effects.^{17,18}

Botulinum toxin

Botulinum toxins A and B are currently the treatment of choice for sialorrhea for patients who do not receive good results with anticholinergic therapy. Botulinum toxin has been used since the 1980s in conditions such as strabismus and dystonia. Botulinum toxin can penetrate axon terminals and degrade proteins thereby inhibiting fusion of neurosecretory vesicles with the plasma membrane of nerve synapses.¹⁹

Radiotherapy

Salivary gland radiation therapy is a last resort for elderly patients who cannot receive available drug therapy because of side effects or cannot undergo surgery.⁷ In a study of twenty patients in Norway, single-dose palliative radiotherapy to the parotid salivary glands of patients with amyotrophic lateral sclerosis resulted in significantly reduced salivary secretion compared to saliva before treatment.⁵

Surgical treatment options

Surgical treatment is a treatment option for sialorrhea patients who cannot receive treatment with drug therapy because of the side effects caused by these drugs. Surgical treatment is the last option for patients because surgical treatment is destructive and irreversible.⁵

Treatment of sialorrhea with surgery is removal of the parotid or submandibular gland. This surgery aims to bind or divert the salivary gland ducts or disrupt the parasympathetic nerve supply to the salivary glands. Surgical treatment options are not indicated in patients with transient sialorrhea due to the invasive nature of this treatment.^{1,5}

DISCUSSION

Sialorrhea is a disease that often occurs in neurological disorders and requires polypharmacy treatment. Sialorrhea is still an unknown disease in general, although this disease can cause difficulty in speaking and can cause life-threatening complications such as aspiration pneumonia and rarely get good treatment. In the treatment of neurological disorders such as cerebral palsy, brain injury and stroke or neurodegenerative diseases such as amyotrophic lateral sclerosis and Parkinson's diseases, sialorrhea is often not a plan in treatment.

There are several suggestions for the treatment of sialorrhea in neurological disorders, including: (1) Medical personnel must understand that sialorrhea is a disease that can affect the social life of patients and their caregivers so that such understanding will lead to improved patient treatment. (2) There is a need for further research to see the benefits, side effects and costs for the treatment of sialorrhea. (3) Treatment for sialorrhea can be done both non-pharmacologically and pharmacologically so that health workers must have good medical knowledge about sialorrhea. (4) There is a need for special training regarding giving BoNT injections to doctors such as oral disease specialists so that sialorrhea patients can get treatment that is not too late because they must be referred.⁵

CONCLUSION

Treatment for sialorrhea includes non-medical therapy, medical therapy, botulinum toxin, radiotherapy and surgical treatment. Oral medicine specialist dentists have a role in the care of sialorrhea patients with neurological disorders in terms of oral care related as a result of sialorrhea such as perioral dermatitis.

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