

Research Article

Incidence of Xerostomia in Dialysis population & to assess effectiveness of oral XYLETOL (TQL) in reduction of Xerostomia

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- Incidence
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- Oral XYLETOL
- Patients

Abstract

Background: Xerostomia or dryness of mouth is relatively common among patients on chronic hemodialysis. Incidence of xerostomia among dialysis population is not well documented. India being a tropical country with high and humid temperatures, xerostomia may be much more severe among its dialysis population. Xerostomia theoretically could worsen weight gain among dialysis patient however its role in Intradialytic weight gain is less understood. We decided to look at incidence and severity of xerostomia in our dialysis population, its effect on intradialytic weight gain and the role of Secretagogues treatment in overcoming xerostomia and inter dialytic weight gain among our dialysis population.

Aims and Objectives: Primary: To study the Incidence of Xerostomia in Dialysis population

Secondary: To assess effectiveness of oral XYLETOL (TQL) in reduction of Xerostomia

Materials and Methods: CKD stage VD patients between 18 to 75 yrs. of age, who were on dialysis for at least 3 months at our centers, were asked to take up the Xerostomia questionnaire. Patients with total score of 25 or more were considered to have significant Xerostomia. Patients with significant xerostomia who consented for further evaluation were started on Oral Xylitol tablet. The tablets were taken thrice daily, 2 hours after each meal for a period of four weeks. Timing of tablets was fixed at 2hrs after meal, as individuals would take water during a meal and symptoms of dry mouth usually start 2hrs after a meal. The xerostomia inventory score was reassessed for each of these patients after four weeks of xylitol therapy. This score was compared with the baseline score obtained before at the start of the study.

Results: Results from our studies shows that the Tablet Xylitol (TQL) in some of the Dialysis Patients is beneficial to reduce the incidence of Xerostomia as it worked well for the patients on whom it was advised after Xerostomia Inventory Score above 25. Although treatment had no effect on IWG or salivary flow rates.

Conclusion: Xerostomia in HD has a multifactorial etiology with cumulative risks of advanced age, systemic disorders, drugs, fluid intake restriction, salivary parenchymal fibrosis and atrophy. It is important to detect possible risk factors to treat it correctly.

INTRODUCTION

Xerostomia or dryness of mouth is relatively common among patients on chronic hemodialysis. It significantly impairs the quality of life [1-8], among dialysis patients. Xerostomia results from reduced salivary flow following atrophy of salivary glands. Among HD patients it may be caused by restriction of fluid intake, reduced salivary flow, atrophy or fibrosis of salivary glands, mouth breathing, use of medications like Anticholinergics, Sympathomimetics, Antihypertensives, Cytotoxics, Anti-HIV drugs, Opioids, benzodiazepines and Anti-migraine agents [9]. Old Age, Psychological factors like stress, anxiety and depression also contribute to dry mouth. Autoimmune disorder like Sjogren's Syndrome is the most common cause for Xerostomia among patients with CKD due to Chronic Interstitial Nephritis.

Xerostomia causes lack of taste with difficulties in chewing,

swallowing, and speaking [10-13]. Dry mouth increases the risk of bacterial and fungal infections predisposing to mucosal, gingival, and tongue lesions [10-13]. Xerostomia is known to induce interdialytic weight Gain resulting from increased fluid intake, contributing to hypertension, Pulmonary Edema, increased Cardiovascular morbidity and mortality [10-13].

Secretagogues are group of drugs that induce salivation and may help overcome dryness of mouth. Role of secretagogues for management of Xerostomia has been evaluated earlier in two studies looking for the effects of sugarless chewing gum on xerostomia in patients receiving hemodialysis. These studies have produced conflicting results [17,18].

Bots et al., in a 6 weeks cross-over study, compared 2weeks of sugarless chewing gum to 2 weeks of saliva substitute among Dialysis patients using Xerostomia Inventory score. Patients had

2 weeks treatment-free period in between before the cross over [17,18].

Sugarless chewing gum was shown to be better in reducing the severity of xerostomia compared to saliva substitute (Xerostomia Inventory scores decreased from 29.9 ± 9.5 to 28.1 ± 9.1). Both treatments significantly reduced the level of thirst assessed using the Dialysis Thirst Inventory. Both treatments had no effect on intra dialytic weight gain (IWG) or salivary flow rates [17,18].

However, chewing gum alone significantly reduced Xerostomia Inventory scores in patients with hyposalivation (from 33.2 ± 9.1 to 29.7 ± 8.4)

Oral Xylitol is a naturally occurring five-carbon sugar alcohol found in most plant material like fruits and vegetables. Xylitol is a sugar free product and is added to chewing gums and other oral care products to prevent tooth decay and dry mouth as it stimulates oral secretions. Xylitol is considered a useful treatment option for dry mouth.

The Incidence of Xerostomia among Dialysis Patients has been reported between 28.2% to 66.7% in various studies previously [10-16].

Severity of xerostomia is assessed using Xerostomia Inventory Score. This inventory score consists of 11 questionnaire, that assess the presence and severity of various aspects of xerostomia on a 5-point scale, ranging from 1 (never) to 5 (very often). The total scores can range from 11 (no dry mouth) to 55 (extremely dry mouth) [19].

A total score of 25 or more is considered significant and translates to presence of significant xerostomia. Xerostomia Inventory score has also been validated for its use in monitoring changes in severity (Prognostication) of the symptoms over time [19].

one study recorded, Xerostomia Inventory score of patients on hemodialysis (28.3 ± 9.1) to be similar to that in patients 2 months after radiotherapy for head and neck cancer (31.4 ± 7.3), suggesting xerostomia is as severe a problem among hemodialysis Patients as it is among patients with post radiotherapy for head & Neck [15].

In our study Hemodialysis patients aged more than 18yrs on HD for more than 3 months, who could understand and provide information as per inventory score were asked to be part of the study. The questionnaire was provided in Language of their understanding.

All patient's data was analyzed after calculating & recording of total score.

In our study Patients with xerostomia inventory score of 25 or more were considered to have significant xerostomia. Patients with significant xerostomia were treated with oral Xylitol thrice a day for a period of 3 months.

The Aim of the study was

- To assess incidence of Xerostomia in Dialysis Patients
- To evaluate the efficacy of Oral Xylitol to overcome symptoms of xerostomia

Secondarily

- The role of Xerostomia in Intra dialytic weight gain among patients on hemodialysis.

AIM & OBJECTIVES:

The aim of the study is to assess

- The Incidence of Xerostomia in our hemodialysis population.
- Efficacy of oral XYLITOL in reduction of Xerostomia symptoms in hemodialysis patients.
- Secondarily to look at relation of Xerostomia to Inter Dialytic weight Gain and hypotensive episodes on Dialysis

MATERIALS & METHODS

CKD stage VD patients between 18 to 75 yrs. of age, who were on dialysis for at least 3 months at our centers were asked to take up the Xerostomia questionnaire. Patients with primary Sjogren's syndrome, acute infections, those not willing to take the questionnaire and patients with allergy to xylitol were excluded from the study.

Xerostomia Inventory Scoring Sheet was used to assess individual Patients response. The inventory score consists of 11 questions, each of which can be scored from 1-5 depending on severity of symptoms. Each of these questions were duly explained to each of the Patient in their Local Languages for scoring feasibility. The questionnaire was translated to patients own language of their convenience. Patients with total score of 25 or more were considered to have significant Xerostomia.

Patients with significant xerostomia who consented for further evaluation were started on Oral Xylitol tablet. The tablets were taken thrice daily, 2 hours after each meal for a period of four weeks. Timing of tablets was fixed at 2hrs after meal, as individuals would take water during a meal and symptoms of dry mouth usually starts 2hrs after a meal.

The xerostomia inventory score was reassessed for each of these patients after four weeks of xylitol therapy. This score was compared with the baseline score obtained before the start of the study.

XEROSTOMIA INVENTORY SCORE SHEET						
Name of Patient:						
Age: Sex:						
Date:						
		Never (1)	Almost Never (2)	Occasionally (3)	Fairly often (4)	Very often (5)
1	I sip liquids to help in swallowing food					
2	My mouth feels dry when eating a meal					
3	I get up at night to drink					
4	My mouth feels dry					

5	I have difficulty in eating dry food					
6	I suck sweets or cough drops to relieve dry mouth					
7	I have difficulty in swallowing in certain foods					
8	The skin of my face feels dry					
9	My eyes feel dry					
10	My lips feel dry					
11	The Inside of my nose feels dry					
Total Score:						
Name of Doctor: Signature:						
Score for each symptom: Never= 1, Almost Never= 2, occasionally= 3, Fairly Often= 4, very often = 5						
Physical parameters like Pre HD BP, pre-HD weight, inter dialytic weight gain, Post HD BP, post HD weight, episodes of hypotension (SBP<90mmHg) were recorded for each dialysis session over treatment period of 4 weeks.						
The same set of physical parameters from the previous 4 weeks (prior to start of study), was also collected from the dialysis records of these patients and recorded. The parameters of previous 4 weeks were compared to parameters obtained during 4 weeks of treatment period. Xerostomia inventory score recorded prior to start of xylitol was compared to the score recorded at end of 4 weeks of therapy.						

RESULTS

ESRD patients on HD for more than 3 months consented to participate in the study. 88(77%) of the cohort were males and 26(23%) were female patients. Average age of the group was 49 yrs., male and female participants had a comparable age, average of 49.27 and 45 yrs. Respectively (Table 1).

Average Xerostomia score for the cohort was 21.97.

Xerostomia scores for male 23.04 and female 22.34 patients were comparable with no statistically significant difference. patients (30.7%) were recorded to have significant Xerostomia, average score among this group being 29.88, highest and lowest scores being 41 & 25 respectively.

Average score of 79 patients with insignificant xerostomia was 18.33. Xerostomia has been considered as one of the factors responsible for increased intra dialytic weight gain contributing to hypotensive episodes on hemodialysis. 35 patients with significant xerostomia contributed to only 4 episodes (14%) of total Hypotensive episodes with an average intradialytic weight gain of 3.09 kg.

Average weight gain for 114 patients

20 Patients who were willing for treatment with Oral Xylitol (Table 2 and Table 3, Table 4, Table 5, Table 6).

Out of 20 patients 5 patients had still xerostomia scoring above 25 in which one was on Steroid therapy. One complained that after taking Oral Xylitol she had a loose motion. And other remaining reason is unknown (Table 7).

Among 35 patients with significant xerostomia, 20 agreed to undergo oral xylitol therapy. These 20 patients had average xerostomia score of 29.3 with average weight gain of 3.54 kg. These patients had recorded only 2 episodes of hypotension on hemodialysis in the previous 4 weeks prior to therapy.

Following 4 weeks of oral xylitol therapy Average weight gain among these 20 patients reduced from 3.54 kg to 3.27 kg, an average reduction of 270 grams equivalent to 7.6% of total weight gain, however this was not statistically significant. Average xerostomia score reduced to 21.2. 4 patients (20%) had reduction in score to below 15 with 11 patients (55%) having scores between 15 to 25. 25% patients continued to have scores above 25.

However, these patients had far more episodes of hypotension on dialysis totaling 5 episodes compared to 2 episodes in the previous 4 weeks prior to treatment phase. Data of 5 patients who did not improve with oral xylitol therapy is recorded in Table No 3.

Among the non-responders, 1 of the patients had loose stools post xylitol therapy and was not regular with therapy, another patient was started on steroids for hyperactive airway disease which may explain absence of benefit however in remaining 3 reasons were not clear.

Table 1: Average weight gain of Patients.

Average weight gain of 114 patients was 2.99 kg
Average Hypotension episodes in four weeks among 114
Patients were 11 episodes

Table 2: Before initiating the Oral Xylitol.

Average weight gain of 20 patients was 3.54 kg
Hypotension episodes in 20 patients was 2
Total average score of Xerostomia was 29.3

Table 3: After Four weeks of the Oral Xylitol.

Average weight gain of 20 patients was 3.27 kg
Hypotension episodes in 20 patients was 5
Total average score of Xerostomia was 21.2

Table 4: Number of Patients Xerostomia Score Post Treatment.

Xerostomia Score	Number of Patients
<15	4
15-25	11
>25	5

Table 5: Comparison of Xerostomia Pre and Post treatment.

t-Test: Paired Two Sample for Means		
	XEROSTOMIA BEFORE TREATMENT	XEROSTOMIA AFTER TREATMENT
MEAN	29.36842105	21.611111
VARIANCE	21.13450292	69.21052632
SD	4.597227743	
P(T<=t) two-tail	0.000523414	
The P value equals 0.000523414 which is highly significant.		

Table 6: Comparison of Weight Gain Pre and Post treatment.

t-Test: Paired Two Sample for Means

	Wt. Gain. BEFORE TREATMENT	Wt. Gain AFTER TREATMENT
MEAN	3.545789474	3.278245614
VARIENCE	0.75101462	0.814695517
SD	0.866610997	
P(T<=t) two-tail	0.161239557	

Table 7:

Average weight gain of 5 patients before treatment was 3.986
Hypotension episodes in 5 patients before treatment in a period of 4 weeks were 6
Total average score of Xerostomia before treatment was 29.6
Total average score of Xerostomia after treatment was 30.4
Average weight gain of 5 patients after treatment was 3.584
Hypotension episodes in 5 patients after treatment in a period of 4 weeks were 6

Table 8: Comparison of Weight gain before treatment at 114 PTS and 20 PTS.

t-Test: Two-Sample Assuming Equal Variances

	Wt. Gain. BEFORE TREATMENT 114 PTS	Wt. Gain BEFORE TREATMENT 20 PTS
MEAN	3.075106383	3.545789474
VARIENCE	0.909001601	0.75101462
SD	0.953415755	
P(T<=t) two-tail	0.048945716	

The *p* value equals 0.048945716 which is significant.

Table 9: Comparison of Weight gain after treatment at 114 PTS and 20 PTS.

t-Test: Two-Sample Assuming Equal Variances

	Wt. Gain. AFTER TREATMENT 114 PTS	Wt. Gain AFTER TREATMENT 20 PTS
MEAN	3.075106383	3.278245614
VARIENCE	0.909001601	0.814695517
SD	0.394792999	
P(T<=t) two-tail	0.394792999	

The *P* value equals 0.394792999 which is not significant.

DISCUSSION

With increase in incidence of CKD and a good government support more and more patient are on regular hemodialysis. Xerostomia or dry mouth is a common problem among patients on Hemodialysis. It contributes significantly to impairment in quality of life, however is often a neglected symptom. Xerostomia has been considered as one among the factors contributing to inter dialytic weight gain and possibly contributing to episodes of hypotension.

Previous studies had recorded incidence of xerostomia at

28% to 66% (10-18). Our study showed incidence of xerostomia at 30% in our dialysis population, which is comparable.

Use of Oral Xylitol helped significantly improve symptoms of xerostomia in 75% of the subjects which was statistically significant. Improving dryness of mouth also helped reduce average weight gain among these patients by 270 grams per session equivalent to 7.6% of inter dialytic weight gain, however it was statistically insignificant. The proposed belief that xerostomia is one of the factors responsible for increased weight gain resulting in episodes of hypotension on hemodialysis stands to be untrue in our study, similar findings were also recorded by earlier studies (17,18). In our study hypotensive episodes were recorded to be more common for patients on therapy suggesting that multiple factors are responsible for hypotension on HD and correction of dry mouth with xylitol alone may not help reduce these episodes.

CONCLUSION

Xerostomia in HD has a multifactorial etiology with cumulative risks of advanced age, systemic disorders, drugs, fluid intake restriction, salivary parenchymal fibrosis and atrophy. It is important to detect possible risk factors to treat it correctly.

Results from our studies conclude that the Tablet Xylitol (TQL) in some of the Dialysis Patients is beneficial to reduce the incidence of Xerostomia as it worked well for the patients on whom it was advised after Xerostomia Inventory Score above 25. Although treatment had no effect on IWG or salivary flow rates (Tables 8 and 9).

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