EVALUATION OF EFFICACY OF DESENSITIZING AGENTS FOR INSTANT RELIEF OF DENTINE HYPERSENSITIVITY IN PATIENTS ATTENDING BAQAI DENTAL COLLEGE. A CLINICAL TRIAL

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Abstract

Objectives: *The present study was a randomized, double blind, single site, placebo controlled clinical trial conducted in Outpatient Department of Operative Dentistry, Baqai Dental College.*
Materials & Methods: *The present study was a randomized clinical trial conducted in Outpatient Department of Operative Dentistry, Baqai Dental College. Duration of study was from October 2017 – December 2017. The following desensitizing agents were used as an active ingredients 8% Arginine, Strontium acetate and sodium fluoride, Potassium nitrate and strontium and Placebo. The differences between the patient responses for each toothpaste at baseline, day3, 1 week, 1 month, 3months was analyzed by performing Friedman's test by using IBM SPSS version 22. P-value was set at 0.05.*

Results: *The results of the present study reported that a statistically significant reduction in mean score of Schiff scale from day 1 to all treatment intervals. It was also observed that Arginine group significantly reduced after initial treatment.*

Conclusion: *The present study concluded that 8%Arginine was found to be more effective Strontium acetate, Potassium Nitrate and Fluoride as evaluated by Schiff scale in providing instant relief in Dentin Hypersensitivity.*

Key Words: *Arginine, Dentine hypersensitivity, Desensitizing agents,Schiff scale*

Introduction

Dentin hypersensitivity (DH) is considered to be as one of the most common complaints in dentistry, and is typically seen in young to middle-aged adults[1] and approximately 57% of the patients found to be affected within a dental practice[2,3]. Around 80% of this condition affects premolars and bicuspids[4,5] and facial surface is more involved than the lingual surfaces of teeth[6]. Women tends to have a higher prevalence rate than men[7,8]. Dentin hypersensitivity is defined as short, sharp shooting pain arising from exposed dentin in response to external stimuli, such as tactile pressure during scaling, hot or cold drinks or from sweet or sour foods[9,10]. Some of the patientscomplains of minor discomfort from dentin hypersensitivity while for other patients it might be a very disturbing condition provoking chronic pain and emotional distress[11]. hydrodynamic theory which was proposed by Brannstrom was considered to be the most widely accepted theory for dentin hypersensitivity[12]. Clinical methods of diagnosing this condition includes air blast method or using an exploratory probe on the exposed dentin in a mesiodistal direction, recording all the teeth in the area in which the patient complained of pain[13]. The severity or degree of pain can be measured either

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according to the categorical scale or by using a visual analog scale and another commonly used method is Schiff scale[14]. The treatment of dentin hypersensitivity using desensitizing agents with active ingredient as potassium salts was used as the first line of action[15,16]. A variety of desensitizing agents have been used for a number of years including Strontium acetate, Strontium chloride, and Stannous fluoride as active ingredients of toothpaste for dentin hypersensitivity[15,16]. Treatment for dentin hypersensitivity may includemucogingival surgery, a pulpectomy, and application of resin, lasers, topical desensitizing agents and toothpastes[17]. Recently a new innovative technology using 8.0% arginine has been introduced to provide instant relief from dentin hypersensitivity. This new desensitizing technologysimulates saliva's natural process of plugging and sealing open dentinal tubules[18]. The rationale of the study was to know the prevalence of dentin hypersensitivity and the efficacy of different desensitizing agents used in providing instant relief from dentin hypersensitivity.

Objectives

The objective of this present experimental study was to compare the clinical efficacy of a toothpaste containing 8% arginine with other desensitizing agents containing strontium acetate/sodium fluoride and potassium nitrate/strontium respectively in providing instant relief to the patient from dentin hypersensitivity.

Materials and Methods

The present study was a randomizedclinical trial conductedin Outpatient Department of Operative Dentistry, Baqai Dental College. Duration of study was from October 2017 – December 2017. The study was approved by the ethical committee, Baqai Medical University. Each patient read and signed the informed consent form prior to the initiation of the study. Patients aged 18-35 years old with a history of generalized hot and cold sensitivity were included in the study.Patients with active carious lesions, chipped teeth or fractured cusps, gross oral pathology, pulpitis, if patients used any desensitizing agents for the last 6 months, patients with the history of chronic use of anti-inflammatory medications, currently involved in another clinical trial and history of allergy to oral care products were excluded from the study.

The randomization process was done by using computer generated random table. Patients selected for the study were then randomly divided into four groups comprising 50 patients each. Patients and the Principal investigator were fully blinded to product assignment.Four toothpastes were overwrapped with white tape designated with a code A, B, C, and D for identification before handling to the principal investigator. The following desensitizing agents were used as an active ingredients 8% Arginine, Strontium acetate and sodium fluoride, Potassium nitrate and strontium and Placebo[17]. Sensitivity was assessed at baseline and after 3 days, 1 week, 1 month and 3 months.

Patients reported with hypersensitive teeth were assessed clinically by air blast sensitivity assessment. The facial surfaces of incisors, canines and premolars were included. Air blast sensitivity was assessed by using triple syringe, a blast of air was directed for 11 second on the facial surface of the sensitive tooth from a distance of 1cm. Adjacent teeth were protected by examiners fingers and cotton rolls. Sensitivity was recorded in accordance to the Schiff cold air sensitivity scale.

The differences between the patient responses for each toothpaste at baseline, day 3, 1 week, 1 month, 3 months was analyzed by performingFriedman's test by using IBM SPSS version 22. P-value ≤ 0.05 as significant.

Results

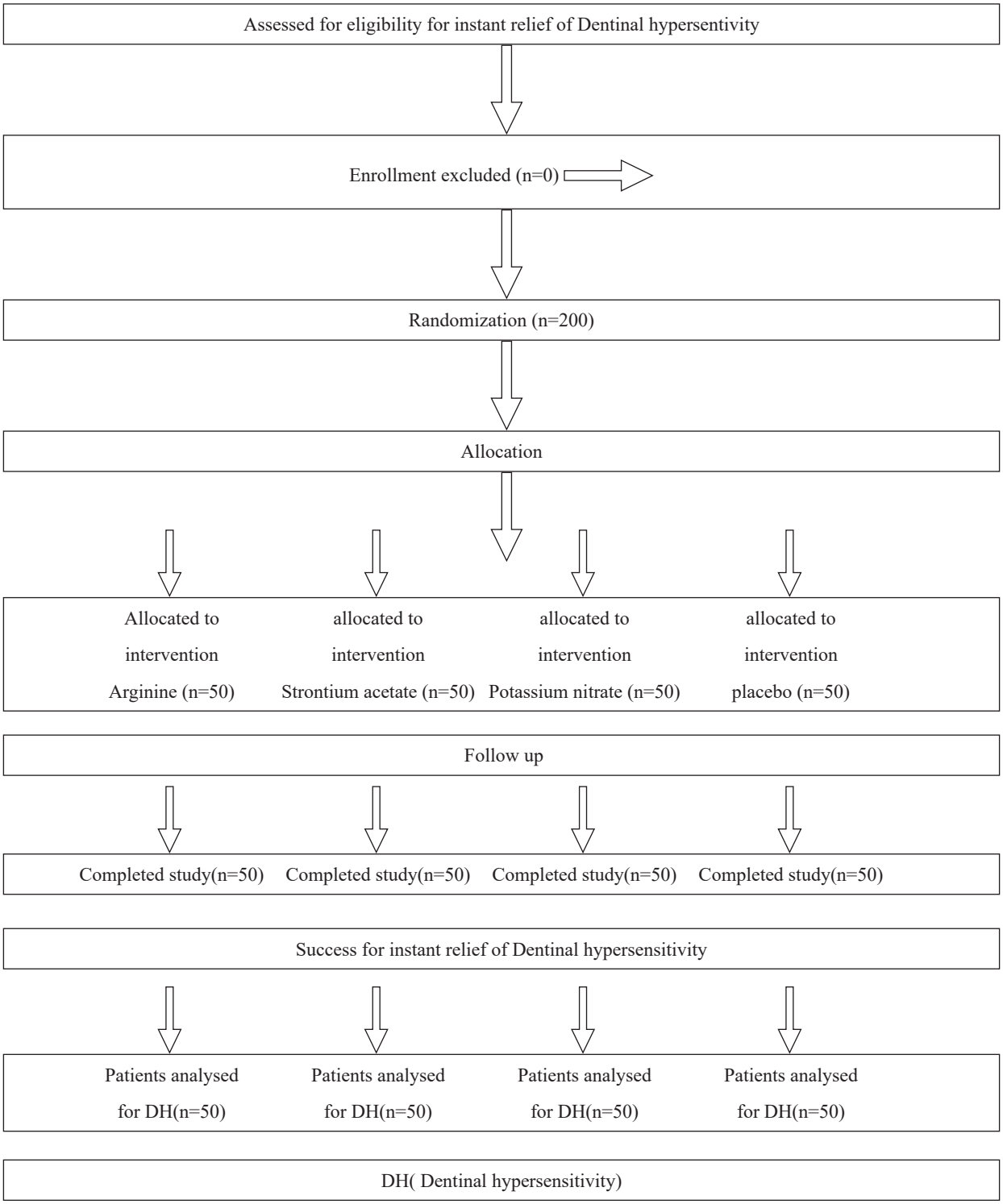
A total of 200 patients were assessed for eligibility and were randomized into four groups. All the four groups received allocated toothpastes with the follow up after given initial treatment.

(Fig 1). (Table1) presented distribution of the patients according to gender and desensitizing agents in four allocated groups. The results of the present study reported that a statistically significant reduction in mean score of Schiff scale from day 1 to all treatment intervals. It was also observed that Arginine group significantly reduced after initial treatment. (Table 2)

Discussion

The purpose of the present study was to provide instant relief from dentin hypersensitivity after application of 8% Arginine, Strontium acetate and sodium fluoride, Potassium nitrate and strontium as

Fig: 1 Consort flow chart



Desensitizing agents.The result of our study reported that Arginine group significantly reduced hypersensitivity after initial treatment. Dentin hypersensitivity is a very common condition arising from exposed dentin in response to typical stimuli such as thermal, evaporative, tactile, osmotic or chemical[19]. Recent advancement includes treatment that can provide both instant relief and a lasting desensitizing effect for a significant time period after application of these agents that would be of great assistance to dental

Table 1: Gender distribution of Four Study Groups

Group	Desensitizing agents	Gender		
		Male	Female	Total
Group A	Arginine	25	25	50
Group B	Strontium acetate	25	25	50
Group C	Potassium nitrate	25	25	50
Group D	Placebo	25	25	50

Table 2: Descriptive statistics for Schiff cold air sensitivity scale

Schiff cold air sensitivity scale	Desensitizing agents	Mean±SD	p-value
Day 1	Arginine	2.50± 0.505	0.000
	Strontium acetate	2.52±0.505	
	Potassium nitrate	2.86±0.351	
	Placebo	2.70± 0.463	
Day 3	Arginine	0.72±0.640	0.000
	Strontium acetate	1.52± 0.814	
	Potassium nitrate	2.76±0.431	
	Placebo	2.62±0.530	
1 Week	Arginine	0.20± 0.404	0.000
	Strontium acetate	0.72±0.730	
	Potassium nitrate	2.46±0.542	
	Placebo	2.44±0.837	
1 Month	Arginine	0.04±0.198	0.000
	Strontium acetate	0.34±0.593	
	Potassium nitrate	1.64±0.631	
	Placebo	2.06±0.935	
3 Months	Arginine	0.06±0.240	0.000
	Strontium acetate	0.24±0.591	
	Potassium nitrate	1.02±0.795	
	Placebo	1.66±0.917	

practioners in managing dentin hypersensitivity. The present study reported reduction in dentin hypersentivity in all four groups after initial application of desensitizing agents by measurement of Schiff scale. Agarwal JH et al[21] in a study reported that reduction in the symptoms of dentin hypersensitivity in all the three groups starting from initial period to 6 weeks' time by the measurement of both air and water sensitivity scores. Samuel SR et al[22] reported comparable clinical effectiveness among both the desensitizing agents with significant reductions in the measure of dentine hypersensitivity till the 30th day after single direct topical application[20]. The 8% arginine/calcium carbonate desensitizing agents contains a combination of arginine and calcium carbonate to simulate the natural process of plugging and sealing patent dentinal tubules[5,18].

In our study 8% Arginine when used as active ingredient reported the highest efficacy in reducing dentin hypersensitivity when compared to potassium nitrate, Strontium acetate and Placebo. Hall C et al[23] in a study reported that8% arginine/calcium carbonated toothpaste achieved similar statistically significant reductions from baseline in dentin hypersensitivity over an extended 11-week treatment period.Li Y et al[24] in a study also reported similar results on application of 8% Arginine.Kleinberg et al[17] in a study reported significant reductions in dentin hypersensitivity after application of Arginine based

desensitizing agents.Domico R et al[25] in a study also reported significant reduction in dentin hypersensitivity on application of 8% Arginine.Ayad F etal[26] in a study reported that 8.0% arginine and 1450 ppm fluoride in a calcium carbonate base provided superior relief from dentin hyper sensitivity when compared to a leading potassium-based desensitizing toothpaste. The present study reported that strontium acetate was the second most effective desensitizing agent in reducing dentin hypersensitivity. Mason S et al[27] in a study reported that 8% Strontium acetate immediately reduced dentin hypersensitivity after application when compared to fluoride.The present study also compared the mean score of the four desensitizing agents which were observed at day 1,day 3, 1 week, 1 month and 3 months. The three desensitizing agents when compared to the placebo which was fluoride containing toothpaste showed least efficacy in providing instant relief to dentin hypersensitivity.

Dentin hypersensitivity is a common condition nowadays whose prevalence and symptoms has been studied in different population across the globe. There are no still established parameters to measure dentin hypersensitivity and reporting of this condition is also not homogeneous among investigators. Millions of people are affected by dentin hypersensitivity and for some it also affects the quality of life and daily activities[28].

Limitations

The single application of 8%Arginine in our study provided instant relief to the patients with dentin hypersensitivity. The study was limited to a small sample size and dentin hypersensitivity was evaluated only with the Schiff scale.

Conclusion

The present study concluded that 8%Arginine was found to be more effective than Strontium acetate, Potassium Nitrate and Fluoride as evaluated by Schiff scale in providing instant relief in Dentin Hypersensitivity. Therefore new researches are required with more parameters and new desensitizing agents which are cheaper and easily available in providing instant relief from dentin hypersensitivity.

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