

PROSPECTIVE COMPARATIVE STUDY TO DETERMINE THE RISK OF SYNCOPE IN A DENTAL CHAIR IN SUPINE POSITION DURING ADMINISTRATION OF LOCAL ANESTHESIA

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ABSTRACT

This study was done to compare the incidence of syncope in supine position versus semi supine position during administration of local anesthesia for dental surgery procedures among the local population.

One thousand healthy patients presenting for tooth extraction at the Oral and Maxillofacial Surgery Department of Dr Ishrat-ul-Ebad Khan Institute of Oral Health Sciences, Karachi from 15th January 2007 to 31st August 2007 were included in this study. Patients were divided into two groups. In Group A patients were administered local anesthetic injection in supine position i.e. with patients head and heart at the same level, while in the Group B patients were administered local anesthesia in semi-supine position.

There were 1000 patients requiring tooth extraction under local anesthesia with an age range of 15-47 years (Mean 28.31±8.55 years). It was noted that 135 patients (27%) treated in supine position had pre-syncope symptoms while 245 patients (49%) had pre-syncope symptoms in semi supine position. The difference was statistically significant ($P < 0.0001$). No patient fainted in supine position in this study.

It was concluded that it was easy to prevent syncope if all patients are placed in a supine position before hand.

Key words: Vasodepressor syncope, Dental chair position, Local anesthesia, Complications of local anesthesia.

INTRODUCTION

Syncope is a transient, self-limited loss of consciousness and postural tone that usually leads to falling due to transient cerebral hypoperfusion¹⁻⁶. Syncope is the most frequently occurring medical emergency⁷⁻¹⁰ accounting for over 60% of the emergencies occurring in a dental office¹¹. It most often occurs before, during or immediately after administration of local anesthesia¹⁰⁻¹²

Predisposing factor of syncope may be psychogenic (fright, anxiety emotional stress, bad news, sudden

severe pain, sight of blood or surgical or dental instruments e.g. local anesthetic injection) or non-psychogenic (prolonged standing or sitting in an upright position e.g. in a dental chair, missed meals, hunger due to dieting, exhaustion, poor physical condition, hot humid crowded environment, male gender, age between 16 and 35 years¹³⁻¹⁸

The most important contributing factor in vasodepressor syncope is patient's position in a dental chair. Patients presenting for dental treatment are administered local anesthesia in supine or semi supine (30 to 45-degree) position^{12,14}. Although syncope typically devel-

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ops in the upright position but may even occur in the supine or seated positions in the dental chair¹⁷⁻¹⁹.

Syncope can be easily prevented by eliminating the predisposing factors, that is adequate room ventilation, room temperature control, light snack or meal before dental appointments, proper positioning and anxiety relief.^{12,14} Furthermore, leg crossing combined with muscle tensing, applied as a simple physiological measure at the onset of prodromal symptoms can delay or prevent vasovagal syncope.²⁰

Today, throughout the world, patients are treated in supine or semi supine positions, a practice that has minimized the chances of syncope in dental chair. This, however, is not always the case in this country, where majority of the patients are still treated in upright position. To our knowledge no data exist about the incidence of syncope in the dental chair among patients presenting for treatment at various dental hospitals or dental clinics in Pakistan.

METHODOLOGY

One thousand healthy patients presenting for tooth extraction at the Oral and Maxillofacial Surgery Department of Dr Ishrat-ul-Ebad Khan Institute of Oral Health Sciences, Karachi from 15th January 2007 to 31st August 2007, were included in this prospective convenient sampling study design. This study was conducted with prior approval from the ethical committee of DIIOHS and informed consent from the all patients. After taking the medical history, patient with any systemic diseases including hypertension, diabetes, heart problems and pregnancy were excluded from the study. Each patient was asked to have a light snack or meal before the procedure in case they were empty stomach. Types of clothes were noted especially veil and neck ties. The anxiety levels of all the patients were recorded preoperatively via a 10-Point Fear Scale. A score of 1 indicated no dental fear; 5 moderate fear; and 10 extreme fear.

Patients were divided in two groups. Patients in group A were administered local anesthetic injection in supine position i.e. with patients head and heart at the same level, while patients in group B were administered local anesthesia in semi-supine (30°-40° position).

RESULTS

There were 399 males (39.9%) and 601 females (60.1%). All patients were healthy and their age ranged from 15 to 47 years with a mean age of 28.32 ± 8.55

years (Table 1). More than three quarter of the patients (76.6%) had a score of 1 indicating no fear on a 10-Point Fear Scale, 20.2% had a score of 3-6 indicating mild to moderate fear, while 3.2% had a score of 7-10 indicating extreme fear, (Fig 1). Majority of the patients (65.3%) wore loose clothes while 34.7% patients with tight clothes including scarf, burka or a neck tie (Fig 2). Among 500 patients included in Group A, there were 189 males (37.8%) and 311 females (62.2%). These patients were administered local anesthesia in supine position. Five hundred patients included in Group B had 210 males (42%) and 290 females (58%). They were administered local anesthesia in semi-supine (30°-45°) chair position.

Group A 31.2% males and 24.4% females complained of slight light headedness while in group B, 44.3 % male patients and 52.4% female patients complained of symptoms (Table 2). The frequency of pre-syncope between both sexes was significantly higher (P= 0.009 for males and P= 0.001 for females) in-group B as compared to group A (Table 2). All patients with pre-syncope symptoms were immediately placed in supine position except those who were already in supine position and were kept as such, there clothes were loosened and were asked to take deep breaths, practice leg crossing and muscle tensing while they were being

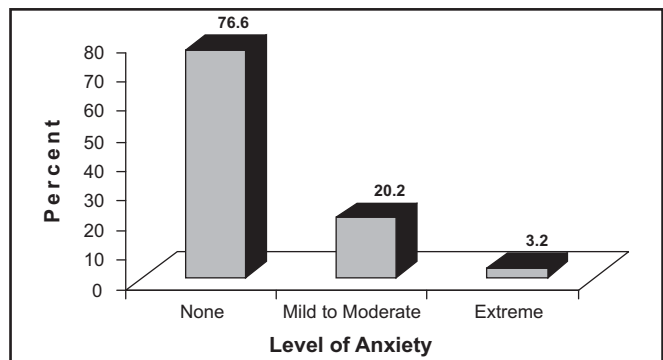


Fig 1: Level of Anxiety

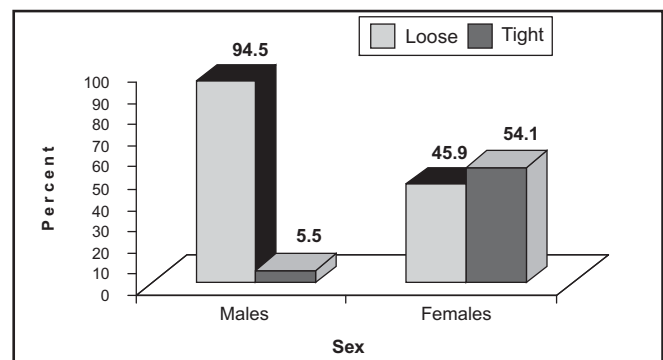


Fig 2: Type of clothing

TABLE 1: DISTRIBUTION OF CASES ACCORDING TO AGE AND SEX

	Males n = 399		Females n = 601		Total n = 1000	
	No.	Percent	No	Percent	No	Percent
< 20	33	8.3	65	10.8	98	9.8
20 - 24	125	31.3	181	30.1	306	30.6
25 - 29	86	21.6	117	19.5	203	20.3
30 - 34	42	10.5	36	6.0	78	7.8
35 - 39	79	19.8	76	12.6	115	11.5
40 - 44	20	5.0	103	17.2	163	16.3
≥45	14	3.5	23	3.8	37	3.7
Mean ± SD	28.21 ± 8.26		28.38 ± 8.73		28.31 ± 8.55	

TABLE 2: COMPARISON OF SIGNS/SYMPTOMS OF SYNCOPE IN BOTH POSITIONS ACCORDING TO SEX

	Group A Supine Position		Group B Semi-Supine Position		
	No	%	No	%	
Males	189		210		
None	130	68.8	117	55.7	P = 0.022
Light Headedness	59	31.2	93	44.3	P = 0.009
Females	311		290		
None	235	75.6	138	47.6	P < 0.0001
Light Headedness	76	24.4	152	52.4	P < 0.0001

reassured till complete resolution of symptoms. All patients recovered completely in 2-3 minutes. None of the patient lost consciousness once placed in supine position.

DISCUSSION

Syncope is a benign and self-limiting process, which has spontaneous recovery without therapeutic intervention¹¹. Loss of postural tone and the ultimate falling is a protective natural mechanism that re-establishes the interrupted cerebral perfusion. In the absence of this mechanism, death may eventually occur as noted in individuals who were forced to maintain upright position during crucifixion.¹⁴.

Hass from University of Toronto, Canada has observed that medical emergencies were most likely to occur during and after local anesthesia, while performing tooth extraction or endodontics and sixty percent of these emergencies were syncope, followed by hyperventilation (7%)¹¹. The studies from United States and Canada have also shown that syncope is the most common medical emergency seen by the dentists. Syncope represented approximately 50% of all reported emergencies during dental practice^{8,14}. Muller et al

from Germany surveyed 2998 dentists listed in the Saxony State Dental Council Register in January 2005 to find out the most common medical emergencies in dental practice. Vasovagal syncope was the most frequent emergency (1238 cases)²⁰ Girdler et al distributed a questionnaire to 887 dentists working in general dental practice across five counties of Northern England²¹. The most frequently reported emergency was vasovagal syncope (1.9 cases, per dentist per year), followed by hypoglycaemia (0.17), angina (0.17), epileptic fit (0.13), choking (0.09), asthma (0.06), hypertensive crisis (0.023) and anaphylaxis (0.013).

The most important contributing factor in vasodepressor syncope is patient's position in the dental chair. Patients presenting for dental treatment are administered local anesthesia in supine or semi supine (30 to 45-degree) position^{12,14}. Although syncope typically develops in the upright position but may even occur in the supine or seated positions in the dental chair¹⁷⁻¹⁹.

In our study we found that 380 patients (38.0%) had pre-syncope symptoms including 228 females (22.8%) and 152 males (15.2%). A female patient is more

susceptible to syncope than the male patients. This finding is in contrast to the generally held view that men experience syncope more often than women^{11,13,14}. This could be because of the fact that in our study most of the 54.1% female patients wore tight clothes, which is a risk factor for syncope.

The administration of local anesthetic injection in supine position minimizes the risk of syncope in the dental chair. When the patient is in supine position the force of gravity is equally distributed over the entire body and blood flows more readily from the heart to the brain. In semi supine position the systolic blood pressure decreases by 2mmHg for each inch that the patients head is situated above the level of the heart^{14,8}

Graham *et al.* found that 31.2% of 32 patient fainted while donating blood in supine position, while 43.7% out of 16 patients fainted while having a simple venipuncture in up-right sitting position¹⁸. We did not find any patient to have fainted in supine position or after being placed in supine position. Pre-syncope symptoms in supine position were 135 patients (27%) and in semi-supine 245 patients (49%).

Gatchel *et al.* at the Division of Psychology, University of Texas, Dallas evaluated the incidence of dental fear and avoidance in a general population of adults. They reported 11.7% of population with high dental fear, and another 17.5% with moderate dental fear, while the remaining 71% had no dental fear²². Our study had comparable results as 76.6% had no dental fear, 20.2% had mild to moderate fear, while 3.2% had extreme dental fear. Fright and anxiety are known psychological predisposing factors of syncope yet we did not find any patient to have fainted following administration of local anesthetic in supine position.

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