DOI: https://doi.org/10.53350/pjmhs2023172117

ORIGINAL ARTICLE

Anaphylactic Reaction by Local Anesthesia; Knowledge and Attitude among the Dental Practitioners of Islamabad and Rawalpindi, Pakistan

MUHAMMAD UMAIR[1], ABDUL MANAN SHAHID[2], MUHAMMAD MUDDASSAR[3], MARIA RABBANI[4], MUHAMMAD RIZWAN[5], SADIA RASHID[6]

[1]*Assistant Professor Oral Medicine, Foundation University College of Dentistry, Islamabad.*
[2]*Assistant Professor Oral Medicine, Islamabad Medical and Dental College,Islamabad.*
[3]*Associate Professor Oral Medicine, HITEC-IMS Taxilla Cantt.*
[4]*Assistant Prof Community Dentistry, Dental College HITEC-IMS TaxillaCantt.*
[5]*Professor Oral Pathology, HBS Dental College, Islamabad.*
[6]*Professor of Physiology, HBS Medical and Dental College Islamabad.*
Correspondence to Dr. Muhammad Rizwan, Email: drrizwaniqbal05@gmail.com. Cell: 03335435866

ABSTRACT

Aim: To assess the knowledge and attitude of dental practitioners of Islamabad and Rawalpindi about anaphylactic reaction seen in patients after administration of local anesthesia.

Method: A questionnaire based cross section study was conducted among the randomly selected practicing general and specialist dental surgeons of Islamabad and Rawalpindi during January to June 2022. About 370 questioners were prepared and distributed among the practicing dentist surgeons of Rawalpindi and Islamabad without any priority or preference of the area. Two dentists were nominated for distribution and motivation of participating dentists to fill the form and collect the filled forms after one week time or earlier.

Results: Two hundred thirty dentists responded to the questionnaire. The results indicated that the majority of the participants had knowledge of one or more symptoms relating to anaphylaxis. However, none of the participants demonstrated that they knew about all symptoms relating to anaphylaxis. Only few had experience of managingthe reaction. The results also did not vary with age. About 75% dental surgeons knew about the emergency drug but about 40% of them were equipped with emergency kits in their clinic and knew the technique of use of it.

Conclusion: Local Anesthesia is routinely used for various treatments by the dental surgeons and Anaphylactic reaction from it can happen anytime with any patient putting life on risk. To deal with such situation and protect the community, serious attitude is necessary. Presentstudy has revealed the lack of knowledge among dentists in Islamabad and Rawalpindi about anaphylactic reactions and theirattitude towardsmanagement which needs to be enhanced to prevent severe consequences on health and safety of common people seeking dental treatment. Our study will provide awareness to dentists to increase their knowledge and skills to deal such situations so that the community should proceed to the dentist for treatments with confidence of safety and better care.

Keywords: Anaphylaxis, Allergy, Emergency drugs, Local Anesthesia

INTRODUCTION

According to WHO anaphylaxis is defined as a severe, life threatening systemic hypersensitivity response which is characterized by an acute onset of potentially life threatening airway, breathing or circulatory problems. Anaphylaxis is an immunological response to the allergen involving immunoglobulin E (IgE) that activates basohils and mast cells, to release vasoactive inflammatory mediators such as leukotrienes, histamine, prostaglandins and tryptase. It is a generalized response related to cutaneous, respiratory, cardiovascular or GI Symptoms. It may involve state of anxiety and confusion along with feeling of warmth and itching that may lead to urticaria and inflammation of bronchi and larynx[1].

The immediacy of the onset of symptoms means that there will be more severe response to allergen. The incidence of death related to anaphylactic reaction is mostly due to obstruction of respiratory tree or the collapse of circulation or both[2].

A study determining the incidence of anaphylaxis in south Asia (Pakistan, India and Bangladesh), in Britain found that the incidence rate among south Asians was 58.3% cases per 100000 persons/year[3]. The most common trigger which can cause anaphylaxis include food, latex, certain medications including LA agents and insect sting[4]. Patients reporting to dental set up are at risk of developing anaphylactic reaction as they normally receive LA during different routine procedures[5].

The LA agents are either of amide or ester group depending upon the linkage and ester group is more sensitive to cause anaphylaxis, mostly owing to the p-amino benzoic acid; a breakdown product[6,7]. The additive and preservatives in LA can also be the offending agent[8]. Proper history record and certain pre-

Received on 12-09-2022
Accepted on 27-01-2023

procedural tests can be performed to prevent the allergic reaction like skin prick test in which small amount of anesthesia if deposited intradermally and response in noted prior to administration of prescribed dose[9]. The symptoms of anaphylaxis are very unpredictable and can differ from one individual to another so the treating dentist should have a sound knowledge of the mechanism, presentation and management of anaphylaxis as lack of training and failure to manage this medical emergency may lead to serious consequences and litigation. Thus to diagnose medical issues particularly the anaphylactic response, dental surgeon must have suitable understanding of the probable reaction of the allergens[10,11].

The objective of this study is to assess the knowledge and attitude of dental surgeons practicing in teaching hospitals of Islamabad and Rawalpindi regarding the anaphylactic reaction after LA administration. In different studies and countries, knowledge and attitude of dentists has been assessed regarding anaphylaxis which shows need for improvement in both avenues. Literature also revealed that no such studies have been conducted in Pakistan regarding knowledge and attitude of dentist about anaphylactic reaction and its management.

MATERIAL AND METHOD

This is a cross-sectional study which was carried out among the dental surgeons working in private clinics and dental teaching hospitals of Rawalpindi and Islamabad, Pakistan. The duration of study was about six monthsfrom January to June 2022. A questioner to gather the information was prepared. It included the information about dentist, their experience, knowledge and

theirattitude to handle the anaphylactic reaction.The questioner was distributed among the dental surgeon working in private dental clinics and dental teaching hospitals. Threesenior dentists working in three different areas of region were selected for the distribution and collection of questioners. Total 370 questioners were distributed and were collected back after 1 week time or earlier by the nominated dentists. Only 230 participating dentists filled the questioners and returned. Remaining forms were unfilled or not returned on time. All the information provided by the participating dentists was then arranged in the form of table and assessed as shown in Tables 1, 2 and 3.

RESULTS

Our study consisted of 230 dentists, with mean age being 30±5 years. Seventy-three percent of the study population was general dentists and specialists with a mean experience of 7±2 years (Table 1). The data obtained from demographic details were subjected to statistical analysis using chi-square test.

All dental surgeons use local anesthesia for some dental treatment. Ninety-one percent of dentists preferred Lignocaine or Medicaine local anesthesiaas 1st choice and 98% of them had a preference for local anesthetic with adrenaline.Even though 85% of dentists had the habit of history taking regarding any drug allergy before starting the treatment, only 3% admitted that they give test dose on routine basis. Only 36% know which drug group may cause allergic reaction while 64% were unaware of it. The results show that majority of dentists have some knowledge about the symptoms of anaphylaxis but none of them had a thorough knowledge of all the symptoms. Only63% of them had actually seen a case with adverse reaction to local anesthesia. This awareness did not differ with age, experience or specialization (Table 2).

Table 1: Percentage of GP and Specialists, their age group and experience of practice.

Dental Surgeons	**General Practioner**	**Specialists**
	77%	23 %
Age of Dentist	25 - 35 years	
Experience of Dentist	5-9 years	

Table 2: Knowledge of Dentists about Anaphylactic Reaction to LA

Questions Asked	**Knowledge of Dentists**	
Which LA you use in daily practice.	**Lignocaine / Medicaine**	**Others**
	91%	9%
Do you prefer LA with adrenaline or Without adrenaline	**With adrenaline**	**Without adrenaline**
	98%	02 %
Do you take history of any drug Allergy before treatment?	**Yes**	**No or Occasionally**
	85 %	15 %
Do you ask previous experience of LA for treatment.	63 %	37%
Do you know signs and symptoms of Allergic reaction in patients after giving LA?	65 %	35%
Do you know which group of LA is more likely to cause anaphylaxis?	36%	64 %
Have you received any training / workshop attended to deal such emergency?	66 %	34%
Do you know how to do allergic test?	40%	60%

The results of the study also indicate that only 62% of the dentists had emergency medicine kits in their clinics but 60% showed they would be able to manage such situation and only 40% would go for start of treatment while remaining 60% would refuse such patients. Though 68% of the dentists knew that the preferred choice of treatment for anaphylaxis was epinephrine, only 28% were aware about its route of administration. Sixty-three percent of dentists suggested alternate route of administration for epinephrine, whereas 9% were totally unaware of how to administer epinephrine as mentioned in Table 2 and 3. Corticosteroids and antihistamines were considered as the ideal choice of drug for the treatment in anaphylaxis in about 11% of the study population, which was a misconception (Table 2 and 3).

Table 3: Attitude of dental surgeons towards anaphylactic reaction

Questions Asked	**Yes**	**No**
Do you check expiry date of LA	92%	08%
Do you ask for any allergy from LA before injection.	85%	15%
Do you perform aspiration before injection?	70%	30%
Do you perform Allergy test of patient before treatment.	3%	97%
Is Medical emergency kit available in clinic	62 %	38%
Do you know the use of emergency kit?	74%	26%
Do you know the preferred drug for Allergy	68%	32%
Do you know the route of drug use?	35%	56 % alternate route, 9 % don't know
Will you be able to manage emergency?	60%	40 %
If u know patient is Allergic to LA, would you start treatment or can you handle such patient?	40%	60 %

Table 2 Shows the knowledge of dental surgeons regarding Anaphylactic reaction and its features.
Table 3: Shows about the attitude of dentists to the Allergic situation and its management.

DISCUSSION

Local Anesthesia is one of commonly used drugs during dental procedures. Anaphylactic reactions during treatments are very rare but they can occur and have severe consequences. Several studies from various countries have been reporting incidences of Anaphylactic reactions from local anesthesia ranging from 1 in 3,500 to 1 in 20,000 during dental treatments[12,14,15,16].

Although incidence ratio of reaction is low but its effects irrespective of dosage, can be severe, sometimes life threatening[16]. So, the dental surgeons should have necessary knowledge and ability or attitude to manage it. This study was conducted on the dental surgeons of Islamabad and Rawalpindi to determine the knowledge and attitude about the signs and symptoms and the management of anaphylactic reaction to reduce the incidence. As majority of dental treatments require use of low concentrations of Local Anesthesia along with vasoconstrictor, some studies indicate that the toxicity or anxiety reaction to these agents can be sometimes misinterpreted with anaphylactic reactions [17, 18]. Several studies have shown that chances of allergic reaction are more from Ester type anesthetics than amide-type and allergic reactions seen in patients can be most likely from the methyl paraben and metabisulfite preservatives added in the solution rather than anesthetic agent, caine itself[19].

Our study shows that more than half of the dentists were confident about handling anaphylaxis at their dental office, of which males were better than females, whereas the remaining had an attitude of calling ambulance in case of emergency conditions. The dentists who were not sure of handling these situations lacked hands-on experience and required further workshops and training programs. The availability of emergency kits at the dental office was at a lower level (26%), which could be attributed to the ignorance and general lack of interest of dentists toward the preparedness for medical emergency. If a significant incident of anaphylaxis is encountered, intramuscular (IM) injection of epinephrine into the lateral thigh is the first line of treatment[20]. The

results of the present study show that 68% of the dentists were confident that epinephrine was the first-line drug of choice in management of anaphylaxis, but only 28% had knowledge about the route of administration of epinephrine during an anaphylactic episode. In some severe systemic reactions generally corticosteroids and antihistamine are used but usually no substitutes or alternative of epinephrine is used for Local Anesthetic reaction[21,22].

Our study shows that 11% of dentists admit the use of antihistamines in the management of anaphylaxis as they have less knowledge. The observations from the present study reflect the alarming situation about the capability of dentists in Islamabad and Rawalpindi to deal with an emergency of anaphylaxis from local anesthesia. Although the theoretical aspect of emergencies is taught in the dental colleges but little or no clinical training or exposure is given. Also, the results indicate deficiency of equipment to manage an emergency situation in clinics of majority of dental surgeons. As dental surgeon is the only person responsible to deal emergency, lack of their experience and inability to deal medical emergency may lead to adverse consequences to patients in a dental clinics[23].

CONCLUSION

Anaphylactic reaction during dental treatments is rare but when occurs, it could lead to severe problems. Our study has pointed out lack of knowledge and attitude of dentists facing such reactions. This is a serious matter and requires awareness of dentists about basic life support and continuing dental education programs, workshops and hands-on courses related to such situations should be made mandatory each year for clinicians to prevent any serious consequences.

Ethical permission: Permission was granted by Institutional Review Board.

Conflict of interest: Nil

REFERENCES

1. Krishnamurthy M, Venugopal NK, Leburu A, KasiswamyElangovan S, Nehrudhas P. knowledge and attitude towards anaphylaxis during local Anesthesia among dental practioners in Chennai. A cross sectional study. Clincosmet investing Dent. 2018;10:117-21
2. Balaji k, jainarAcu.Varma MD. Knowledge attitude and practice regarding anaphylaxis among dental students. IJSDR. 2017; 2(4): 428-32
3. BAKU RJ, Crossman RJ, Melchior CL, Huissoon AP, Hackett S, Dorrian S, Cooke MW, Krishna MT. Anaphylaxis and ethnicity: higher incidence in british south Asians. Allergy 2015; 70 (12); 1580-7.
4. Laemmle Ruff I, O'Hehir R, Ackland M, Tang ML. Anaphylaxis—identification, management and prevention. AustFamPhysician . 2013; 42(1-2): 38-42.
5. Ozkars MY, Yurttutan S, drug allergy and anaphylaxis in dentistry. Asthma allergy immunol. 2020; 18: 142-7
6. Chitre AP. Basic techniques of local anesthesia. Manual of local anesthesia in dentistry. 2006: 127.
7. Su N, Liu Y, Yang X, Shi z, Huang Y. Efficacy and Safety of Mepivacaine compared with lidocaine in local anesthesia in dentistry; a meta-analysis of randomized controlled trials. Int Dent J. 2014; 64: 96-107
8. Bhole MV, Manson AL, Senevirantne SL, Misbah SA, IgE mediated allergy to local anesthetics: separating fact from perception: a UK perceptive. Br J Anesth. 2012: 108; 903-11
9. Kvisselgaard AD, Kroigaard M, Mosbech HF, Garvey LH. No cases of perioperative allergy to local anesthetics in the Danish Anesthesia allergy centre. Acta Anaesthesiol Scand. 2017; 61:149-55.
10. Albelaihi HF, Alweneen AL, Ettish A, Alshahrani FA. Knowledge, Attitude, and perceived confidence in the management of medical emergencies in the dental office. a survey among the dental students and interns. J Int Soc Prevent Community Dent.2017; 7(6) : 364-9.
11. Yadav B. Anaphylaxis: Act now or never. J Nepal Med Assoc. 2020; 58 (226): 442-3.
12. Hepner DL, Castells MC. Anaphylaxis during the perioperative period. AnesthAnalg. 2003;**97**:1381–95.
13. Lieberman P, Camargo CA, Bohlke K, et al. Epidemiology of anaphylaxis findings of the American College of Allergy, Asthma and Immunology, Epidemiology of Anaphylaxis Working Group. Ann Allergy Asthma Immunol. 2006;**97**:596–602.
14. Webb LM, Lieberman P. Anaphylaxis a review of 601 cases. Ann Allergy Asthma Immunol. 2006;**97**:39–43.
15. Vervloet D, Magnan A, Birnbaum J, Pradal M. Allergic emergencies seen in surgical suites. Clin Rev Allergy Immunol. 1999;**17**:459–67.
16. Laxenaire MC. Again and always allergy. Ann Fr Anesth Reanim. 1999;**18**: 831–3.
17. Carolina A, Franca J, Soares M, Salles L. Dentist's knowledge regarding signs and symptoms of the systemic toxicity of local anesthetic solutions. Rev GauchOdontol. 2015;**63**(1): 41–6.
18. Canfield DW, Gage TW. A guideline to local anaesthetic allergy testing. AnaesthProg.1987;**34**:157–63.
19. de Leon-Casasola OA, Weiss A, Lema MJ. Anaphylaxis due to propofol. Anaesthesiology. 1992;**77**: 384–6.
20. Sumons KJ, Sumons FE. Epinephrine and its use in anaphylaxis: current issues. CurrOpin Allergy ClinImmunol. 2010;**10**:354–361.
21. Sheikh A. Glucocorticosteroids for the treatment and prevention of anaphylaxis. Curr Opin Allergy ClinImmunol. 2013;**13**:263–7.
22. Sheikh A, ten Broek VM, Brown SG, Simons FE. H1-antihistamines for the treatment of anaphylaxis with and without shock. Cochrane Database Syst Rev. 2007;**24**(1):CD006160.
23. Shenoy N, Ahmed J, Ongole R, Boaz K, Srikant N. Are dental surgeons prepared for medical emergencies. Int J Pharm Bio med Res. 2013;**4**:416–64.