



Asthma & dentistry- with a case presentation of pain management in dental patient

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ABSTRACT –Toothache is inevitable problem in person's life that could range from mild to severe intensity. And in 21st the people are suffering from many systemic diseases and their oral cavity manifestations are very common also and one of them is asthma. And so, there are dental considerations for the such patients and in this article after the case presentation we are going to discuss about the same dental considerations in asthma patient.

Key words – Asthma, oral cavity, inflammatory disease, dental pain.

I. INTRODUCTION –

Pain is inevitable problem in person's life in once at least that could range from mild pain to moderate to severe intensity. Either be it chronic pain or acute it is always disturbing for a patient and might cause lack of function of the affected body part too. Same as in case of toothache where a moderate to severe intensity pain can lead to lack of masticatory function and so patient avoids to take food or sometimes even liquid diet because of high intensity pain along with hypersensitivity and also, untreated toothache may lead to the abscess formation or other space infections in head & neck region, so the dental treatment should be done as soon as possible to eliminate the cause of the disease. But today's in 21st century due to the life style changes and much more pollutants in the environment, the people are suffering from many systemic diseases like cardio vascular diseases, obesity, diabetes, respiratory problems, etc. And so, these days, dentist needs to take proper case history and medical history of the patient and even verbal or written consent from patient's general physician (if required) prior to dental treatment to avoid the chances of the medical emergencies at dental clinic.

He must be aware and well educated about these systemic diseases and to provide first aid to the patient till the arrival of the medical team or ambulance. Although there are various systemic diseases that require dental treatment modifications but here in this paper, we are going to discuss about one of the respiratory diseases i.e., 'asthma'.

Brief on Asthma disease – Asthma is a chronic inflammatory disease of the airways where the chronic inflammation is associated with airway hyperresponsiveness that is an exaggerated airway-narrowing in response to specific triggers such as viruses, allergens; that leads to recurrent episodes of wheezing, breathlessness, chest tightness and/or coughing that can vary over time and in intensity and these symptom episodes are generally associated with widespread, but variable, airflow obstruction within the lungs that is usually reversible either spontaneously or with appropriate asthma treatment such as a fast-acting bronchodilator(1). The typical clinical presentation of asthma includes coughing, wheezing, chest tightness, and dyspnea.

Whereas, in much severe bronchial obstruction results in labored breathing, tachypnea, tachycardia, diaphoresis that is profuse perspiration and pulsus paradoxus which can be defined as a decline of 10 mm Hg or more in blood pressure during inspiration compared to expiration (2) and the common risk factors for asthma are obesity, exposure to air pollutants, allergy like pollens, cigarette smoke, viral infections, etc. and the irritants lead to the immune mediated events that further leads to the chronic inflammation of the airway system; furthermore the inflammatory mediators cause bronchospasm, swelling or edema and increased production of the mucous. There has



been seen the infiltration of eosinophils, mast cells, and lymphocytes mostly CD4+ T lymphocytes, together with respiratory epithelial cell damage and subepithelial thickening in cellular inflammatory response; several mediators including histamine, cysteinyl leukotrienes, kinins, and eosinophil breakdown products, such as eosinophil cationic protein (ECP), also can be found in the asthmatic airway and these mediators have potent inflammatory properties that exacerbates the symptoms of the disease (3,4). The signs and symptoms of an acute asthmatic attack are:

- Shortness of breath
- Wheezing
- Coughing

- Tightness in the chest
- Hypoventilation
- Cyanosis
- Tachycardia

The different types of asthma are as follows –

Allergic asthma

Intrinsic asthma

Exercise induced asthma

Nocturnal asthma

Occupational asthma

Asthma is one of the common underdiagnosed disease among population and so the physician must look carefully for the clinical patterns of the disease. The diagnosis of the asthma is as follow in the table – Table 1 (5).

Diagnostic feature	Diagnostic criteria
1 <i>History of variable respiratory symptoms</i> Wheeze, dyspnea, chest tightness, and cough Descriptions may vary between cultures and by age	Generally, more than one type of respiratory symptom (in adults, isolated cough is rarely due to asthma) Symptoms occur variably over time and vary in intensity Symptoms tend to be worse at night or on waking Symptoms are often triggered by exercise, laughter, allergen exposure, cold air Symptoms often appear or worsen with viral infections
2 <i>Confirmed variable expiratory airflow limitation</i> Documented excessive variability in lung function (in one or more of the tests below) AND documented airflow limitation	The greater the variations, or the more occasions excess variation is seen, the more confident the diagnosis At least once during the diagnostic process when FEV ₁ is low, confirm that FEV ₁ /FVC is reduced (normally >0.75–0.80 in adults, >0.90 in children)
Positive bronchodilator (BD) reversibility test (more likely to be positive if BD medication is withheld before test: SABA ≥8 h, SAMA>24 h, LABA ≥48 h)	<i>Adults:</i> increase in FEV ₁ of >12% and >200 mL from baseline, 10–15 min after 200–400 µg albuterol or equivalent (greater confidence if the increase is >15% and >400 mL) <i>Children:</i> increase in FEV ₁ of >12% predicted
Excessive variability in twice-daily PEF over 2 weeks	<i>Adults:</i> average daily diurnal PEF variability >10% <i>Children:</i> average daily diurnal PEF variability >13%
Significant increase in lung function after 4 weeks of anti-inflammatory treatment	<i>Adults:</i> increase in FEV ₁ by >12% and >200 mL (or PEF by >20%) from baseline after 4 weeks of treatment, outside respiratory infections
Positive exercise challenge test	<i>Adults:</i> fall in FEV ₁ of >10% and >200 mL from baseline <i>Children:</i> fall in FEV ₁ of >12% predicted, or PEF >15%
Positive bronchial challenge test (usually only performed in adults)	Fall in FEV ₁ from baseline of ≥20% with standard doses of methacholine or histamine, or ≥15% with standardized hyperventilation, hypertonic saline or mannitol challenge

Modified from the Global Strategy for Asthma Management and Prevention. Revised 2016.

The main goal on the management of asthma is to maintain the control of the disease in order to prevent abrupt or progressive worsening of symptoms of asthma and then to control or minimize the frequency and severity of asthma symptoms, normalize physical activity and improve lung function as well as overall quality of life; and the pharmacological agents that are used in the

management of the asthma are subdivided into different categories (1)-

1. Controller medications, these are the pharmacological agents that are taken by the patient daily on a long-term basis for the control of the inflammation primarily via their anti-inflammatory properties. These drugs include –



- a. ICSs i.e., Inhaled corticosteroids (like beclomethasone)
 - b. Leukotriene receptor antagonists (like montelukast)
 - c. Long standing beta agonists that act as bronchodilators (like salmeterol) in combination with an ICS, long-acting muscarinic receptor antagonists (like tiotropium), and biologic agents including anti-IgE therapy and anti-IL-5 therapy.
2. Reliever medications, these are drug agents that used on as-needed basis for quick relief of bronchoconstriction and symptoms that include rapidly acting beta2 agonists as like salbutamol, short acting anticholinergic bronchodilators like ipratropium Br.
 3. Systemic corticosteroids.
 4. Oral bronchodilators like theophylline.

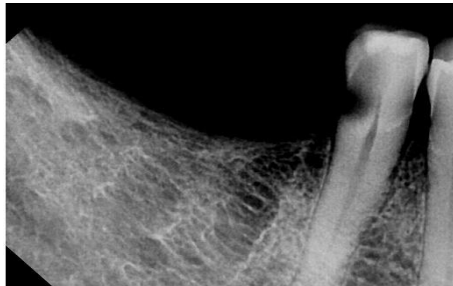
Oral findings in asthma patients or asthma patients taking medication –

In a study conducted in the year between 2008 to 2009 at Faghihi Hospital, Iran; among 100 known patients of asthma and 100 healthy patients (where the patients with other systemic disease, drug consumption, smokers and alcohol users were excluded from the study) between the age group of 12 to 83 years old and in that study, it was found that most prevalent oral lesions in the asthmatic group were chronic atrophic candidiasis(13%), fissured tongue(13%), geographic tongue(10%) with comparison to control group of healthy patients with the prevalence oral lesions like geographic tongue (2%), fissured tongue (11%), lichenoid reaction (2%) and also, it has been seen that asthma patients either on the oral steroids or on inhaled steroids have the higher prevalence of the oral candidiasis, decreased bone mineral density of the mandible and children on anti-asthmatic medicines have lower salivary pH as compared to the control groups thus making them more prone to the dental caries (6,7,8).

Case presentation – A 52-year-old female patient came to the dental OPD with a chief complaint of the pain in the lower right tooth region for 2 days.

On asking further, she said that the duration of the pain is continuous that only subsides on taking painkiller and after the effect of the medication gets over, the pain reappears and the painkiller she was taking was ibuprofen-paracetamol. The type of the pain is radiating in nature that radiates to the mid-line of the mandible on right side, to the right ear side and whenever she bites on right side the intensity of the pain got increased. Past dental history includes the dental visit 3 months ago to a different clinic where she was prescribed with antibiotics & painkillers for the same problem but with less intensity of pain and after that she was asymptomatic. On asking past medical history he said that is suffering from the problem of asthma and taking medication for the same, but was unaware of what medicines she was taking. On oral examination it was found that she had a distal caries to right mandibular second premolar and that tooth was the culprit for the pain, also we found that patient was also having the lesions on tongue that were supposed to be geographic tongue lesions and she was aware of that but since these lesions were asymptomatic so she never bothered about that given in picture 2. Also, the all the teeth posterior to the mandibular 2nd premolar on right side were missing. On dental and radiographical examination of the tooth number 45, we concluded to the diagnosis of apical periodontitis with respect to 45, and the cause of AP was endodontic in origin due to the distal caries present in that tooth and so there was tenderness on percussion to that tooth both horizontally as well as vertically with the death of the pulp i.e., pulpal necrosis as there were no vitality in premolar tooth. So, the treatment plan that was to perform non-surgical root canal procedure, and it was explained to the patient to take all the medication that she is taking for the asthma on next day, so that drug interactions could be prevented during & after the dental procedure. She was prescribed with the alprazolam 0.25mg for anxiety and instructed to take one tablet at bedtime and one another tablet 1 hour prior to the dental procedure on next day at noon time. The 2nd premolar was also de-occluded on day 1 visit and zerodol-P was given for the pain.

Day 1 pictures



Preoperative radiograph of 45

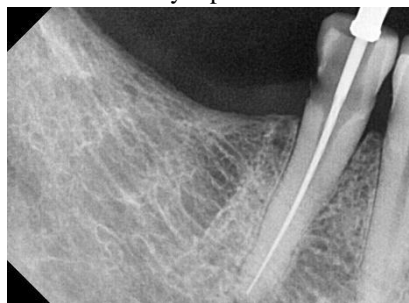


Geographic tongue lesions

On next visit day 2, she came back with all her medicines and she was prescribed with levolinrota caps, montelukast and oral steroid wysolone 5mg for 2 years. After that, local anesthesia of 1.1ml articaine with adrenaline was given infiltration technique and then after access opening and BMP was done, the canal was

prepared up to 30 number with 4% of rotary with a working length of 21.5mm and then she was asked to come after 5 days for obturation and follow-up with prescription of zerodol-p and cefixime 200mg BD. The position of the patient during the procedure was upright.

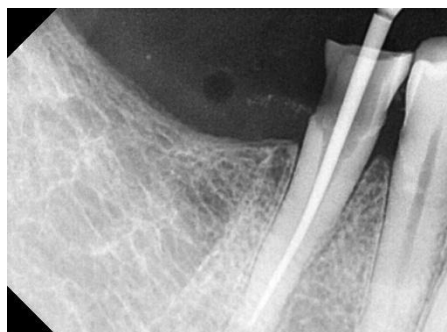
Day 2 picture



Intraoperative periapical radiograph of 45 – BMP done upto 30 no. rotary files with 4%.

On 3rd visit, after 5 days the patient was free of pain so the canal was obturated with 4% of gutta percha with 30 number. Also, after managing her chief complaint she was asked about her tongue lesions whether she had any lesion on other part of body or she ever found any discomfort in those tongue lesions; and there were no kind of any

lesions on other body parts. She said that she noticed those tongue lesions for few months and since there was no discomfort she never visited to any doctor. Thus, lesions were diagnosed on the clinical 3rd visit picture



Master cone with 4% of 30 no. after 5 days of BMP basis as benign migratory glossitis and for the same problem she was instructed not to take spicy, hot and acidic foods and to take balanced diet and rich in beta-carotenes and zinc. Also, she was advised to go general physician for these lesions for cross checking with any other systemic disease she is suffering from, although one was asthma.

II. RESULTS –

Patient's pain was gone after the 2nd day of the BMP and that was the reason her canal was obturated after 5 days and also the patient was managed well with pre-medication for anxiety and the care about prescribing the NSAIDs was also taken so that attack of asthma could be prevented either at OPD or home. But, the results for geographic tongue can't be concluded because after the relief from pain patient never came back.

III. DISCUSSION–

discussion regarding the dental considerations in asthma patients by taking the reference of the case presentation above –

1. Dentist decide to give the premedication for anxiety, the main purpose of the operator to give alprazolam is to prevent the asthmatic attack because a lot of people afraid of dental procedures and fear or anxiety can precipitate the attack of asthma, although it is not guaranteed that attack will not occur during the procedure because any stressful even during intra-operative procedure can also precipitate the attack of asthma.
2. The purpose of the noon appointments was only that is has been seen that broncho-constriction in least at the time of noon and thus this could also be helpful to carryout procedure more safely.

3. The ibuprofen-based medicines the was taking for pain were also replaced by other alternate as the drugs like ibuprofen, aspirin, naproxen can precipitate the asthma attack.
4. Although, these are all the methods to prevent the chances of the asthma attack in dental OPD, but there must be an emergency drug kit for asthma with these medications at dental office and dentist must have knowledge regarding the same-
Adrenaline inj,
Dexamethasone or hydrocortisone inj,
Oxygen,
Theophylline tablet or inj,
Salbutamol inhaler.

The need of these drugs to keep in dental office to provide first aid to the patient till the arrival of the ambulance or medical team.

5. The main focus should be on to give minimum stress to the patient during treatment and patient upright position should be preferred on the dental chair, also the chances of aspiration are more in supine position during dental treatment.
6. Use of dry cotton directly or near to patient should be avoided as it can precipitates in some people as they are allergic to fibers of the cotton, if there is need to use cotton first wet them extra orally away from patient either with saline or sterile water.
7. Also, the geographic tongue lesions were seen in the oral cavity and the missing teeth were also present, and so there are the chances that these oral manifestations could be due to asthma because anti-asthmatics drugs can change pH of saliva which predominates the chances of the caries and steroid use in asthma is also helpful in caries progression. These all manifestations can occur in any healthy person also, but asthma and oral cavity changes are no



doubt linked and these have been seen in different studies.

8. Severity of the asthma should be charted before starting the dental procedures.

IV. CONCLUSION –

It is concluded that there should be multidisciplinary approach whenever the patient is diagnosed with asthma and also the dentist must be aware of the management of dental patient with asthma problem, this not only saves the life of patient but also helps in gaining the trust of the operator and whenever required dentist must also consult with patient's general physician or any other physician specially in case of severe cases of asthma where it could lead to death of the patient and so in such cases, it is better to operate at hospital environment so as to minimize the risk of complication.

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