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RESEARCH ARTICLE

ORAL MANIFESTATIONS OF SYSTEMIC DISEASES IN CHILDREN CAUSED BY BACTERIAL INFECTION- A REVIEW

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Abstract

Any alteration in systemic diseases of the body may show initial signs and symptoms in the oral cavity. Oral manifestations show up as oral ulcers or inflammations in the oral cavity & orofacial region. Patients are mostly unaware of the cause of oral manifestations. As dentist, we are the first to identify these signs and symptoms. In order to diagnose the underlying cause for the oral signs, we must have sound knowledge about the systemic diseases, their relation to the oral cavity and its oral manifestation. This review article focuses on the various oral manifestations linked to systemic conditions and the awareness regarding these conditions. In pediatric patients, poor oral health has been linked to poorer health outcomes overall. Thorough history taking and physical examination by dentists may aid in determining the underlying etiology of oral changes and allow for earlier intervention by medical colleagues.

Introduction:-

Since ages, oral diseases has been a global burden worldwide. It might cause pain, discomfort and can also be the cause of various underlying diseases affecting the overall health of a person like Crohn's disease, Behçet syndrome, Systemic lupus erythematosus, Sarcoidosis, Wegener's granulomatosis etc. On the other hand oral diseases are often manifested as oral ulcers, macules, papules, blisters, purpura, petechiae etc affecting the whole oral cavity(gum, palate, teeth, lip, oral mucosa).Oral diseases affects both the young and the adult.Children are more susceptible to oral infections because of their developing immune systems and recurrent exposure to infectious vectors. The signs and symptoms of bacterial oral infections in this age group are diverse and depend on the source , site of infection. Several factors that increase the susceptibility of children to oral infection are poor immune system, hematologic malignancies, autoimmune disease, endocrine disorders, granulomatous disease, diabetes mellitus, aplastic anemia , HIV infection, white blood cell dysfunction etc. Some local factors also increase the susceptibility to bacterial infection like low saliva flow, poor oral hygiene, dental appliances , trauma, use of interim dentures and other dental

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appliances.If we as pediatric dentist are able to diagnose systemic diseases by its oral manifestation, we might be able to prevent future complications and help in proper growth and development of the child.

Various Bacterial Infection

Tuberculosis

Tuberculosis (TB) is a specific infectious granulomatous disease caused by mycobacterium tuberculosis.[1]TB cases seen in children ranges from 1-4 years and 10-14 years age group. Systemic symptoms include weight loss, fever, productive cough, haemoptysis and night sweats[2].Tuberculararoral lesion(Fig1)present in a variety of forms, such as ulcers, nodules, tuberculomas, and periapical granulomas[3]. Primary oral lesion are seen in mostly younger patients and secondary oral lesion relatively more common in middle-aged and elderly patients.Tuberculosis gingivitis(Fig2), tubercular gingival enlargement (Fig3) and tubercular osteomyelitis(Fig 4)are also seen[3]. Tuberculosis is diagnosed by tuberculin skin test, chest radiography, MRI, ultrasound, High-resolution computed tomography, sputumculture etc. BCG vaccination[4] reduces the risk of disseminated (miliary) disease and tuberculosis meningitis in young children.For treatment of TB, first line tubercular drugs are initially given to children to two phases, intensive phase and preventive phase[5].

Fig 1:- Primary Oral Tuberculosis.

Fig 2:- Tuberculosis gingivitis.

Fig 3:- Tuberculosis gingival enlargement.

Fig 4:- Primary tuberculosis osteomyelitis of the mandible.

Scarlet fever

Scarlet fever is a contagious bacterial infection occurring predominantly in children caused by Strep pyogenes.[1]It is most common among children 5 through 15 years of age. Symptoms are bright scarlet to dusky red skin rash[6](Fig 5) appears on the second or third day of the illness, floridtonsillitis with fever >38°, and swollen glands in the neck[7]. Stomatitis scarlatina(Fig6) accounts for the chief oral manifestation. Strawberry tongue(Fig7), red-raspberry tongue(Fig8), fiery red palate &uvula, hypoplasia of teeth are seen in oral cavity[3].It is diagnosed clinically, routine blood examination and microbiological culture. For management, isolation[8], hygiene maintain, antibiotics[3], fluid replacement etc. should be done.

Fig 5:- Skin rash on face.

Fig 6:- Stomatitis scarlatina.

Fig 7:- Strawberry tongue.

Fig 8:- Red raspberry tongue.

Leprosy

A chronic infectious disease caused by a mycobacterium (Mycobacterium leprae) affecting especially the skin and peripheral nerves[1].The disease tends to occur with the highest frequency in 5–14 years of age group in children.Bilateral and symmetrical ill- defined macular hypoesthetic lesions, diffuse infiltration of the face and earlobes,trophic ulcers due to sensory loss or muscle weakness are occasionally first to be observed clinically[9]. Most common oral manifestation of leprosy is oral lepromas(Fig9-10)which aremay be seen in the gingiva, anterior portion of the maxilla, hard and soft palates, uvula, periodontium and tongue. Others are enamel hypoplasia, pulpal necrosis leading to a pinkish discoloration of crown, oral melanosis, atrophy of papillae and loss of taste sensation, aphthous ulcer, candidiasis, depigmentation, smokers palate, Oral submucous fibrosis (OSMF) andXerostomia[3].Diagnosis isdone with Slit Smear Examination, Histopathological examination,

Lepromin test[3], Serological and molecular diagnostic methods etc.Bacille Calmette–Guérin (BCG) and Mycobacterium indicus pranii (MIP) vaccines are commonly used to prevent leprosy.Multidrug therapy(MDT) is the mainstay of leprosy treatment[9].

	
Fig 9:- leproma involving tongue.	**Fig 10:-**Multiple papules & nodules on dorsal tongue.

Diphtheria

An acute febrile contagious disease typically marked by the formation of a false membrane especially in the throat and caused by a gram-positive bacterium (Cornybacterium diphtheria)[1].This disease mostly occurs in children under 5 years of age. Clinical symptoms of diphtheria include fever of 380C(100.4 0F) or above, chills, fatigue, bluish skin coloration(cyanosis),sore throat,horseness,cough,headache,difficultyswallowing, painful swallowing, difficultybreathing, rapid breathing, foul-smelling bloodstained nasal discharge and lymphadenopathy[6]. Apatchy 'diphtheritic membrane'(Fig11-12)can be seen in oral cavity[3].It is diagnosed clinically by culture & staining method, biochemical tests, chest radiography, toxin detection test, MRI, CT scan and ECG.Diphtheria can be prevented by immunization. It is usually treated by proper rest and antibiotic prophylaxsis[10].

	
Fig 11:- Diphtheria membrane.	**Fig 12:-** Diphtheria patch.

Impetigo

Impetigo is a common bacterial skin infection in children caused by Staphylococcus aureus or streptococci, or a combination of the two[1].Impetigo occurs most commonly in children ages 2 to 5 years.It most commonly presents as erythematous plaques with a yellow crust(Fig13) and may be itchy or painful.Oral ulcerated lesions(Fig14-15) were observed on the labial, jugal mucosa& gingiva.It is diagnosed clinically by culture & sensitivity test, anti-DNA-ase B test etc. Treatment involves topical and oral antibiotics and symptomatic care[11] and natural remedies[12].

		
Fig 13:- Yellowish colored crust.	**Fig 14:-** Ulcerated lesions on the labial mucosa.	**Fig 15:-** Ulcerative lesions on the keratinized gingival.

Tetanus

An acute infectious bacterial disease characterized by tonic spasm of voluntary muscles especially of the jaw and caused by an exotoxin of a clostridium (Clostridium tetani)[1].Anyone can get tetanus, but the disease is particularly common and serious in newborn babies and pregnant women[13].It is characterized by generalized rigidity and convulsive spasms of skeletal muscles. Rigidity of muscle of mastication(Risus sardonicus)(Fig16), Lock jaw(Fig17) seen in the oral cavity[3]. Tetanus is diagnosed by clinically. Tetanus can be prevented by vaccination.All wounds should be cleaned & necrotic tissue and foreign material should be removed for management of tetanus[14].

Fig 16:- Risus sardonicus.

Fig 17:- Lock jaw.

Tularemia

An infectious disease especially of wild rabbits, rodents, some domestic animals, and humans that is caused by a bacterium (**Francisella tularensis**)[1]. It is more common among children 5–9 years of age.Classic tularemia is characterized by regional lymphadenopathy(Fig18)with or without skin or mucosal ulceration (ulceroglandular or glandular forms, respectively)[3].Diphtheria-like appearance(Fig19)seen in tonsil, posterior pharyngeal wall, soft palate, base of the tongue and buccal mucosa.Generalized stomatitis also seen in the oral cavity[6].It can be prevented by avoid tick and insect bites,drink only treated water etc.It is diagnosed by clinically, serological test and skin test. Antibiotics are prescribed for treatment of tularemia[15].

Fig 18:- Lymph node enlargement.

Fig 19:- Fibrinous pseudomembrane formation(Diphtheria-like).

Syphilis

A chronic contagious usually venereal and often congenital disease caused by a spirochete (Treponema pallidum).[1]Congenital syphilis most commonly seen in birth to 2 years age.Chancre, Circinate lesions, macular or papular rash, split papule Condylomalatum, Gumma, Tabes dorsalis are clinical manifestations of syphilis. Oral chancre(Fig20), snail track ulcers(Fig21) split papule(Fig22), oral condylomalatum(Fig23), oral gumma(Fig24) ,luetic glossitis, postrhagadic scarring and syphilitic rhagades, Hutchinson teeth(Fig25), Screwdriver-shaped incisors(Fig26), Mulberry molars(Fig27)are oral manifestations of syphilis. It is diagnosed by dark ground microscopy,serological test, x-ray etc.Penicillin is the treatment of choice[3].

				
Fig 20:- Chancre of hard palate.	**Fig 21:-** Snail track ulcers.	**Fig 22:-** Split papule.	**Fig 23:-** Oral Condylomalatum.	**Fig 24:-** Gumma on hard palate.

		
Fig 25:- Hutchinson teeth.	**Fig 26:-** Screwdriver-shaped teeth.	**Fig 27:-** Mulberry molars.

Conclusion:-

The mouth and oral cavity are focal points for the interaction of the body with the external environment. Chronic health conditions create a massive burden on the health of individual as well as the entire healthcare system[16]. It has been found that systemic conditions can manifest in the oral and maxillofacial region and in the oral cavity, involving the dentition, soft tissues, bone, musculature and nerves.Routine and regular dental care not only prevents periodontal disease and caries but also helps to stratify patients who are at significant risk for more serious systemic conditions.The oral cavity is also the intersection of dentistry and medicine, semi-independent professions that share the same common goal of improving the health and quality of life of patients, thus a coordinated approach between physicians and pediatric dentists in the diagnosis and management of these conditions is necessary to achieve optimal clinical outcomes[17].

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