

Congenital Infections and Dental and Oral Involvement

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Abstract

Many congenital bacterial, viral and parasitic infections can lead to dental and oral involvement. Studying them is important from clinical and epidemiology point of view. They can lead to myriad signs and symptoms. Hence they have to be detected, differentiated and managed early as far as possible. They can be prevented also by vaccination. We here have tried to collate available information in medical literature about these.

Keywords: Congenital, signs, symptoms, prevention

Introduction

Many bacterial, viral and parasitic infections can be transmitted congenitally. They can lead to congenital infection in the newborn in utero, producing many clinical features involving the teeth, lips and mouth cavity. These features are seen along with other systemic involvements. These have to be studied well for proper management. Unfortunately, no comprehensive literature is there to review such infections. We hence try here to collect and present existing information about it.

Materials and Methods

We reviewed literature available in books and journals across internet to prepare the review article.

Congenital Rubella syndrome

This infection was very commonly reported once upon a time and still not very rare. Congenital rubella syndrome (CRS) has a quite low rate of occurrence now. It has been expected to reduce to 1 case per 100000 live births. The infection can be acquired by contact with the Rubella virus belonging to the *Togaviridae* family of RNA viruses during pregnancy. Fetal development is completely deranged once the virus is transmitted to the developing foetus in utero [1]. Patients with CRS are usually considered special patients with exaggerated dental problems. This is usually due to lacking manual skills and failure on the part of caretakers to provide timely oral disease prevention, as because they consider it secondary owing to the grave systemic problems the patient suffers from [2]. The infected child may be unable to chew, and

her diet usually comprises soft foods. Intraoral examination can reveal caries of teeth. The lower anterior teeth can be diagnosed congenitally missing owing to a knife edged alveolar ridge. Also, the maxillary arch can be unusually narrow, and the palate can be deep [2]. Prevention can be done by MMR (Measles-Mumps-Rubella) Vaccination of the mother before pregnancy (Figure 1).



Figure 1: Teeth in Congenital Rubella syndrome (Source: BMJ Case reports).

Congenital Cytomegalovirus (CMV) infections

CMV is a DNA virus and member of the *Herpesviridae* family. Congenital CMV infection can involve many organs and tissues in the newborn, and teeth and oral cavity can also be sometimes involved. Hypoplasia and hypocalcification of tooth enamel are commonly seen in children having congenital CMV infection and

hence, regular dental visits are an important part of the long-term care of these infants [3] (Figure 2).



Figure 2: Defects of tooth structure seen in congenital CMV infection (Source: American Academy of Pediatrics).

Congenital Syphilis

Although many physicians, dentists and pathologists in developed countries will be aware of the dental features of congenital syphilis, most will never have seen a case or made the diagnosis. The earliest reference to the dental manifestations of congenital syphilis was by Sir Jonathan Hutchinson, Assistant Surgeon at The London Hospital, England, in 1861 [4]. Dental defects are the most consistent clinical manifestation of syphilis and are pronounced in teeth, which calcify in the first year of life such as permanent incisors and first molars [4]. According to Putkonen (1962) who investigated 235 syphilis patients, 45 % children with permanent incisors showed features of Hutchinson's form. About 22 % with first permanent molars had Moon's form. However, only 12 % showed cortical thickening related to periosteitis on radiographs of the limbs .

Hutchinson's incisors

Sir Jonathan Hutchinson also noted that the dental defects were restricted to the permanent teeth. According to Hutchinson the colour of the teeth is also abnormal, the affected teeth being semi-translucent rather than the ivory colour of normal teeth. In incisors affected by congenital syphilis the incisal edge has been described as either notched or 'screwdriver shaped'. The bulbous crown is described as 'barrel shaped' [4].

Moon's molars

The first description of the characteristic defect of permanent first molars was given by Henry Moon, Dental Surgeon at Guy's Hospital (1877) [4,5]. He described these teeth as being small and dome shaped, with cusps set closer together than normal. The crowns are widest at the base and the narrowest at the cusps, have no grooves running around the cusps and the crown surface is smooth. These teeth were later referred to as 'Moon's molars' and in some cases as 'bud molars', the latter term aptly describing their morphology [4].

Fournier's molars or mulberry molars

Fournier (1884) described a different form of permanent molar tooth defect associated with congenital syphilis. In this there is a deep groove around the base of each cusp caused by enamel hypoplasia. He described it as 'a smaller tooth growing out of a larger one, a stump growing from a normal crown' [4,6]. The defect is clearly very different from that described by Moon and probably results from infection at a slightly different time of development. Though the two defects are distinct, the terms have often been confused, even by the originator of the term mulberry molar, Karnosh, who proposed it to describe both types, though his illustration clearly shows Fournier molars. Syphilitic canine: Several studies describe typical features of a syphilitic canine, but this defect is less commonly found than other incisor and molar defects. According to an archeological study, maxillary and mandibular canines are as characteristic in morphology as the upper central incisors and are bulbous column-like pegs with an occlusal notch. They also have an elevated ring of enamel on the occlusal surface [4,7]. The tell-tale feature in Congenital syphilis is Hutchinson's triad which is characterized by peg shaped upper central incisors, and interstitial keratitis which consists of blurred vision, abnormal tearing, eye pain and abnormal sensitivity to light, saddle nose, bony prominence of the forehead (frontal bossing), high arched palate, short upper jawbone, neural deafness and fissuring around mouth and anus [8]. Interestingly, Mercurial poisoning was noted by Sir Hutchinson to grossly affect tooth development producing abnormalities of enamel formation . Mercury had been used to treat congenital syphilis but can also involve teeth in the newborn. These may interfere with the expression of "classic" dental signs of congenital syphilis [9] (Figures 3 & 4).



Figure 3: Hutchinson's teeth (notched incisors). (Source: Researchgate.net).



Figure 4: Mulberry molars found in Congenital syphilis (Source: Researchgate.net).

Congenital Toxoplasmosis

Congenital toxoplasmosis leads to CNS and pulmonary involvement in the newborn, and does not cause dental affection per se. However, the sugar suspending agents used for delivering drugs like Pyrimethamine and Leucovorin, that are used to treat the babies infected with congenital toxoplasmosis, can lead to dental caries. Hence teeth have to be cleaned well after medicine administration [10].

Congenital Epstein-Barr virus infection

Congenital infection by Epstein-Barr virus usually produces no or little symptoms in the newborn. Rarely micrognathia or small jaw may be reported along with other constitutional symptoms like Cryptorchidism, thrombocytopenia, hypotonia and petechial hemorrhagic spots [11].

Congenital Zika virus infections and dental affection

Children born to mothers infected with Zika virus can have incomplete deciduous dentition. The abnormal chronology of dental eruption and dental development disturbances in children with microcephaly infected with ZIKV born to infected mothers indicate a possible role of the virus in odontogenesis [12]. In another study, a higher frequency of the following oral conditions was observed in Zika virus infected mothers: delayed eruption chronology (100%), dental biofilm (55.88%) and enamel defects (DDE) (22.06%). Bohn nodules (6.85%), micro dents (2.70%) and ectopically positioned dental elements (1.35%) were less frequent. Only one of the cases showed incipient caries lesion (1.47%). In this study, the occurrence of DDE was more frequent among those with ogival palate, normal weight at birth and who did not have an eruptive delay ($p < 0.05$) [13]. Hence, monitoring oral health conditions is necessary to minimize oral health problems in these children.

Discussion

Many congenital infections can have oral and dental involvement. Either they themselves affect the teeth or oral cavity of the newborn child, or it is due to the drugs administered to treat these conditions. Hence proper history taking, and investigations are needed to pick them. It is also important to study this because many congenital diseases can involve teeth and oral cavity and features may also be overlapping.

Conclusion

Congenital infections affecting teeth and oral cavity can present variably and hence have to be managed and detected early for optimum results.

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