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A case of Beckwith–Wiedemann syndrome with peculiar dental findings

ABSTRACT

Background *Beckwith-Wiedemann syndrome (BWS, OMIM 130650) is a rare genetic disorder characterised by overgrowth, tumor predisposition and congenital malformations. Few systemic manifestations and oral features have been reported so far.*
Case report *We report on a case of BWS, describing all features expanding the knowledge on oro-dento-facial phenotypes, along with a review of the literature.*

Keywords *Beckwith Wiedemann syndrome; Mouth; Oral manifestations; Systemic manifestations.*

Introduction

Beckwith-Wiedemann syndrome (BWS, OMIM 130650) is a rare genetic disorder characterised by overgrowth, tumor predisposition and congenital malformations. Patients with BWS have an abnormal growth from the 5th month of intrauterine life until the first year of life; adult height is in the normal range [Shuman et al., 2000]. Hypoglycemia is reported in 30-50% of newborns. With regard to oral features macroglossia, skeletal Class III, open bite, prognathic mandible and rarely cleft palate have been reported [Shuman et al., 2000; Wilfong et al., 1992; Tank and Kay, 1980; Weinstein et al., 1986; Kacker et al., 2000; Menard et al., 1995] omphalocele, embryonal tumor, optic glioma, retinoblastoma, nevus flammeus, aniridia, opsoclonus-mioclonus, visceromegaly involving abdominal organs, fetal adrenocortical cytomegaly, renal abnormalities, and hepatoblastoma are associated with BWS [Shuman et al., 2000; Wilfong et al., 1992; Tank and Kay, 1980; Weinstein et al., 1986; Kacker et al., 2000]. Cardiac malformations are found in 9-34% of cases and about half of these have spontaneously resolving cardiomegaly. Patients affected by BWS have a high predisposition to embryonal tumors mostly in the first 8 years of life with a risk estimate of 7.5% [Shuman et al., 2000; Wilfong et al., 1992; Tank and Kay, 1980].

Oral manifestation

Few reports on BWS with regard to oral manifestations have been so far published; the most striking oral features in BWS are macroglossia, skeletal Class III, open bite as distinctive phenotype of the syndrome, rarely cleft palate has been reported [Shuman et al., 2000; Wilfong et al., 1992; Tank and Kay, 1980; Weinstein et al., 1986; Kacker et al., 2000]. Variable degrees of macroglossia have been noted in patients with BWS. Past studies have shown that a major effect of macroglossia is protrusion of dentoalveolar structures, resulting in an anterior open bite and a prognathic mandibular appearance secondary to an abnormally obtuse gonial angle and increased effective mandibular length as described in a report [Menard et al., 1995], where in 11 BWS patients it was observed that early correction of the macroglossia by means of partial glossectomy resulted in decreased anterior open bite and mandibular prognathism as compared with patients managed conservatively [Menard et al., 1995; Friede and Figueroa, 1985]. In 1985 other authors repored the paradigm: "The changes in tongue shape and dentofacial morphology support the position that early partial glossectomy should be delayed or abandoned." [Kadouch et al., 2012], apart those cases where tongue reduction is considered mandatory. In any case, the treatment is a challenge and requires a personalised treatment plan, in absence of protocol or guidelines for such a rare disease [Shuman et al., 2000].

BWS is caused by various genetic and epigenetic alterations that dysregulate genes located on chromosome 11p15.5. The diagnosis is clinical and based on the presence of at least three characteristic clinical findings such as overgrowth, macroglossia and omphalocele. Differential diagnoses include Simpson-Golabi-Behmel, Costello, Perlman, and Sotos syndromes and mucopolysaccharidosis type VI [Shuman et al., 2000].

Prenatal testing is available through chorionic villus sampling or amniocentesis. Foetal omphalocele can be detected on ultrasound. The disease occurs sporadically (85%), but familial transmission is reported (15%). Tumor surveillance should be always monitored in BWS patients, especially when the syndrome is suspected or diagnosed in a clinically unaffected monozygotic twin. Screening for hypoglycemia should be constantly carried out. With regard to life expectancy, at the severe onset of systemic manifestations, patients are at risk of early death due to complications coming from hypoglycemia, prematurity, cardiomyopathy, macroglossia or embryonal tumors. In patients who survive childhood, prognosis is generally good [Shuman et al., 2000].

So far, in the literature few reports (12 papers to date matching with the keywords "Beckwith-Wiedemann syndrome", "oral manifestation" and "teeth" and "mouth") on this entity have been found in PubMed and the most used data bases in scientific literature; therefore, in this report are described the dental features detected in a 5-year-old boy with BWS.

Case report

We report on a 5-year-old boy with BWS and the dental features observed.

Variable degrees of macroglossia have been noted in patients with BWS [Shuman et al., 2000; Wilfong et al., 1992; Tank and Kay, 1980; Weinstein et al., 1986; Kacker et al., 2000]. Past studies have shown that a major effect of the macroglossia is protrusion of dentoalveolar structures, resulting in an anterior open bite and a prognathic mandibular appearance secondary to an abnormally obtuse gonial angle and increased effective mandibular length (Fig. 1) [Pruzansky, 1976].

Our patient had a previous glossectomy; macroglossia is the most common finding and one of the diagnostic criteria in BWS together with skeletal Class III, congenital and caused by macroglossia which is able to cause prognatism, making more prominent the mandible in an already congenital skeletal cephalometric Class III. This is the first report describing BWS and peculiar oral features such as delayed eruption, congenital diastema in mandibular permanent incisors, tooth shape anomalies, and dental enamel defects i.e enamel hypoplasia. On dental examination the following were observed: mixed dentition, enamel defects on tooth 21, open bite, skeletal Class III, macroglossia and poor oral hygiene. An orthpantomography (Fig. 2) was carried out showing widely spaced teeth (the space between teeth 31 and 32, 31 and 41, 41 and 42, in the lower jaw is unique, atypical and expands the dental phenotype of this rare disease); misshapen teeth (knife edge shape of teeth 31, 32, 41, 42) have been observed. Systemic features such as omphalocele (treated with surgery at birth) with posterior abdominal pain diagnosed as intestinal obstruction by flanges, and partial glossectomy were observed. The patient also presented postnatal overgrowth, ear creases, gastroesophageal reflux, hiatal hernia, hypoglycemia, pes cavus and seborrhoeic dermatitis. The patient has been enrolled in a physiotherapic, psychologic, and speech therapy programme.

Discussion

BWS is a rare disease. Case reports of rare diseases have been proved to have a high value, as they "provide insights into fundamental mechanisms and also assist clinicians in the treatment of similarly affected patients" [Pruzansky, 1976].

In literature are reported diseases with a very low incidence, for which there is still a limited knowledge such as X-linked reticulate pigmentary disorder, Goltz Gorlin syndrome, Cornelia de Lange syndrome, cleidocranial dysostosis, Alagille syndrome, Neurofibromatosis (distinguished in many different subtypes) and many more [Callea et al., 2011; 2012a;

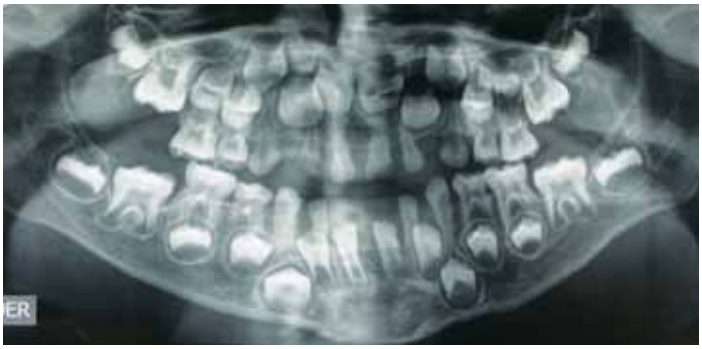

FIG. 1 Skeletal Class III, open bite, enamel defect on tooth 21, macroglossia although glossectomy had already been performed.
FIG. 2 Panoramic radiograph showing all permanent teeth, delayed eruption, crowding in the bilateral maxillary central region and narrow palate; widened space between teeth 32 and 31, 31 and 41, 41 and 42 with a peculiar diastema between teeth 31 and 41.

2012b; 2012c; 2012d; 2013a; 2013b; 2014; Pezzani et al., 2013; Montanari, 2012]. This, together with the scarcity or absence of literature with regard to these diseases and their systemic manifestation, prompted us to describe our case report adding a brief review with a peculiar attention to the oral features. This report attempts to evidence the expansion of dental phenotype with regard to BWS, one of the 6000 rare diseases classificated to date [Callea and Yavuz, 2015].

Conclusion

Any report of a rare disease has a high value expanding the knowledge of phenotypes to date unreported; further reports of BWS cases will expand the phenotypic spectrum of BWS. With regard to macroglossia, early intervention might be required if feeding or respiratory difficulties arise. The diagnosis of the syndrome should alert the dentist to all systemic manifestation of BWS opening a dialogue with a multidisciplinary team [Abeleira et al., 2011]. In conclusion we report on a case of BWS, with typical orofacial features such as macroglossia, skeletal Class III, open bite, and added features such as wide spaced teeth, tooth shape anomaly, and enamel dental defects to date unreported in BWS encompassing the medical records of a patient with BWS. Considered the rarity of reports with regard to oral manifestation in BWS, the authors consider this report significative as aimed to expand the knowledge of BWS and rare diseases, a field neglected until 2 decades ago.

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