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Case Report

A rare chromosomal disorder in a newborn: Trisomy 3q

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SUMMARY: Kahvecioğlu D, Tatar-Aksoy H, Yıldız E, Bakır A, Alioğlu B. A rare chromosomal disorder in a newborn: Trisomy 3q. Turk J Pediatr 2019; 61: 271-274.

Trisomy 3q is a rare chromosomal disorder that leads to multiple congenital abnormalities. We hereby present a patient with chromosomal karyotype 46, XY, dup (3)(q23-29), which can be classified as pure 3q duplication and has thin sclera and iris dysgenesis, anterior and posterior segment dysgenesis besides the previously identified specific facial features. To the best of our knowledge only 12 cases have been reported with pure duplication in the literature. Our case is the 13th one reported and has noval findings concerning eye involvement. The ocular manifestations of the 3q duplication syndrome provide additional evidence of the involvement of genes which are responsible for eye development in this chromosomal region.

Key words: trisomy 3q, iris dysgenesis, Cornelia de Lange.

Trisomy 3q is a rare chromosomal disorder that leads to multiple congenital abnormalities. It has overlapping features with Cornelia de Lange Syndrome.[1,2] Affected infants have specific craniofacial abnormalities, mental retardation, developmental delay, congenital heart defects, renal and ocular malformations, limb and central nervous system anomalies.[3,4]

We hereby present a patient referred to our unit because of multiple congenital anomalies, diagnosed as Trisomy 3q Syndrome.

Case Report

A 2650 g male newborn of 39 weeks gestational age was born to a 42- year-old, gravida 9, parity 7 mother via vaginal delivery. His mother suffered from polyhydramniosis during pregnancy. He was referred to our NICU on postnatal 9th day because of necessity for congenital glaucoma operation. There was consanguinity between the parents, and two abortus history with unknown origin. On physical examination, his body weight was 2430 g, height: 44 cm and head circumference: 31 cm (< 3rd percentile for his age, respectively). Round shaped facial appearance, coarse facial features, low forehead hairline, hypertrichosis and, synorphysis, lateral eyebrow flare, hypertelorism, upslanting palpebral fissures, corneal opacity of the right eye, bilateral microophtalmia, bilateral epicanthal folds, wide and broad nasal root, anteverted nares, short nose, long philtrum, low set and malformed ears, full cheeks, cleft palate, micrognathia, low posterior hairline , generalized excessive hair growth, short, webbed neck, simian line, clenched hands, shortness of proximal of the extremities, 11 ribs on both sides, 3/6 systolic murmur, cryptorchid testes and sacral dimple were detected on physical examination (Figs. 1-2). Echocardiography showed atrial septal defect, ventricular septal defect (VSD), right ventricular hypertrophy and 3rd degree tricuspid insufficiency. Hemorrhagic connatal cyst with a size of 9.9x5.6 mm on the frontal area and Grade 1 periventricular hemorrhage were detected by transfontanel ultrasound. Anterior and posterior segment dysgenesis, thin sclera and iris dysgenesis were found in the right eye. Microphtalmia confirmed with ocular ultrasound. Due to multiple congenital abnormalities, chromosomal analysis was performed on lymphocyte cells from peripheral blood samples and revealed the presence of Trisomy 3q2. Microarray analysis was performed

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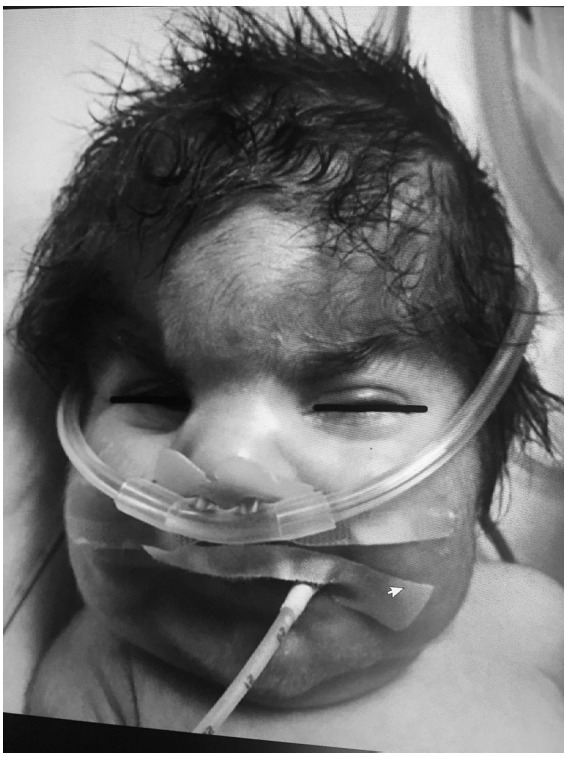

Fig. 1. The facial appearance of the patient

to confirm the diagnosis with high resolution. As a result microarray analysis revealed an increase in copy number of approximately 56 Mb in the q23-q29 band region of distal chromosome 3q. Based on positive clinical findings and the results of conventional and molecular cytogenetic studies the diagnosis of Trisomy 3q Syndrome was confirmed. His family refused to give an example for karyotype analysis because they were living in another city. A pulmonary banding operation was performed on postnatal 35th day. The baby who had no cardiac insufficiency, was full orally fed with an orogastric feeding tube and no further procedures were planned for his eyes, he was re-transported to the hospital which he was born, upon the request of his family for the long-term follow-up on postnatal 72nd day. Informed consent was received from the family.

Discussion

Trisomy 3q (Partial Duplication of 3q Syndrome) is a rare disorder in which a portion of the 3rd chromosome appears three times in the cells of the body. It was first reported by Falek et al.[5] in 1966 and almost 100 cases have been reported since then. Unbalanced translocation or inversion of chromosome 3, results in duplicated chromosome 3q genetic material and monosomy of another chromosomal region.

The chromosomal karyotype of our patient was 46XY, dup (3)(q23-29), which can be classified as pure 3q duplication. To the best of our knowledge only 12 cases have been reported with pure duplication (Table I). Our case is the 13th one and has novel findings concerning eye involvement.

Patients with Trisomy 3q Syndrome show

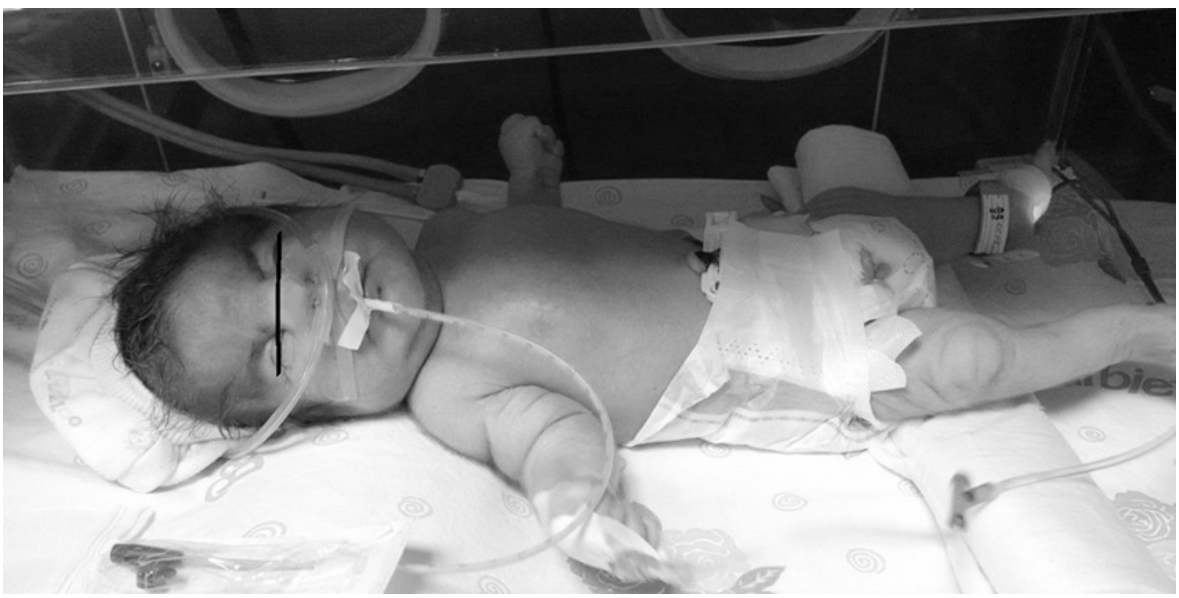

Fig. 2. The appearance of body and extremities

Table I. Pure 3q Duplication Syndrome Cases Previosly Reported in the Literature.

	Wilson et al. [1978]	Stengel Rutkowski et al. [1979]	Sciorra et al. [1979]	Rosenfeld et al [1981]	Van Essen et al. [1991]	Rizzu et al. [1994]	Faas et al. [2002]	Meins et al. [2005]	Shanske et al. [2010]	Zhu et al. [2013]	Imataka et al. [2013]	Present Case [2018]
Region of affected chromosome	q25→q29	q21→q27	q23→q27	q21→q26	q25→q28	q25→ q26.2	q26.3→qter	q24→q26.31	q21→q29	q24→q28	*q*22→q29	q23→q29
Growth reterdation	-	+	+	+	-	+	+	-	+	+	+	+
Microcephaly	+	-	+	-	-	+	-	+	+	+	ND	+
Hirsutism	+	ND	-	ND	+	ND	-	-	-	ND	ND	+
Low hairline	+	+	ND	ND	ND	ND	+	-	+	ND	ND	+
Synorphysis	+	ND	+	-	+	-	-	-	+	ND		+
Hypertelorism	ND	+	+	-	ND	ND	-	-	+	ND	+	+
Cleft palate	-	+	+	+	+	+	-	-	-	+	+	+
Wide, broad nasal root	ND	+	+	+	ND	-	+	+	+	+	+	+
Rib anomaly						ND		ND	-	ND	ND	+
Ear deformity	-	+	ND	+	ND	+	+	+	ND	ND	+	+
Congenital heart defects	ND	+	+	+	+	ND	+	-	-	+	+	+
Shortness of extremities						ND	-	-	-	ND	ND	+
Cryptorchid testis	+	NA	NA	NA	NA	ND	-	ND	ND	-	ND	+
Sacral dimple	ND	ND	ND	ND	ND	ND	ND	+	-	ND	ND	+
Microophtalmia	ND	ND	ND	ND	ND	ND	ND	-	-	-	ND	+
Corneal opacity	ND	ND	ND	-	ND	ND	ND	-	-	-	ND	+
Iris dysgenesis	ND	ND	ND	ND	ND	ND	ND	-	-	-	ND	+

a characteristic clinical phenotype but this may change because of the size of duplicated portion[3,6]. Abnormal head shape, ocular hypertelorism, palpebral fissures, epicanthal folds, anteverted nares, a thin upper limb, microretrognathia, prominent philtrum, cleft lip-palate, low set ears and hairline, excessive hair growth, brain anomalies, simian line, renal malformations and cardiac defects, ocular abnormalities (glaucoma, cataracts, corneal opacities, nystagmus, strabismus, coloboma, microophtalmia), clinodactyly, syndactyly, limb defects, motor-mental-growth retardation and hypotonia have been detected[3,7]. In our patient anterior and posterior segment dysgenesis, thin sclera and iris dysgenesis were detected besides the previously identified features (Table I).

The critical genomic region for the most clinical features was narrowed down to 3q26.33q29.[6] Our case overlaps the critical genomic region which was described before. This region has been known to be associated with neuronal development and facial dysmorphism.[8] Our patient also has SOX-2 mutation. It's located on 3q26.33 genetic region and associated with optic nerve hypoplasia and central nervous system abnormalities. SOX-2 related eye disorders are usually characterized by anophthalmia and microophthalmia.[14] SOX-2 plays a critical role in early retinal development. SOX-2 expression in the cholinergic amacrine cells plays a role in their differentiation.[15] SOX-2 may be the candidate gene concerning eye involvement in our patient.

In conclusion, chromosomal karyotype of our patient was 46,XY,dup (3)(q23-29), which can be classified as pure 3q duplication. Anterior and posterior segment dysgenesis, thin sclera and iris dysgenesis were found in his eyes in addition to the previously identified specific facial features. The ocular manifestations of the 3q duplication syndrome provide additional evidence of the involvement of genes which are responsible for eye development in this chromosomal region. More cases should be evaluated in the future in order to fully understand the characteristics of trisomy 3q.

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