Retraction

Retracted: Prenatal Diagnosis of Concurrent Achondroplasia and Klinefelter Syndrome

Case Reports in Obstetrics and Gynecology

Received 28 January 2016; Accepted 28 January 2016

Copyright © 2016 Case Reports in Obstetrics and Gynecology. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

The article titled “Prenatal Diagnosis of Concurrent Achondroplasia and Klinefelter Syndrome” [1] has been retracted as the same case report was found to have been presented in the following previously published article: “Achondroplasia with 47, xxy karyotype: A case report of the neonatal diagnosis of an extremely unusual association,” *BMC Pediatrics* 2012, 12:88. The article has also been published without the consent of Dr. Cristina Martinez-Payo. The first author, Dr. Esther Perez-Carbajo, assumes full responsibility.

References

- [1] E. Perez-Carbajo, I. Zapardiel, L. Sanfrutos-Llorente, S. Cruz-Melguizo, C. Martinez-Payo, and E. Iglesias-Goy, “Prenatal diagnosis of concurrent achondroplasia and klinefelter syndrome,” *Case Reports in Obstetrics and Gynecology*, vol. 2015, Article ID 980749, 2 pages, 2015.

Case Report

Prenatal Diagnosis of Concurrent Achondroplasia and Klinefelter Syndrome

Esther Perez-Carbajo,¹ Ignacio Zapardiel,² Luis Sanfrutos-Llorente,¹ Sara Cruz-Melguizo,¹ Cristina Martinez-Payo,¹ and Enrique Iglesias-Goy¹

¹Obstetrics and Gynecology Department, Puerta de Hierro Majadahonda University Hospital, 28222 Madrid, Spain

²Obstetrics and Gynecology Department, La Paz University Hospital, 28046 Madrid, Spain

Correspondence should be addressed to Ignacio Zapardiel; ignaciozapardiel@hotmail.com

Received 6 December 2014; Accepted 5 February 2015

Academic Editor: Giovanni Monni

Copyright © 2015 Esther Perez-Carbajo et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Achondroplasia is the most frequent nonlethal skeletal dysplasia, with a prevalence of 1 : 5000 to 1 : 40,000 live births, and it is caused by a fibroblast growth factor receptor alteration. The combination of achondroplasia and Klinefelter syndrome is extremely rare and just four reports have been published in the literature, which were all diagnosed postnatally. We report the fifth case described of this uncommon association and its prenatal diagnosis. In cases of prenatal diagnosis of achondroplasia with additional suspicious morphological abnormalities, an invasive test such as amniocentesis must be carried out to assess the karyotype normality.

1. Introduction

Achondroplasia is the most frequent nonlethal skeletal dysplasia, with a prevalence of 1 : 5000 to 1 : 40,000 live births. It is a bone dysplasia caused by a fibroblast growth factor receptor alteration (FGFR), which results in abnormal cartilage growth and abnormal endochondral ossification. On the other side, Klinefelter syndrome is the most common cause of genetic hypogonadism in males with a frequency ranging from 1 : 500 to 1 : 1000 live births. It presents a characteristic 47,XXY karyotype caused by nondisjunction in phase I or phase II of meiosis during oogenesis or spermatogenesis.

The combination of achondroplasia and Klinefelter syndrome is extremely rare and just four reports have been published in the literature [1–4], which were all diagnosed postnatally. We report the fifth case described of this uncommon association and its prenatal diagnosis.

2. Case Presentation

A 38-year-old healthy pregnant woman, at 27 weeks of gestation, presented a moderate decrease of fetal long bones growth during an ultrasound scan. Femur and humerus

lengths were four weeks less than amenorrhea, and rhizomelic shortening of limbs was also observed. The ratio of femur length (FL)/foot length was 0.86 and ratio of femur/abdominal circumference (AC) was 0.17. Likewise, a discreet abnormal skull shape (Figure 1), suggestive of craniosynostosis, was noted. Thorax development and the rest of the fetal morphological study were strictly normal. At 33 weeks, an additional ultrasound scan assessed prior findings and normal thorax circumference (TC)/AC and TC/head circumference ratios. Due to these findings, amniocentesis for karyotype and genetic study for bone dysplasias was performed. The invasive study revealed an abnormal fetal karyotype that was 47,XXY trisomy; and the molecular study detected a heterozygous Gly380Arg mutation, located in the coding sequence of FGFR3 gene, which can be found in achondroplasia syndrome in 99% of cases, confirming our suspected diagnosis.

At 41 weeks of gestation, labor was induced because of prolonged gestation, and a live male newborn was delivered vaginally. Neonatal morphology was consistent with achondroplasia. He had a normal-sized penis and descendent testis. A body X-ray scan was carried out to the newborn which confirmed the abnormalities compatible with achondroplasia.

FIGURE 1: Abnormal skull shape observed by conventional sonographic scan.

3. Discussion

Prenatal diagnosis of achondroplasia use is delayed until third trimester of pregnancy, since precise diagnosis of bone dysplasia by ultrasound is difficult, and many times molecular techniques are needed in order to classify and to demonstrate the specific genetic mutation. Once the diagnosis is suspected, we must differentiate sonographically between the lethal and nonlethal bone dysplasias. Most common ultrasound findings observed in achondroplasia are rhizomelic shortening of the limbs and craniofacial abnormalities. However, femur length is considered the best parameter to distinguish among the five most common skeletal dysplasias: thanatophoric dysplasia, osteogenesis imperfecta type II, achondrogenesis, achondroplasia, and hypochondroplasia. Moreover, FL/foot length ratio may be useful, because from 14 to 40 weeks of gestation the ratio is constant (close to 0.99); however, achondroplasia shows values under 0.87. Femur/abdominal circumference allows us to differentiate between nonlethal dwarfism (>0.16) and lethal dwarfism (<0.16), while thoracic/abdominal circumference ratio (normal: 0.77–1.01) and chest/head circumference ratios (normal: 0.56–1.04) may also facilitate the study of thoracic transverse dimensions regardless of gestational age [5]. In our case, we found a decreased FL/foot length ratio that added to the cranial abnormality, making us think about the possibility of achondroplasia.

The signs of Klinefelter's syndrome are usually milder and difficult to be detected prenatally. The classic characteristics include tall stature, eunuchoidal phenotype, microtestes, azoospermia and sterility, gynecomastia, low testosterone levels, and mild or moderate cognitive deficiencies. Moreover, it is necessary to demonstrate the existence of polysomes karyotype 47,XXY, which is the only way to diagnose it during the prenatal period by means of invasive tests such as amniocentesis. In the case, reported amniocentesis was performed based on maternal age, as there are no sonographic manifestations characteristics of these abnormal chromosomes. Sebire et al. [6] reported no differences in nuchal translucency among fetuses with 47,XXY, 47,XYY, or 47,XXX karyotypes.

Only one, among the four cases reported in the literature with concurrent achondroplasia and Klinefelter syndrome,

was diagnosed postnatally: three of them [1–3] during the study of genital and fertility problems and the fourth one [4] in the context of a familiar genetic study. In the four cases described above [1–4], they showed phenotypic dominance for achondroplasia, the same as our case.

Although achondroplasia and Klinefelter syndrome are rarely associated, in cases of prenatal diagnosis of achondroplasia with additional suspicious morphological abnormalities, an invasive test such as amniocentesis must be carried out to assess the karyotype normality in order to give the parents the most accurate information about the pregnancy.

Conflict of Interests

The authors declare they do not have any potential conflict of interests.

References

- [1] M. Sendrail, L. Gleizes, M. Sendrail-Pesqué, and P. Colombiès, "Klinefelter's polygonosomy and achondroplasia," *La Semaine des Hopitaux : Organe Fonde par l'Association d'Enseignement Medical des Hopitaux de Paris*, vol. 43, no. 18, pp. 1217–1225, 1967.
- [2] T. A. Kulakova and I. T. Ignat'ev, "Achondroplasia associated with Klinefelter's syndrome," *Klinicheskaia Meditsina*, vol. 64, no. 3, pp. 126–128, 1986.
- [3] B. S. Sayli, D. Gul, and H. Cakirbay, "Achondroplasia with XXY karyotype," *Clinical Genetics*, vol. 45, pp. 217–218, 1994.
- [4] A. Juul, L. Aksglaede, A. M. Lund, M. Duno, N. E. Skakkebaek, and E. Rajpert-De Meyts, "Preserved fertility in a non-mosaic Klinefelter patient with a mutation in the fibroblast growth factor receptor 3 gene: case report," *Human Reproduction*, vol. 22, no. 7, pp. 1907–1911, 2007.
- [5] E. Maymon, "Anomalías esqueléticas en el feto," in *Ecografia en Ginecología y Obstetricia*, C. Fleischer, F. A. Manning, P. Jeanty, and R. Romero, Eds., pp. 445–506, The McGraw-Hill, New York, NY, USA, 2004.
- [6] N. J. Sebire, R. J. M. Snijders, R. Brown, T. Southall, and K. H. Nicolaides, "Detection of sex chromosome abnormalities by nuchal translucency screening at 10–14 weeks," *Prenatal Diagnosis*, vol. 18, no. 6, pp. 581–584, 1998.