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Prenatal diagnosis of type A1 brachydactyly

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ABSTRACT

Brachydactyly can occur as an isolated malformation or as part of numerous syndromes. Prenatal assessment of brachydactyly may be especially helpful in multiple anomaly syndromes associated with hand and/or finger anomalies. In isolated type A1 brachydactyly, which is an autosomal dominant disorder, all middle phalanges of the fingers and toes are affected. We present a fetus with type A1 brachydactyly inherited from the mother and grandmother.

INTRODUCTION

Brachydactyly can occur as an isolated malformation or as part of numerous syndromes, such as bone dysplasias. Bell classified brachydactyly into seven types: A1, A2, A3, B, C, D and E[1]. Type A3, clinodactyly of the fifth finger, and type D, 'stub thumb', are common and can be considered normal variations. The other types are rare. In type A1 brachydactyly all middle phalanges of fingers and toes are affected. The middle phalanges are either absent, rudimentary or fused with the terminal phalanges. In the isolated form, type A1 brachydactyly is an autosomal dominant disorder. Detection of brachydactyly by prenatal ultrasound may be especially relevant in pregnancies at risk for syndromes associated with type A1 brachydactyly.

We report the prenatal diagnosis of a fetus with type A1 brachydactyly, whose mother and grandmother were affected by the same disorder.

CASE REPORT

A 32-year-old, gravida 2 para 1 woman with autosomal dominant type A1 brachydactyly was referred for ultrasound examination at 19 weeks of gestation to verify the fetal hand development. The first child had been born at term and has normal hands. The patient's mother is also affected with type A1 brachydactyly (Figure 1). The family history was otherwise unremarkable.

Ultrasound examination (ATL HDI 3000, Advanced Technical Laboratories, WA, USA) demonstrated fetal biometry consistent with dates and normal amniotic fluid volume. All fingers (Figure 1) and toes appeared short and the phalanges were not clearly discernible. No other (skeletal) anomalies were observed. Type A1 brachydactyly was diagnosed.

It is local policy that in the presence of a parental structural anomaly, amniocentesis for fetal karyotyping at 16 weeks of gestation is offered. A normal karyotype and normal alpha-fetoprotein level were established.

Pregnancy progressed uneventfully. At term a female infant of 3760 g was born. Brachydactyly of hands and feet was confirmed; there were no other anomalies.

DISCUSSION

Bronshtein *et al.*[2] were the first to report on the prenatal ultrasound diagnosis of fetal finger abnormalities between 13 and 17 weeks of gestation. In the 20 000 fetuses that were studied, 24 (0.12%) abnormalities were observed: overlapping fingers, polydactyly, syndactyly, cleft hand, adactyly, aphalangia and clasped thumbs. In 15 (62.5%) fetuses there were associated malformations and/or an abnormal karyotype. They concluded that reliable observation of all fingers and phalanges is possible from 12 to 13 weeks of gestation. In early pregnancy the fetus tends to keep its hands open with the fingers extended. In the second trimester the fingers are more often flexed which reduces the possibility of examining the fetal fingers by ultrasound.

Reiss *et al.*[3] published a prospective study on examination of the fetal hands during prenatal scan between 13 and 39 weeks of gestation. The majority of the fetuses were scanned during the second trimester or later. Both hands were visualized in 188 out of 215 (87%) fetuses. Four (2.1%) hand abnormalities (syndactyly, clenched hands, wrist contractures with clenched hands, and polydactyly) were diagnosed prenatally whilst eight hand abnormalities were present at birth.

Both studies included pregnancies at high or low risk for fetal anomalies. The different rates of hand abnormalities

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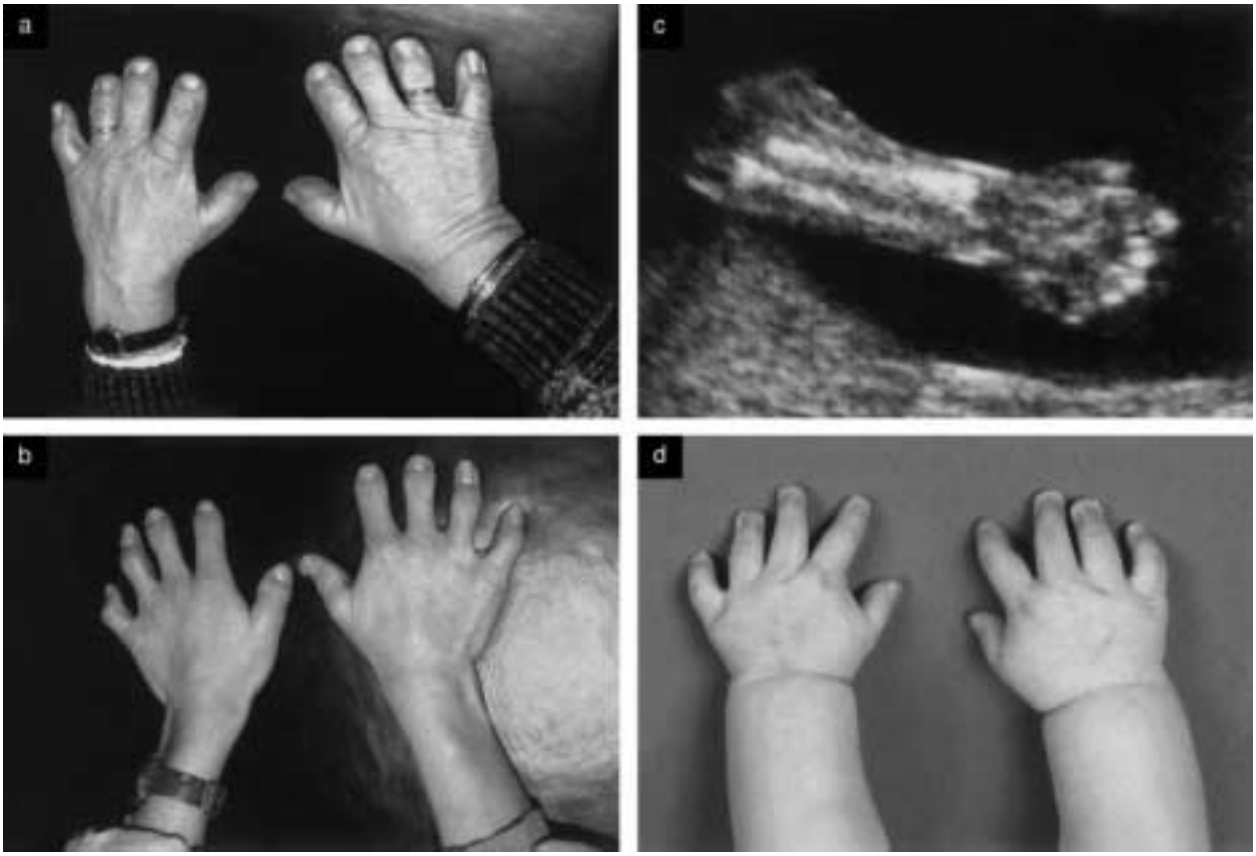

Figure 1 Photographs of the hands of the infant at 6 months (d), the grandmother (a) and the mother (b), showing type A1 brachydactyly. In the ultrasound picture of the fetal hand at 19 weeks (c) the thumb and index finger are extended and the other fingers are slightly bent.

(0.12% and 2.1%) may be related to the number of patients included and differences in inclusion criteria.

There are several studies[4–6] reporting on individuals with brachydactyly type A1 in combination with other anomalies such as Klippel–Feil anomaly and facial anomalies[4], generalized skeletal anomalies (lumbar scoliosis and valgus deformities of the feet) together with nystagmus and squint[5] and the combination of abnormal menisci and scoliosis[6]. These observations prompted the question whether the extensively affected individuals represent the more severe manifestations of the autosomal dominant gene for brachydactyly[5]. A candidate gene was unsuccessfully searched for in two families[7].

To the best of our knowledge this is the first report on the prenatal diagnosis of brachydactyly type A1. It shows the possibility of diagnosing this type of brachydactyly at 19 weeks of gestation. This may be relevant in pregnancies at risk for syndromes associated with type A1 brachydactyly. Possible variability of expression is to be considered in every individual syndrome.

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