



Case report

A Case Report of a Man with Klinefelter Syndrome Having a Healthy Neonate with Normal Karyotype

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ABSTRACT

Background: Klinefelter syndrome (KS) also known as 47, XXY is one of the most prevalent chromosomal abnormalities among men. Infertility is one of the most primary features of this condition. However, there are some other associated features such as thin and tall appearance, absent, delayed or incomplete puberty, small and firm testicles, small penis and gynecomastia.

Case description: We herein report a patient with mosaic KS whose karyotype consisted of 47, XXY/46, XY. The case's wife had two miscarriages, followed by a healthy girl with a normal karyotype who was born taller than the average at the age of two.

Conclusion: Mosaic KS dramatically increases the chance of having healthy offspring with normal genetic patterns without performing artificial insemination methods compared to those with complete KS.

Keyword: [Klinefelter Syndrome](#), [Chromosome Aberrations](#), [Newbor](#).

INTRODUCTION

Klinefelter syndrome (KS) is one of the most common chromosomal abnormalities characterized by the presence of an extra X-chromosome in the male karyotype, which originates from father's non-disjunction in 26–66% of cases (1). The incidence of KS is about 1 in 500-1000 males worldwide (2). Males with KS may have a classic 47, XXY (90%) or a mosaic 47, XXY/46,XY (10%) karyotype with varying degrees of spermatogenic failure, which is characterized by symptoms including increased follicle-stimulating hormone (FSH), gynecomastia and a slightly low IQ (3). Treatment with testosterone replacement therapy can alleviate the symptoms, improve sexual function and maintain virilization (4). Men with KS may be asymptomatic and remain undiagnosed until they present infertility. More than half of adults with KS are unable to have biological children with current assisted reproductive technology (5). Currently, 16% of men with KS are diagnosed before adulthood, 10% before birth by prenatal testing and 6% in childhood (6). Infertility is reported as one of the most impactful parts of the KS diagnosis, which is associated with sadness and loss of control and self-esteem in both adolescents and adults with KS (7). A semen analysis is the simplest way to determine fertility status of a man with KS. If viable sperms are found in the ejaculate, they can be cryopreserved for future use with assisted reproductive technology. Approximately 8% of adult men with KS have viable sperm in their semen (8). Over time and with aging, the rate of spermatogonia germ cell apoptosis and fibrosis of the seminiferous tubules increases, leading to progressive infertility throughout the lifetime of a male with KS (9). This process of germ cell depletion is accelerated at the onset of puberty (10). Recent research suggests that ability to find sperm at testicular sperm extraction decreases with age (11). Today, successful in vitro fertilisation (IVF) and intracytoplasmic sperm injection are offered for infertile men with KS. We herein report the birth of a healthy girl without any assistance from a man with mosaic KS.

CASE PRESENTATION

The patient was a 37-year-old man with a non-consanguineous marriage who complained of infertility. He had no family history of

infertility. His wife had two miscarriages in the first trimester of her pregnancy. His height and weight were 180 cm and 84 kg, respectively. There was no sign of gynecomastia, and fat distribution was normal. Endocrinology results were normal for FSH, luteinizing hormone and testosterone levels, but semen analysis revealed oligospermia. The patient's motor and mental development was normal. The subject had elementary school education, mainly for social reasons. Karyotype was done from peripheral blood leukocytes. The 38 metaphases were analyzed, and the results showed a 46,XY/47,XXY karyotype. His wife had normal 46,XX female karyotype. As a result of the man's abnormal karyotype, the couple was sent to genetic counseling and was informed of the laboratory findings and their feeble chance of having normal pregnancies. The couple refused to take ISCI-IVF treatment. After a while, the normal pregnancy occurred, and the woman had a normal delivery of a healthy girl. Chromosome analysis of peripheral leukocytes from the baby showed a normal 46,XX female karyotype.

DISCUSSION

The KS (XXY, 47) is characterized by at least one extra X chromosome in men that may be inherited from either parent (12). It is the most common chromosomal aneuploidy in males and may be asymptomatic until sexual maturity (13).

In most cases, the syndrome manifests as the classic 47,XXY karyotype; however, mosaic 47,XXY/46,XY and other higher-order X chromosome hyperploidies are also found. While patients with KS are azoospermic or severely oligospermic, mosaic cases are less severely affected and may have complete spermatogenesis (14). There is a direct correlation between the rate of gonosomal mosaicism in somatic cells and fertility in 47,XXY patients with an increased incidence of XY cells in their lymphocytes (15). The syndrome is characterized by tall stature, but not all XXY men show or develop the symptoms. Many autosomal genes are expressed differently in KS patients, explaining the phenotype's clinical variability among the patients. Many men show no abnormalities and may only have a small amount of oligospermia (16).

CONCLUSION

Consistent with previous studies, we demonstrated the higher percentage of normal karyotype in KS mosaic individuals, the higher chance of fertility and the birth of a healthy baby. Therefore, individuals diagnosed with KS mosaic should undergo genetic counseling to assist them in having healthy offspring with more confidence and hope before attempting to conceive.

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CONFLICT OF INTEREST

All the authors declare no conflict of interest.

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