BRIEF COMMUNICATION

Homicide and Klinefelter syndrome: a complex interaction

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Introduction: Several studies have shown an association between homicide and sexual chromosomal abnormalities, but data are still lacking regarding Klinefelter syndrome. Methods: We retrospectively reviewed two cases of homicide perpetrators who were both diagnosed with Klinefelter syndrome on the basis of a karyotype analysis. A neurocognitive assessment was also performed (MMSE, Frontal Assessment Battery, brain CT, and electroencephalogram). Results: Numerous intermediate risk factors of homicide were shared by our two cases, including dispositional (male gender, young age, low socioeconomic status), historical (prior arrest record and past conviction for any offense), contextual (unemployment), and clinical (alcohol abuse). Conclusion: It is important that clinicians go beyond obvious risk factors, such as chromosomal abnormalities, to pinpoint other meaningful risk factors and potentially facilitate preventive approaches.

Keywords: Homicide; Klinefelter syndrome; risk factors; chromosomal abnormalities

Introduction

Homicide is defined as fatal injuries inflicted by another person with intent to injure or kill.1 Its prevalence is high, with an overall rate ranging from 1.0 per 100,000 population in established market economies to 44.8 per 100,000 in sub-Saharan Africa.2 Epidemiological studies3,4 have shown a strong association between homicide, major mental disorders,5 and chromosomal abnormalities.6 However, the role of Klinefelter syndrome in homicide is inconclusive.

Klinefelter syndrome is caused by one or more supernumerary X chromosomes in men, and represents the most frequent chromosomal aneuploidy, with a prevalence of 1 in 700 men.7,8 Klinefelter syndrome also represents the leading cause of male hypogonadism and is characterized by cognitive and psychosexual dysfunctions and abnormalities in physical maturation.7 Many cases of Klinefelter syndrome remain undiagnosed because of substantial variation in clinical presentation. Only 10% of subjects with Klinefelter syndrome are diagnosed prenatally, and another 25% diagnosed during childhood or adulthood, leaving 65% undiagnosed. Therefore, this syndrome may be relatively common yet often undiagnosed among psychiatric patients.7,9

This syndrome has also been associated with violent behavior,10-12 but the involved risk factors for homicide in these patients remain unknown. In the present study, we report two cases to shed light on the relationship between Klinefelter syndrome and violence. We reviewed two cases of homicide perpetrators (2 out of 276 perpetrators retrospectively examined), who had been imprisoned for homicide and were subsequently diagnosed with Klinefelter syndrome. Although this syndrome seems to be associated with an increased risk of aggressive behavior, we hypothesize that a large set of vulnerability risk factors found in individuals without Klinefelter syndrome are also common in men with Klinefelter syndrome and might have a significant impact on the risk of homicide.

Case report

Two men, aged 25 and 26 years respectively, were imprisoned for homicide in Western France (Table 1). They were examined by a forensic psychiatrist as part of a comprehensive psychiatric evaluation, which includes standardized psychological tests and additional physiological tests (such as blood tests, electroencephalography, and, in some cases, a computed tomography [CT] scan of the brain). Psychiatric reports were requested from the trial courts. In both cases, the victim was an adult stranger to the perpetrator. In the first case, the victim was killed with a firearm, whereas in the second case, the victim was killed with a blunt object. In both cases, the homicide occurred at night, in a private residence, and during a physical argument. In addition, both perpetrators had consumed alcohol, but no other...
In addition, dispositional factors, including male gender, younger age, low socioeconomic status, and violent behavior than their 46,XY counterparts.

Klinefelter syndrome is also suggested to be higher than the general population. Personality features reported in men with the XXY karyotype include passivity, poor concentration, emotional immaturity, shyness, and hypersensitivity. The association between Klinefelter syndrome and violence could be linked to a lower IQ, with selective reduction in verbal IQ scores. In addition, low IQ and psychiatric symptoms and disorders are more clearly associated with homicide. Regarding the normal but below-average IQ of the two patients reported herein, it is interesting to note that a deficit in inhibitory executive functions has been detected in XXY males as compared with XY male and female (XX) controls, reflecting an impairment in the prefrontal cortex.

A recent study suggests that the overall risk of homicide is moderately increased in men with Klinefelter syndrome; however, it was similar to that of controls after adjusting for socioeconomic parameters. Therefore, the discovery of rare chromosomal abnormalities in cases of homicide should not be construed as an exclusive explanatory or predictive factor for the criminal act. Homicide has also been related to several non-psychiatric factors, including the personal history of the perpetrator (i.e., history of violence, juvenile detention, physical abuse, and parental arrest record), dispositional (i.e., male gender, younger age, and low socioeconomic status) and contextual (unemployment), and clinical (alcohol abuse) factors.

The factors that lead to homicide in Klinefelter syndrome are complex, heterogeneous, and interactive. Klinefelter syndrome has been widely associated with mild cognitive impairment and language impairments. The frequency of psychiatric disorders in patients with Klinefelter syndrome is also suggested to be higher than in the general population.

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Nevertheless, future research should take into consideration the prevalence of Klinefelter syndrome among homicide perpetrators and the need to study the risk of homicide in this population vs. the general psychiatric population. Finally, prospective studies should be conducted to ascertain whether Klinefelter syndrome constitutes an independent risk factor for homicide.

In summary, to explain the criminal act, we propose the hypothesis that numerous comorbid risk factors might be much more clearly involved in homicide than Klinefelter syndrome per se, even though a multiplicative effect is possible, i.e., many of these risk factors may be maximized when a person has a 47,XXY karyotype. As “one cannot see the forest for the trees,” it is also important that clinicians diagnose Klinefelter syndrome earlier in its course.

Disclosure

The authors report no conflicts of interest.

References