Klinefelter's Syndrome in South African Indians and Blacks

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SUMMARY

Poly-X syndromes are very uncommon in Indian and Black South Africans. Two affected males of each race group are described; the Indians are probably the first to be reported in this country, and there are now 8 case histories of Klinefelter's syndrome in Blacks. The possible reasons for the rarity of the poly-X syndromes in South Africa are discussed and it is suggested that these syndromes are less common here than in other countries.


Intersexual defects are by no means equally common in the different races of South Africa and, in particular, Indian and Black males appear to be remarkably free of aneuploidy involving the sex chromosomes. There are only two reports of local Blacks having the Klinefelter syndrome and there are no reports of Indians being affected. It is, therefore, of interest that 2 Indians and 2 Blacks with poly-X karyotypes have recently been identified in Durban.

CASE REPORTS

Case 1

A 21-year-old Indian man had been married for 2 years, but his wife had not conceived, although examination had shown her to be gynaecologically normal. His parents were first cousins and at the time of his birth his mother and father were aged 40 and 43 years, respectively. Two older brothers and a sister were reported to be normal. The subject was tall (179 cm) and moderately obese (82 kg). Ground-to-pubis distance was 91 cm and arm-span, 188 cm. Both breasts were enlarged, but this might have been due to lipomastia rather than to gynaecomastia. Beard growth was poor and he shaved only once a week; axillary hair was sparse and the pubic escutcheon was feminine. His penis was small and the testes were incompletely descended. At times, bilateral cryptorchidism was noted in the hospital records, and at other times, inguinal testes were noted. At the age of 17 he was found to be diabetic. There were no defects of vision, hearing, or blood coagulation factors. Intellectual development was fair and he had passed the sixth standard before leaving school. The lymphocyte karyotype was a mosaic of 46,XY and 47,XXY cell lines in equal proportions. Dermatoglyphs (Table I) were typical of the syndrome.

Table I. Dermatoglyphic Profiles of Two Indians with Poly-X Syndromes

<table>
<thead>
<tr>
<th>Case</th>
<th>Karyotype</th>
<th>L</th>
<th>R</th>
<th>TRC</th>
<th>a-b</th>
<th>atb</th>
<th>Palmar topology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>XY/XXY</td>
<td>LLAWL</td>
<td>LAALL</td>
<td>72</td>
<td>64</td>
<td>71</td>
<td>H, III, IV, t, t', 5.</td>
</tr>
<tr>
<td>2</td>
<td>XXY/XXYY</td>
<td>WWWWW</td>
<td>WLLWL</td>
<td>139</td>
<td>63</td>
<td>68</td>
<td>III, t. 4.</td>
</tr>
</tbody>
</table>

Case 2

A 16-year-old Indian was admitted to hospital for psychiatric assessment after there had been repeated complaints about his behaviour. On numerous occasions he had ill-treated smaller children and pet animals, destroyed clothing and furniture, and exposed himself indecently. He was the eighth of 9 children born to an impoverished family. His 5 sisters and 3 brothers were said by the parents to be normal. At the time of his birth the mother and father, who denied consanguinity, were 34 and 40 years old, respectively.

He was a slightly-built youth, 167 cm tall, who weighed 42 kg. Ground-to-pubis distance was 84 cm, and arm-span was 162 cm. His head circumference of 50.2 cm was subnormal. Slight epicanthic folds were present and he had an intermittent left convergent squint. The jaw was heavy and the lower premolars were maloccluded, but despite a gothic palate, his upper teeth were regular. Gynaecomastia was more noticeable on the right side. He was suffering from a goiter. He had 15 teeth, 13 of which were regular. The nipples were small. The arms were relatively long and the carrying angles were normal. All metacarpophalangeal joints were hyperextensible. The hands and feet were long and narrow. There was a genu valgum on the
right and there was bilateral pes cavus. The penis was about 5 cm long. The testes had descended, but were small. Secondary sexual development was limited to a feminine pubic escutcheon.

Visual acuity and colour vision could not be assessed. Blood coagulation studies, and a radiographic survey, showed nothing remarkable. Bone age and chronological age corresponded. Biopsies of tissue from the testes showed that the majority of tubules were lined only by Sertoli cells; a few contained immature germ cells and there was focal Leydig cell hyperplasia. Many of the tubules showed hyalinisation of the basement membrane.

Because of his poor intellect, the patient's intelligence quotient could not be assessed, but he appeared to be imbecilic. The Bender-Gestalt test showed marked disturbance, probably because of the low IQ.

Two cell lines were found in peripheral lymphocytes: 25% were 47,XXY and 75% were 48,XXYY. The dermatoglyphs (Table I) were not typical of either XXY, XYY or XXXY syndromes.

Case 3

A seriously-ill Black man, 29 years old, was admitted to hospital for treatment of suspected bilharziasis; he had severe pain in the lower abdomen, painful micturition, and haematuria. He was tall and eunuchoid, with signs of hypogonadism. Secondary sexual development was limited to a scanty growth of pubic hair and bilateral early gynaecomastia was found.

The patient's condition deteriorated rapidly and an emergency laparotomy revealed that he had primary carcinoma of the bladder with metastases in the liver. He died after 4 days in hospital.

Postmortem examination was limited to the cancer, for the pathologist was apparently unimpressed by the provisional diagnosis of Klinefelter's syndrome. This, however, was confirmed when peripheral lymphocyte karyotypes proved to be 47,XXY.

Case 4

This 6-month-old Black infant was admitted to hospital with severe gastro-enteritis and marasmus. At the age of 3 weeks he underwent laparotomy for correction of an unspecified intestinal obstruction. Thereafter, until the present illness, he had been well, but gained weight slowly.

Examination showed a hydrocephalic infant who weighed 3,5 kg. Head and chest circumferences were 40 cm and 32 cm, respectively. The sutures were still open, the occiput was prominent, there was slight webbing of the neck, and the chest was shield-like. Cryptorchidism was noted, and the scrotum was poorly developed.

The baby died before investigations were completed, and no postmortem examination was performed. Peripheral lymphocyte karyotypes revealed equal numbers of 47,XXY and 48,XXYY cell lines.

DISCUSSION

Klinefelter's syndrome has been regarded as a rarity in South African Blacks, and only 2 cases have previously been reported;\(^3\) but in recent years other cases have been identified, although not reported: 3 in Bloemfontein\(^1\) and 1 in Salisbury\(^2\). In North Africa, too, it appears that poly-X Blacks are very uncommon; and in 1968, Gentilini \(et\ al.\)\(^4\) obviously unaware of the South African reports, claimed to have found the first affected Blacks. It is curious that there have been no comments about the rarity of the poly-X syndromes in local Indian males: the 2 reported here are, apparently, the first to be recorded. Klinefelter's syndrome is very uncommon in Indians; for instance, Chaudhuri\(^5\) had seen only 4 cases, and Chandra\(^6\) commented that all aneuploid disorders were uncommon in Indians. That view is supported by the failure of Subray and Prabhaker\(^7\) to find any chromatin-positive male among the 2,058 whom they examined.

Various estimations have been made of the prevalence of the XXY karyotype in White populations. For example, Overzier\(^8\) found that it affected 1 in 500 males, but Hamerton \(et\ al.\)\(^9\) put the incidence at 1,1/1,000. However, if it is accepted that the incidence in Whites is of the order of 1/1,000 then there should be, if the same incidence pertains to Durban, at least 100 affected Whites here. If the other races are similarly prone to this aneuploidy, then there might be some 200 affected Blacks, 100 Indians, and about 40 Coloured males in the Durban area. However, during 6 years, from 1968 to 1973, when the distribution of intersexual syndromes was surveyed in Durban, only 13 of the possible 440 subjects were identified: 8 Whites, 1 Coloured, and the 4 patients described in this article. Several possibilities may be advanced to account for the huge difference between expected and observed numbers. It may be that affected individuals do not, for one or another reason, seek medical attention; or that when they do, they are not recognised as having the Klinefelter syndrome; or perhaps they were not referred for cytogenetic investigation. On the other hand, there might be a real difference in the prevalence of gonosomal aneuploidy in South African males.

The last of the possible explanations is preferable, because affected males are commonly motivated by physical changes or the psychological effects of decreased libido and impotence to seek medical help, and it is improbable that so many went unobserved because they had been incorrectly diagnosed or were not referred for cytogenetic examination. It is clear that in South Africa the epidemiology of the poly-X syndromes and other forms of gonosomal aneuploidy is quite different from that found in European and North American countries.

REFERENCES