SEXUAL MALFUNCTION DUE TO MALDEVELOPMENT OF THE GENITAL SYSTEM (TURNER'S SYNDROME)

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SUMMARY

One hundred cases with sexual malfunction were studies. Out of these 32 cases turned out to be Turner's syndrome and are described in this article. Turner's cases reported here were with primary amenorrhea, few had absence of secondary sex characters along with amenorrhea. Two cases out of thirty two had secondary amenorrhea. One case out of the 32 had secondary sterility also.

Statistically one case in one thousand is Turner's syndrome. In this study because selected cases were sent with sexual malfunction, the incidence is high. In few cases of Turner's syndrome, the usual cardinal features are rarely seen all together in one case, so also in the present study.

INTRODUCTION :

Turner in 1938 described three main features as follows. Webbing of neck, cubitus valgus and sexual infantalism. Fleishman and Wilkins in 1944 said that there are no ovaries in cases with Turner's syndrome. Barr and Bertram in 1944 found that there was no sex chromatin or negative sex chromatin in the above cases. Tijo and Levan in 1956 found the karyotype as 45, XO and later on Dewhurst in 1975 found a typical forms of Turner's cases with mosaisism two or more cell lines varney et al (1942) found high urinary gonado trophins in it.

The main cardinal features seen in Turner's syndrome are as follows. Low hair line, Webbed neck or short neck, ptosis of upper lids. Lowest ears. High arched palate. Protruded mandible. Triangular face cut. Cubitus Valgus. Hypoplastic nails. Short fourth digit either in the hand or in the foot. That is shortening of 4th metacarpal or 4th metatarsal. Sheilded chest with widely placed nipples. Raised urinary gonadotophins and high finger ridge count.

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MATERIALS AND METHODS :

The study was conducted in the Anatomy department of Osmania Medical College, Hyderabad from 1984-1986 in the genetics lab.

Patients from various Government and private hospitals with sexual malfunction were refered. Age, Sex and buccal smear for sex chromatin were immediately recorded. Brief history of all patients were noted. Peripheral blood for karyotype and culture setting were taken.

The patients were asked to get the reports of estimation of gonadotrophins in the urine and were asked to come after three weeks. Interesting cardinal features noted were photographed. In cases of short stature comparative siblings were noticed specially when younger to the patients and mainly in height and development of secondary sex characters.

RESULTS :

Out of 100 cases studies thirty two were classified as Turner's syndrome. Out of thirty two, pure Turner's syndrome were 18 and the rest 12 cases were Turner's Mosaic. Pure Turner cases reported with primary amenorrhea Turner's Mosaic had in one case secondary amenorrhea and in another case secondary sterility. Statistically one in one thousand cases of Turner's have secondary amenorrhea and secondary sterility. It is high in the present study because already selected cases came for investigations.

DISCUSSION :

The development of the genital system for convenience of description is divided into 4 stages. They are as follows :

1. The stage of sex determination.
2. The stage of gonadal differentiation.
3. The stage of internal ducts development.
4. The last stage is development of external genitation.

The sex is determined at fertilization by the sex chromosomal component of the spermatozoa. All ova carry one `X' chromosome except in abnormal non dysfunctions were one cell may have `XX' component while the other no sex chromosome at all.

The spermatozoa on the other hand may be either `X' bearing of `Y' bearing or in exceptional cases have no sex chromosome at all or may have both `XY'. Depending on the type of germ cells, the zygote will be either male or female. Sometimes dysfunction occurs in later

stages of division of the zygote giving two cell lines in the peripheral blood cells thus reporting Mosaic cases.

In the absence of `X' chromosome or in the absence of `Y' chromosome, the basic phenotype remains female. Presence of tripple `X' does not alter the basic female sex development. The presence even a fraction of `Y' chromosome changes the femal ephenotype to either male or intersex.

Thus in Turner's syndrome with 45, XO the phenotype is female. In Klinefelter's syndrome due to the presence of `Y' the phenotype is male (47 xx).

The second stage of gonadal differentiation. It is noted that the testis is developed earlier to ovary. It develops at about 4th week. The ovaries start developing at about 7th week only in the absence of even traces of `Y'. If the `Y' is present even in very small quality it produces very small amount of testis, earlier to ovary. This small amount of testis starts producing two

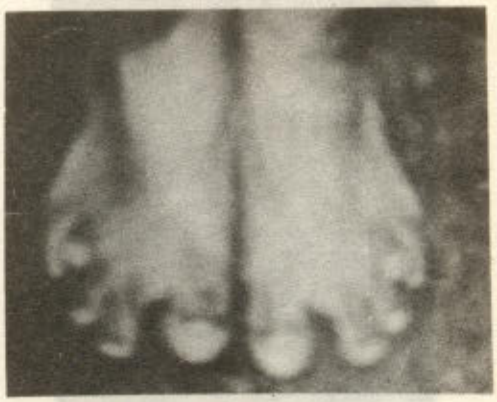
things. One is Mullerian duct inhibiting hormone which is very small quantity although not sufficient to form male Wolfian duct interferes with normal mullerian duct development. The little amount of testis also produces small quantity of testosterone which produces virilization resulting in intersex.

In case of Turner's syndrome the resulting ovaries are formed as follows. Two `X' chromosomes are essential for normal development of the ovary. Deletion of short arm of one `X' chrosome produces streak gonads. This shows that the genes determining ovarian differentiation are located in the short arm of `X'. Carr and SIngh in (1966) have shown that 45, XO fetuses have ovarian development in the begining but later on it fails.

The germ cells are formed from the blastocyst as early as 4 days after fertilization. They migrate by pseudopodia at the gonadal ridge, mix with the mesenchymal and coelomic epithelial cells and form the primordial germ cells or oogomia surrounded by primitive granulosa cells. These proliferate in the cortical region of th eovary. Latter differentiation results in oogonia becoming primary oocytes. These germ cells remain the Meiotic phase and in the same shape till the onset of puberty. Later stages of Meiotic division occur in the preovulatory phase of menstrual cycle.

The follicular cells which surround each oocyte proliferate and lead to the development of primary and latter on graafian follicles.

The primordial follicles consist of an oocyte and a layer of granulosa cells. They exist in groups incompletely separated from one another



by connective tissue. As mentioned earlier not all of them develop into Mature follicle. A large number degenerate at various stages. The mechanism of this selection is not understood. In fetuses of about 20 weeks there are nearly 7 million follicles. These decrease to about two million at birth. After the onset of puberty, follicles mature periodically releasing an ovum that is capable of being fertilized.

In the Turner's syndrome there are streak gonads due to absence of one `X' chromosome. The gonadal failure causes the following. Absence of the secondary sex characters, high gonadotrophins in the urine primary amenorrhea, sexual infantalism and sterility.

Sometimes superficial layers of the ovarian cortex contain few oocytes. These when released give onset of puberty and then the secondary amenorrhea. These oocytes even get fertilized rarely and thus pregnancy occurs and later on secondary sterility and secondary amenorrhea.

Sometimes all the oogonia degenerate before the complete ovaries form. There is no reason for it but in such cases the Karyotype does not change. Hence such cases form another group of sexual malfunction that is hypogonadism which is differentiated from Turner's where 45, XO chromosomes are present.

The 3rd stage of development is formation of internal duct. In turner's syndrome or in

Turber Mosaism there is complete absence of `Y' chromosome. Hence the mullerian ducts do not get inhibited nor there is any testosterone to cause virilization. Hence the internal ducts or the mullerian ducts grow from paraxial mesodern without any interference. If there is fraction of testicular tissue it starts secreting Mullerian duct inhibiting substance. This substance is very localised in action and inhibits mullerian ducts partly wherever it is present. Its action is appreciated in intersex cases. In Turner's syndrome it is completely absent. Hence the proximal part of Mullerian ducts form the follopian tubes, the middle portion form sthe uterus after the two ducts on either sides are united. The lower portion of the United Mullerian ducts form the upper part of vagina. Hence in Turner's syndrome the internal ducts and then derivatiives are not altered by the absence of one `X' chromosome.

The fourth stage : In the early stage of development of external genitalia the following are seen. Urogenital membrane, genital tubercle urethral folds or genital and labioscrotal folds. It is indifferent state of development. Till the end of 9th 10th week.

Depending on `Y' chromosome, testicular tissue, Androgens, Mullerian duct inhibiting substance, and another enzyme called as 5 Alpha reductase which acts a end organ sensitivity, the external genitalia change.

In testicular feminisation syndrome the chromosomal sex remains 46. XY male, the gonadal sex also remains male with testis. The defect remains in the end organ sensitivity where either there is 5 Alpha reductase leads to interference in testosterane or steroid synthesis. Such cases have secondary female sex characters. They are diagnosed only by karyotype. They have primary amenorrhea because uterus does not develop. Blindly ending vagina and normal external genitalia are present. Hence they are not true female. They one pseudo male hermalphrodites.

In adrenogenital syndrome the clitoris grows and is mistaken for phallus and due to interfer-

ence of testosterone and hydnoxyease deficiency which also causes fusion of the genital folds mistaken for the scrotum. These cases are diagnosed as pseudo female hermaphodites. Here chromosomal sex, gonadal sex as well as internal ducts remain to be female type.

In Turner's syndrome there is no defect in the formation of the external genitalia. The Labioscrotal folds form the Majora, the genital or urethral folds form the labium Minora and the genital tubercle forms the clitoris.

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