

## PROFILE OF INTERSEX CHILDREN IN SOUTH INDIA

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### ABSTRACT

*Thirty five children with ambiguous genitalia admitted to our centre between January 1986 to December 1991, were followed up and their clinical, laboratory and management strategies were analyzed. Most of them presented between 1 month and 2 years of age and only 2 presented in the newborn period. Sixteen were female pseudohermaphrodites. Eighteen out of 31 children were assigned female sex. One genetic female with congenital adrenal hyperplasia was assigned male sex. We practised more than one type of clitoroplasty in our centre. Parents prefer the intersex children to be reared as male possibly because of the less social stigma attached to an impotent male than to sterile female, and because males are socially independent.*

**Keywords:** *Ambiguous genitalia, Clitoroplasty, Congenital adrenal hyperplasia, Hermaphroditism.*

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Intersex (ambiguous genitalia) is defined as a condition in which there is difficulty in assigning sex to an individual from the appearance of external genitalia. It is a social emergency in the neonatal period and sex should be assigned as early as possible(1). The work up needs a team approach involving the pediatric surgeon, endocrinologist, cytologist, radiologist and psychologist. Once sex is assigned, surgical treatment should commence in early infancy and completed by school age(2). The diagnostic approach does not differ significantly in different centres, but the surgical techniques and the timing of surgery differ. Ambiguous genitalia can be due to defective gonadal development (true hermaphroditism and mixed gonadal dysgenesis) or due to fetal endocrinological abnormalities (female pseudohermaphroditism and male pseudohermaphroditism)(3). We reviewed 35 cases of ambiguous genitalia admitted to our centre in the last 6 years to study the problems in diagnosis, difficulties in gender assignment and methods of surgery. We compared our experience with that in other centres.

### Material and Methods

The case records of children, aged up to 12 years, who were admitted with ambiguous genitalia to the Department of Pediatric Surgery, Sree Avittom Thirunal Hospital, Medical College, Trivandrum from January 1986 to December 1991 were analyzed. Only patients whose investigations were complete, so that a diagnosis could be arrived at, were included in this study. The data was analyzed for clinical presentation, investigations, diagnosis, sex assignment and the treatment adminis-

tered. Patients were classified into four major diagnostic groups: male pseudohermaphroditism (MPH), female pseudohermaphroditism (FPH), true hermaphroditism (TH) and mixed gonadal dysgenesis (MGD). The FPH were subdivided into those with adrenogenital syndrome and those without adrenogenital syndrome. Those with adrenogenital syndrome were further grouped into salt-losers and non-salt losers.

The diagnostic investigations employed in the study group were estimation of Barr bodies in buccal smear cells, karyotyping of a bone marrow cells, estimation of 24 hour urinary 17 ketosteroids, estimation of serum sodium and potassium, (both in genetic females), ultrasound scan of pelvic organs, urogenital sinogram, urogenital endoscopy and laparotomy plus gonadal biopsy. The following criteria were used to classify cases:

*Female pseudohermaphroditism (FPH):* Enlarged clitoris with or without hypertrophied and rugose labioscrotal folds; gonads not palpable; karyotype 46 XX; presence of Mullerian duct structures (uterus, fallopian tubes and upper 1/3 of vagina) demonstrated by ultrasound scan/genitogram and/or laparotomy. FPH fell into 2 categories-adrenogenital syndrome (congenital adrenal hyperplasia) and non-adreno-genital syndrome. Congenital adrenal hyperplasia (CAH) was diagnosed if the 24 hour urinary 17-ketosteroid excretion was above normal for the age. CAH was further subdivided into salt-losing variety and non-salt losing variety. The salt losing variety was diagnosed if child presented with vomiting with or without cardiovascular collapse or with hyper-

kalemia and hyponatremia.

*Male pseudohermaphroditism (MPH):* Small phallus with chordee and varying degrees of hypospadias with or without bifid scrotum; presence of descended or undescended testicular tissue (proved by histopathological examination in doubtful cases); karyotype 46 XY; verumontanum detected on urethroscopy; absence of Mullerian duct structures.

*True hermaphroditism (TH):* Hypospadias sometimes with a descended testis on one side of scrotum; presence of both testicular and ovarian tissues in the same patient proved by histopathological examination in doubtful cases; presence of Mullerian duct structures; karyotype 46 XX (58%) followed by 46 XY/46 XX (13%), 46 XY (11%), other mosaicism (16%).

*Mixed gonadal dysgenesis (MGD):* Usually female phenotype with large clitoris, urogenital sinus or vagina; streak gonad on one side and dysgenetic testis on the contralateral side; presence of Mullerian duct structures; cryptorchidism and/or hypospadias; karyotype 45 XO/46 XY or 46 XY.

The treatment administered was analyzed with particular reference to pre-operative sex hormone treatment in MPH, methods of surgery and the attitude of our patients to genitoplasty surgery.

## Results

Out of 35 intersex children, two were neonates, 19 were in the age group between 1 month and 2 years, nine between 2 and 5 years and 5 between 5 and 15 years. A history of consanguinity was obtained in 2 cases.

Sixteen cases were of FPH, 14 cases were of MPH and 5 cases were of TH. There was no case of MGD. Of the FPH cases, 6 were non-salt losing type of adrenogenital syndrome, 5 were salt-losing type of adrenogenital syndrome and 5 were non-adrenogenital syndrome. Of the 5 TH cases, 2 were XX karyotype, 2 were XY karyotype and 1 was mosaic karyotype (Figs. 1 -3).

Sex was assigned to 31 children with ambiguous genitalia. The rest were lost to follow up. Eighteen were assigned female sex. Out of 11 MPH cases, 9 were assigned male and 2 female sex; out of 16 FPH cases, 15 were assigned female sex and one with CAH was assigned male sex because of parental pressure; out of 5 TH cases 3 were assigned male sex and one female sex.

Patients with salt-losing variety of CAH presented with vomiting, dehydration and electrolyte imbalance and

constituted a medical emergency. Such patients were treated with intravenous fluids to correct those abnormalities. Patients with salt-losing variety of CAH were given parenteral hydrocortisone initially and maintained on oral prednisolone. The other children with CAH were put on oral prednisolone. Flourohydrocortisone was administered to 2 salt-losers.

Local applications of testosterone ointment to the external genitalia was used in 3 patients with MPH who were assigned male sex, prior to repair of hypospadias. Parenteral testosterone was given to one MPH reared as male before the masculinising genitoplasty. The systemic testosterone had satisfactory effect in enlarging the size of phallus.



Fig. 1. Female pseudohermaphroditism due to congenital adrenal hyperplasia. Note the clitoromegaly and scrotalization of labia.



Fig. 2. Male pseudohermaphroditism. Note the short, inconspicuous phallus and bifid empty scrotum.

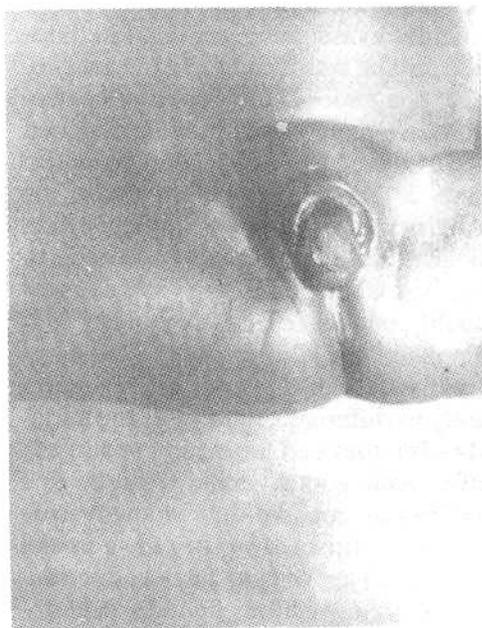


Fig. 3. External genitalia in true hermaphroditism. Note the male appearance of phallus but absence of scrotum and gonads.

The effect of local testosterone was, however, not satisfactory. No untoward effect was noticed with local or systemic testosterone.

*Feminising genitoplasty:* Feminising genitoplasty was done in 5 FPH and in 2 MPH who were assigned female sex. Clitoroplasty and labial reconstruction, low vaginoplasty and gonadectomy were carried out. These procedures were done at varying ages from 6 months onwards. We employed 2 techniques of clitoroplasty. Clitoridectomy was done in 4 cases of which 3 were FPH and 1 was MPH. Clitoral recession was done in one case each of FPH and MPH. Low vaginoplasty was done in 4 cases of which 3 were FPH and 1 was

MPH. Gonadectomy was done in one MPH.

*Masculinising genitoplasty:* Masculinising genitoplasty was done in 6 MPH, one FPH (adrenogenital syndrome) and in 3 TH who were assigned male sex. This consisted of chordee correction and urethroplasty in nine cases, excision of Mullerian remnant plus orchiopexy in one MPH and panhysterectomy in one each of FPH and TH.

In general parents preferred their intersex children to be reared as male in case an option was given to them. Change in sex of rearing was difficult or impossible after 2 years of age when psychologic attachments have occurred to that sex as was evident from a 3<sup>1</sup>/<sub>4</sub> years old genetically female child with adrenogenital syndrome who was brought up as male. Majority of parents were not concerned about the big clitoris for children reared as females as was evident from the observation that out of 18 children reared as females, only 6 have undergone clitoroplasty.

## Discussion

The prevalence rate of intersex problem in South America is about 1/20,000 live births with at least 1/2 and probably as much as 1/4 due to CAH(4). In our series, the congenital adrenal hyperplasia was approximately V<sub>3</sub> (11/35) of all intersex cases. Diagnostic procedures should be urgently undertaken in neonates in order to arrive at the correct sex as soon as possible(5). There should be no change in sex after the second year of life. In the gender assignment, the golden rule is that genetic females recognized in the neonatal period should be reared as females(2). These children can

lead a normal life as females. In genetic males (MPH < some TH and some MGD), the gender assignment is mainly dependent on the size of the phallus. In a term infant if the size of the phallus is less than 1.5 cm long and 0.7 cm wide, that child should be reared as female. However, these general principles cannot be applied when the child is brought late for investigations and treatment, when psychosocial factors and sex of rearing by parents influence the sex assignment. This was exactly the reason why a 3<sup>1/2</sup> years old girl with adrenogenital syndrome was assigned male sex.

Once sex is assigned, surgical correction can be started at 3 months of age in those assigned female sex. Clitoroplasty, along with labioscrotal reduction are done at this age. We have employed more than one technique of Clitoroplasty, but the clitoral recession technique is more often employed with renewed interest as the size of clitoris is lessened without resection with preservation of clitoral sensation(9). At this age, if vagina opens into the urogenital sinus distal to the level of external urethral sphincter, low (cut back) vaginoplasty can be done. If vagina opens above the level of external urethral sphincter, pull through vaginoplasty is done at about 4 years of age. If vagina is absent, vaginal reconstruction operation is done at adolescence. Gonadectomy should be done if the gonads are discordant with assigned sex or dysgenetic. However, some workers perform orchiectomy in those MPH who are assigned female sex only after puberty, as the androgen precursors are converted into estrogen in the

peripheral tissues causing feminization and development of breasts(10).

Hormonal stimulation for penile growth if needed can be employed before masculinizing genitoplasty(11). However, this treatment is beneficial only in those MPH in whom testosterone receptors are normal. Pinter and Kosztolanyi(12) favor early reconstruction of most anomalies at about 3 years of age.

Analysing the attitude of parents of intersex children in our setup, the preference of rearing as male to female is possibly because of the less social stigma attached to an impotent male than to a sterile female; also males are socially independent, where as females are not. The attitude of parents of intersex children in other Indian centres is not different. At Vellore(13), the majority of the male pseudohermaphrodites were reared as males. From Calcutta, Maji *et al.*(14) have reported two true hermaphrodites. One was 2 years old and the other was 20 years old; the latter was brought up by parents as male, and the reason for medical consultation was gynaecomastia and periodic bleeding. Both were assigned male sex. Our experience, and that from the above reported cases, reveal that the Indian parents rear their children as male or female based on the gross appearance of external genitalia. The usual reasons for medical consultation are enlargement of clitoris, absence of testis on one or both sides, hypospadias, gynaecomastia and after childhood, vaginal bleeding. In such situations change in sex is impracticable. They are not concerned whether the child reared as male would be potent or fertile or not.

Many of the parents are not concerned about the need of feminising genitoplasty especially the clitoroplasty. Pediatricians and neonatologists can educate them the need for early sex assignment and early reconstruction of genitalia in sex-assigned children.

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