A CASE OF TRUE HERMAPHRODITISM

By

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Normally, sex is determined at the moment of fertilization, the egg forming a zygote either with a sperm bearing an X chromosome or one bearing a Y chromosome, thus developing either into a female or a male.

While the male normally has only rudimentary vestiges of the müllerian or female genital duct system and the female only rudimentary vestiges of the wolfian or male genital duct system, this does not apply to hermaphrodites. They exhibit the most varied mixtures of fully developed parts of both systems, and their external genitalia may develop from the sexually indifferent structures in a direction opposite to the gonads or into mixed varieties.

The aetiology of hermaphroditism is far from being elucidated. We only know that a few cases are of genetic aetiology and that certain instances of female pseudohermaphroditism are due to adrenal cortical hyperplasia. Hermaphrodites may be classified according to the state of the gonads. This gives, according to Klebs (1870) and Hinman (1935), the classification shown in Table 1. It is generally agreed, however, that this classification is only of pathological and of no therapeutic interest.

 pseudohermaphroditism is not uncommon. Young (1937) has reported an incidence of one in 1000 of the population. True hermaphroditism, on the other hand, is extremely rare, only about 50 cases being reported in the literature. Of them 15 represent lateral hermaphroditism collected in a paper by Green et al. (1952).

To these 15 the author can now add one case.

CASE REPORT

The patient was 29-year-old, 156 cm. in height, registered and reared as a boy. Number 4 of 6 siblings all of whom were stated to be healthy and without abnormalities, as were the parents. The patient had been married for 3½ years to a normal woman and
Table 1.
Classifications of hermaphroditism according to gonads.

| Hermaphroditism |报记者 coitus twice weekly. Both partners obtained orgasm and were entirely satisfied with their sexual relations. Shortly after birth, it was noted that the penis was small and curved with penoscrotal hypospadias. This did not, however, trouble the patient before he got married, and then only because the semen was placed outside the vagina. In his opinion, this was the reason why the marriage remained involuntarily childless. One year prior to the present admission he sustained an injury which gave rise to haematoma and infection in the right half of the scrotum. It was treated elsewhere by incision. On this occasion a lump of necrotic tissue was ejected. Microscopic examination showed necrotic testicular tissue.

Shortly afterwards, he was admitted to our department and operated on for incarcerated left-sided inguinal hernia. The right testis was found to be small, and the left half of the scrotum under-developed and empty. At operation, the left testis seemed to be palpable just inside the annulus abdominalis. At the same time, the hypospadias was corrected, the penis being straightened out and the urethral opening moved to the gland.

During the stay in hospital he complained of haematuria, but no pathological components were found in the urine and urography showed no abnormality. He was told to present himself in the out-patient department, if he had a recurrence of haematuria. He returned shortly afterwards. At that time the voided urine was grossly blood stained, but catheterization showed a completely clear bladder urine. On further questioning regarding the haematuria, it was ascertained that it had started about 2 months after the injury to the right testis, recurring regularly at 4 weekly intervals and lasting for 5 or 6 days. About this period, he had, moreover, transitory pain in the left inguinal region, where a small node was observed in the scar left by the hernial operation.

We then realized that we were dealing not with simple hypospadias, but with hermaphroditism, but its nature was still obscure. As the patient suffered mentally
because of the menstruations, he was admitted for further examination and possible treatment.

The body build was a mixture of masculine and feminine components (Fig. 1). He had feminine hair, marked gynaecomastia, and a masculine voice. All the hormone analysis made (gonadotrophins, androgens, oestrogens, neutral 17-ketosteroids, and corticoids) were within the range of normal for a man of his age. Fluorogenic material in the urine (3α, 17α, 20α-pregnatriol, 11-one) 1.3 mg. in 24 hours which is normal. X-rays of the sella turcica failed to show any abnormality. On two occasions the ejaculate showed only a few immobile spermatozoa. Microscopic examination of the menstrual blood: Blood with numerous leukocytes and squamous cells as well as a few shreds of simple, rather tall columnar epithelium resembling the epithelium of the uterine glands. Urethrography showed a small hypoplastic prostate which was also palpable per rectum.

In the course of a new bleeding, urethroscopy was performed. It showed the bulbous urethra to be normal. In the prostatic portion there was no colliculus or utricle, but a cleft-like opening in the posterior wall, whence a small, bloody lump of tissue protruded. The opening admitted a ureteral catheter for a few cm., and this was evidently

Fig. 1.
The patient in the anterior, posterior, and lateral aspects.

1. This test was kindly performed by Prof. B. Zondek of Jerusalem.
Fig. 2.
Photomicrographs of the malphigian layer of the patient's epidermis. The sex chromatin is indicated by the arrow. By focusing through the thickness of the section, three-fourth of the nuclei are found to contain a mass of sex chromatin located at the periphery of the optical section through the nucleus. This is the typical female picture (haematoxylin-eosin × 2000).

the origin of the bleeding. A skin biopsy test by the method of Barr showed a typically female type (Fig. 2).²

As microscopic examination had previously shown testicular tissue and as the skin biopsy had revealed female type nuclei, this was clearly a case of true hermaphroditism. After the testicular injury, the ovarian tissue had gained the upper hand, so that menstruation set in and the breasts increased in size. Operation was thus indicated in order to remove the ovarian tissue which we knew must be present. The operative findings were as follows: A uterus (Fig. 3), more than double the size of a thumb, a somewhat cystic ovary with corpora lutea (Figs. 4 A and C), a normal-looking

Fig. 3.
Diagrammatic reconstruction of the uterus, vagina, and prostate, also showing the small hypospadic penis.

2. This test was kindly performed by Prof. M. L. Barr, London, Ontario, Canada.
Fig. 4 A–F.

A Ovary, transverse section showing cystic architecture (haematoxylin-eosin × 6).
B Testis, necrotic but plainly showing the seminiferous tubules (× 75).
C Ovary, showing primordial follicle. All stages were present, including the corpus luteum.
D Fallopian tube (haematoxylin-eosin × 8).
E Epoophoron from the left side, the rudimentary vestiges of the wolffian anlage (× 75).
F Endometriosis from the hernial scar in the left inguinal region (× 120).

Fallopian tube (Fig. 4 D) on the left, a vagina which in the form of a cord as thick as the little finger led from the uterus to the posterior aspect of the prostate, where urethroscopy had shown a cleft-shaped opening. Salpingo-oophorectomy was performed. On the same occasion, the small node in the hernial scar was removed. It proved to be endometriosis (Fig. 4 F). In the course of the hernial operation, a suture must have gone through the uterus which lay against the annulus abdominis.
DISCUSSION

In the diagnosis of various forms of hermaphroditism the new tests can be of real help. I am referring in the first place to Barr's finding of the sex chromatin mass in the cells of human tissue (detailed description by Moore & Barr, 1954). The discovery has been utilized clinically in the form of a skin biopsy test (Moore, Graham & Barr, 1953). By simple microscopic examination of a skin biopsy, this method can decide whether the tissue is derived from male or female. Its use in various forms of hermaphroditism has been tested and confirmed (Barr, 1954, 1955). In the latter paper, he reports the results of skin biopsy tests on 73 hermaphrodites — 31 female pseudohermaphrodites all with female type nuclei, 33 male pseudohermaphrodites all with male type nuclei, and 9 true hermaphrodites 6 of whom had female and 3 male type nuclei.

In our case in which the patient was known to have testicular tissue and where the skin biopsy had shown female type nuclei, the test was as valuable as in the ordinary distinction between male and female pseudohermaphroditism. Hsu's investigations of chromosomes in somatic cells are also valuable (Hsu, Hooks & Pomerat, 1953). This method consists in direct microscopic examination of the chromosomes as they appear during cell division in tissue cultures, whereas with the Barr method the cells are only studied during the resting phase. Hence, Hsu's method is more difficult, and requires intimate knowledge of tissue culture technique. In classifying the different varieties of female pseudohermaphroditism, Zondek's test of the urine for fluorogenic material may be helpful (Zondek & Finkelstein, 1953). The excretion of fluorogenic material in the urine (3α, 17α, 20α-pregnanetriol-11-one) is remarkably high in cases of female pseudohermaphroditism due to adrenal cortical hyperplasia. It was normal in our case as in other cases of true hermaphroditism.

In distinguishing simple hypospadias from hypospadias complicated by a development of müllerian derivatives, X-rays may be of great value (Schumann, 1953). Operation for hypospadias should always be preceded by urethrography as well as urethroscopy, as filling of the vagina and uterus is not always obtained, even though these structures are present.

Howard (1948) has related the severity of hypospadias to the differentiation of the müllerian duct into the female direction. Such a relationship is, however, by no means constantly present. Hanley (1953), for instance, has reported a case with completely normal external genitalia, but with a uterus, vagina, and Fallopian tubes, suffering from salpingitis due to hypertrophy of the prostate.

From the therapeutic point of view, our case did not give rise to any doubt. As the patient was a true hermaphrodite reared as a male in whom ovarian function gained the upper hand causing increasing feminization after testicular trauma, there was no doubt that the ovary had to be removed. Cecil (1949) is no doubt right in maintaining that no attempt should be made to remove the
vagina and uterus, as these structures cause no inconvenience, when the ovary has been removed.

Green et al. (1954), studying testicular tissue from a true hermaphrodite by the Feulgen squash technique, found an XXY chromosome constitution. We also tried to make Feulgen squash preparations from our patient, but the spermiogenesis in the traumatized testis was so slight that we could neither confirm nor disprove Green’s result.

**SUMMARY**

A case of true lateral hermaphroditism is reported. Modern diagnostic methods are reviewed, emphasizing especially the Barr skin biopsy test which in this case established the diagnosis before the operation.

**REFERENCES**