

Disorders of Sex Development- The Treatment Revolution

Introduction

“Congratulations, you have a beautiful baby...”. A sentence every parent assumes will be completed with either boy or girl. Yet in as many as 1 in 2,000 births doctors are unable to give a definitive answer (Blackless *et al*, 2000). Disorders of Sex Development (DSDs) or Intersex are the terms preferred by the medical establishment for what the general public chiefly knows as hermaphrodites. This Victorian term conjures up images of circus show freaks in the minds of many and has been responsible for much prejudice and misunderstanding. This essay will explore how the medical establishment has traditionally viewed these conditions and the subsequent revolution in treatment- both surgical and psychological that is underway.

How wrong they were

The dominant figure in the classical medical understanding of gender development was the American psychologist John Money (1921-2006). His doctrine, heavily influenced by Freud depended on the twin ideas that all infants are psychosexually neutral at birth and that development of gender identity was based solely on the internalisation of cues given to the child based on the appearance of their genitals. Essentially Money thought that gender development was completely behavioural (Money, 1963).

He recommended that a child born with a disorder of sex development that caused ambiguous appearance of their genitals should have them surgically altered early in life to be unambiguous. Provided parents raised them to have the same gender as their genitals then Money thought that psychosexual development would be normal for the child and they would identify seamlessly with their assigned gender.

The most famous implementation of the Money hypothesis is the case of a pair of identical XY male twins who underwent an experimental form of circumcision by electro cauterisation when they were 8 months old. For one of the boys the operation was a disaster and his penis was

accidentally burned to a stump. After much discussion he was sent to see Money at the then world renowned centre for gender medicine at Johns Hopkins Hospital where it was decided to raise the boy as a girl; through castration and feminizing surgery. Early reports in the literature from 1975 onwards suggested that these surgeries were a success and seemed to vindicate the Money doctrine; however a landmark investigation by Diamond and Sigmundson in 1997 exploded this myth. The child, known for sake of anonymity as “Joan” came to reject their assigned female gender and ultimately underwent sex altering surgeries at the age of 15 and married at 24, adopting his partner’s children, before sadly committing suicide in 2004 after his marriage broke down (Diamond & Sigmundson, 1997). These revelations destroyed Money's reputation and forced the medical profession to take notice of the shocking way that the well-being of these patients had been neglected.

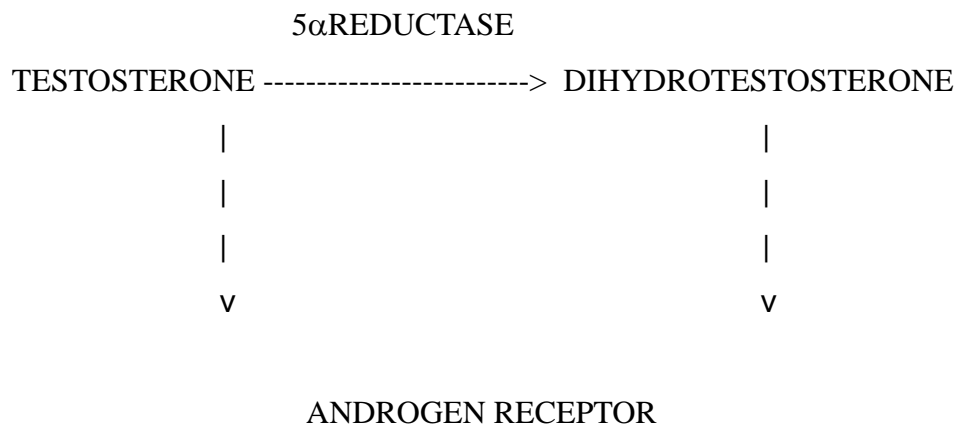
Modern Pioneers

Following this investigation several pioneering research teams have studied the wide variety of sexual development disorders with a view to changing the way they are treated by the medical establishment.

Take for example the condition of Congenital Adrenal Hyperplasia (CAH). In this condition there is a defect in the synthesis of the stress hormone cortisol, which causes an increase in the production of sex hormones called androgens. As a result the external genitals of an XX female appear abnormally enlarged at birth because they were exposed to too much sex hormone in the womb. The traditional approach in these cases has been the removal of much of the excess tissue through clitoroplasty surgery, but this approach has been challenged by the work of Sarah Creighton’s team. They studied women with CAH and found that those who had undergone clitoral surgery were less likely to be able to reach orgasm and more likely to report non sensuality during sex (Minto *et al*, 2003). They call for more research into the effects of clitoral surgery and point out that there is no actual evidence for the psychological benefits of early feminizing surgery. Their research forms part of a growing trend towards a more sympathetic approach to the management of disorders of sex development, with increasing emphasis being placed on the preservation of sexual function later in life rather than creating a “normal” appearance during childhood.

The medical management of several conditions which affect males has also been revolutionised in recent years. One such condition is micropenis, where the penis is anatomically normal, but is far smaller than would be expected. Traditionally this condition has been treated by removal of the penis, feminizing surgery and hormone replacement therapy, as it was thought that psychological stress of having a very small penis would be too great for a developing boy to bear. The view that “Because it is simpler to construct a vagina than a satisfactory penis, only the infant with a phallus of adequate size should be considered for male gender assignment”, from a 1990’s textbook of paediatric medicine (Perlmutter & Reitelman), was the dominant one for much of the 20th Century. However, a bold piece of research by Bin-Abbas found that a course of testosterone given during childhood could allow the penis to develop to a normal size without development of any of the secondary sex characteristics associated with puberty (Bin-Abbas *et al*, 1999). This is particularly important because testosterone levels are normally very low during childhood. This work has led to recommendations that all cases of micropenis be given a trial with testosterone, which gives these patients a chance of fertility in later life, a quite remarkable shift in medical practice.

Two conditions which offer great insight into issues of gender development are Androgen Insufficiency Syndrome (AIS) and 5alpha Reductase Deficiency, both of which involve testosterone.



5alpha Reductase (5αR) is a vital enzyme that converts testosterone into dihydro-testosterone,

which is 10-times more powerful. If this enzyme is defective then a genetic male will not be exposed to sufficiently strong testosterone signals in the womb and his external genitalia will appear largely female, although his internal anatomy will be male as this does not require testosterone in order to develop. This condition is rarely noticed at birth however during puberty testosterone becomes the dominant androgen and its levels rise massively. As a result people who were raised up to puberty as females follow a male pattern of puberty, with no menstruation, hair and muscle development and a deepening voice. This can have a profound effect on patients and it is estimated that 2/3 of 5 α Reductase deficiency patients raised as females subsequently identify as males (Houk *et al*, 2006).

In contrast Androgen Insensitivity Syndrome is caused by a defect in the androgen receptor, a protein present on many cells, including those of the genitals and brain, which means that the cells are no longer able to respond to androgens. If this insensitivity is complete then an XY male will be born with female external genitalia, similar to 5 α R deficiency. However, unlike 5 α R deficiency all of these people retain their female gender identity throughout life. One explanation for this is because brain exposure to androgens in the womb is believed to be a key feature of gender development (Creighton *et al*, 2001). In Complete Androgen Insensitivity Syndrome there is no response from brain cells to androgens, so there is no problem with subsequent female gender identity. However in 5 α R deficiency the brain is still exposed to testosterone *in utero* and it is believed this is an important factor that explains why many 5 α R patients assigned female gender at birth subsequently identify as males.

A long overdue voice for the patients

In addition to the advances in our medical understanding detailed above, we are beginning to give much more consideration to the rights of people born with these conditions, backed by powerful patient advocacy groups. These are often at odds with the immediate wishes of concerned parents who wish that their baby looked “normal”. The traditional approach to management of sex development disorders has required non-disclosure of the condition to patients because it was thought that the patient had to believe they had been born without any abnormality to be happy with their assigned gender.

One view taken by Jennifer Conn is that modern access to the internet makes non disclosure a very dangerous approach. She notes that “advances in information technology have exponentially increased the chance of a woman finding out her diagnosis” and that “unquestionably, the greatest harm would result if the patient found out...by chance in an unsupported environment” (Conn *et al*, 2005). This is a view supported by one of the leading patient advocacy groups, the Intersex Society of North American who believe that “Children and adults with intersex should be treated in an open, shame-free, supportive, and honest way. They should consistently be told the truth (this includes providers being honest about uncertainty), and should be given copies of medical records as soon and as often as they ask for them” (ISNA website, 2010).

The other key ethical concern regarding the treatment of DSDs is the role of patient autonomy and consent for genital altering surgery. In 2006 a key document outlining best-practice for treatment of intersex conditions recommended a more cautious approach to surgery including no vaginoplasty in children as it is unnecessary and clitoroplasty only in the more severe cases (Houk *et al*, 2006). This is an important development and one that has been long fought for by patient rights groups. Melissa Cull, founder of the congenital adrenal hyperplasia network notes that “genital surgery as young children that was not personally consented to...can give rise to feelings of loss of body ownership” and it is important to remember that surgery in childhood is not a “one stage fix all”. Frequently repeat operations are needed during adolescence to preserve the genital identity assigned at birth, which can be damaging both physically and psychologically (Cull, 2005).

Hope for the future

It is clear that the medical management of many different disorders of sex development is going through radical changes. Freed from the overpowering dogma of the Money doctrine researchers are looking much more closely at the biological basis of gender development and increasing focus is being placed on preserving sexual and reproductive function for later in life rather than rushing to simply create a cosmetically appealing appearance early in life. With the rise of patient rights groups the future looks bright for some of medicine's most challenging and misunderstood conditions.

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