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van der Gracht, Stefanie

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SETTING ASIDE THE LOOM: HERMAPHRODITISM IN ANCIENT MEDICINE

STEFANIE VAN DER GRACHT

SUMMARY: The medical condition of hermaphroditism has largely been neglected in the study of the history of medicine. This was especially true in the area of ancient Greek and Roman medical history. Although, only a small percentage of the population was likely to have had contact with hermaphrodite individuals, many of the ancient Greeks and Romans were aware of the condition through the hermaphrodite god that figured in the pantheon of their religion. The popularity of the hermaphrodite as the subject of both paintings and sculptural artworks, particularly during the Roman Empire, is a testament to the prominence of this figure within ancient society. There is ample evidence from the ancient Greek sources to indicate that the condition of hermaphroditism was understood to exist in a medical context. The details provided in the accounts of the ancient writers are descriptive enough that conclusions can be drawn about what specific variation of hermaphroditism are being described. Furthermore, the surgical procedures and treatments outlined in these texts are not dissimilar to those still used today and may have formed the early foundations on which modern medical procedures for treating these conditions were based.

KEYWORDS: Hermaphroditism, History of Medicine, Cultural History, Diodorus Siculus, Aristotle, Hippocrates, Galen and Paul of Aegina.

PRECEPTOR: Dr. Peter Toohey ■ **INSTITUTION:** University of Calgary

Introduction

Throughout my research, I have found two main types of hermaphroditism recognized in modern medicine. The first of these is known as true hermaphroditism; it is extremely rare and its cause is unknown.¹ In cases of true hermaphroditism, both ovarian and testicular tissues are present in one individual. Approximately eighty percent of the individuals with true

¹ Charles B. Clayman, *The American Medical Association Encyclopedia of Medicine* (New York: Random House, 1989), p. 534.

hermaphroditism have a functional or rudimentary uterus. The external genitalia in true hermaphrodites are usually a combination of male and female genitalia. Sixty percent exhibit genitalia that appear to be more masculinized.²

A second type of hermaphroditism is known as pseudohermaphroditism. This is when an individual is born with external genitalia resembling that of the opposite biological sex.³ In other words, a child who is born chromosomally female would have an enlarged clitoris resembling a small penis, or, a child who is born chromosomally male would have a small penis and severe hypospadias⁴ resembling a clitoris and vagina. Pseudohermaphroditism can be caused variously. One cause is described by the term congenital adrenal hyperplasia. Adrenal hyperplasia is a rare disorder that is caused by the deficient production of certain hormones by the adrenal glands and the overproduction of male sex hormones; this disorder is the most common cause of ambiguous genitalia at birth.⁵ In its most severe form, adrenal hyperplasia results in a female infant being born “with what appears to be a penis and scrotum,” but is actually an enlarged clitoris and enlarged labia.⁶ Partial androgen insensitivity is the other main cause of pseudohermaphroditism. Partial androgen insensitivity is a congenital condition in which the individual is unable to respond normally to the male sex hormones (including testosterone). Individuals with this condition tend to appear “externally female since the developing foetus does respond to the small amounts of oestrogen normally produced in males although they possess the Y male-sex chromosome”.⁷ This genetic set-up results in male infants being born with external genitalia ranging

² Donald R. Smith, *Smith's General Urology*; sixteenth edition. Edited by Emil A. Tanagho, and Jack W. McAninch. (New York: Lange Medical Books/McGraw-Hill, 2004), pp. 664-665.

³ Clayman, *The American Medical Association Encyclopedia of Medicine*, p. 829.

⁴ Hypospadias presently occurs in one in every three-hundred male infants. The condition is characterized by the placement of the urethra on the underside of the head or shaft of the penis, and in extreme cases the urethral opening is found “between the genitals and the anus, and the testes are undescended” (Clayman, *The American Medical Association Encyclopedia of Medicine*, p. 561).

⁵ Clayman, *The American Medical Association Encyclopedia of Medicine* Clayman, p. 72.

⁶ *Ibid.*, p. 72 and p. 829.

⁷ Arthur S. Reber, *The Penguin Dictionary of Psychology* (New York: Penguin Books, 1995).

from mild to severe hypospadias to micropenis,⁸ and the testes may be located in the labia or abdomen.⁹ In these severe cases, the genitals may be mistaken for female genitalia resulting in some confusion over the true sex of the child.¹⁰

First Hand Accounts of Hermaphroditism

Accounts of hermaphroditism in a medical context in ancient texts – although not common – did exist, and they typically refer to pseudohermaphroditism. The ancient texts seem to point to a condition known as male pseudohermaphroditism in which the individual is born with external genitalia resembling that of a female. This is often the result of a condition known as hypospadias,¹¹ and is subsequently incorrectly assigned the female sex. Male pseudohermaphroditism can present itself at puberty at which point the individual's external genitalia begin to resemble that of a male more closely. The occurrence of male pseudohermaphroditism in antiquity did not go undocumented and has been preserved in accounts from Diodorus Siculus, who wrote in the first century B.C. Although Diodorus Siculus was a historian and not a medical writer nor a physician, his narrative includes details of the medical procedures used in antiquity to repair genital anomalies. Diodorus Siculus, in the thirty-second book of his *Bibliotheca Historica*, describes two detailed instances of an individual suffering from male pseudohermaphroditism in which the symptoms went untreated until puberty.¹² In all of these cases, male genitalia develop where the individual previously had mildly ambiguous female genitalia. In addition to demonstrating the possibility that some individuals in ancient Greece understood the condition of hermaphroditism, Diodorus Siculus also

⁸ Micropenis is an abnormally small penis and it “may reflect failure of normal hormonal stimulation or failure of normal development (a birth defect)”; *Webster's New World Medical Dictionary* (New York: Wiley, 2003); entry: “micropenis”.

⁹ Smith, *Smith's General Urology*, p. 658.

¹⁰ Clayman, *The American Medical Association Encyclopedia of Medicine*, p. 561.

¹¹ Hypospadias is a condition caused by partial androgen insensitivity in which the opening to the urethra is located in a position that causes the external genitalia to resemble a clitoris and vagina. For more information, see: Smith, *Smith's General Urology*, 2004.

¹² Diodorus Siculus, *Diodorus of Sicily 11. Fragments of books XXI-XXXII*. Translated by F. R. Walton. Loeb Classical Library (Cambridge, Mass.: Harvard University Press, 1980), p. 32 and pp. 10-12.

provided three of the most detailed accounts of male pseudohermaphroditism becoming apparent at the onset of puberty.

Although it is most common for pseudohermaphroditism to be diagnosed and treated at birth, it is also possible for pseudohermaphroditism to present at puberty.¹³ This fact only helps to substantiate the accounts of Diodorus Siculus. Robert Garland points out that with “the extremely early age at which most girls got married in the ancient world, we can well imagine that cases of ambiguous or mistaken sexual identity would have caused enormous consternation,” particularly if the marriage had been consummated prior to the appearance of male genitalia.¹⁴ Although it is certainly the case that women in antiquity were married at an age that today might be considered “extremely early” it is not entirely clear if those marriages would have been consummated immediately. Until a girl reaches puberty, there is no possibility that she could become pregnant and as such it would seem impractical to consummate a marriage with a pre-pubescent girl. That being said, Diodorus’ account of Heraïs addresses this issue. Heraïs was married to Samiades and lived in Abae in Arabia. While Samiades was absent on a “long journey”, Heraïs fell ill and a “severe tumour appeared at the base of her abdomen”.¹⁵ Over the course of the illness, the “tumour” became more swollen and Heraïs suffered from high fevers, which led her physicians to suspect “that an ulceration had taken place at the mouth of the uterus”.¹⁶ On the seventh day of the illness, with only her mother and two maidservants as witnesses, “the surface of the tumour burst, and projecting from her groin there appeared a male genital organ with testicles attached”.¹⁷ Once she recovered from her illness, she continued to wear “feminine attire” and conduct herself “as one subject to a husband”.¹⁸ Heraïs’ hermaphroditism became a problem when her husband returned from his long journey and she continuously refused his sexual advances. Samiades went to court over the issue and as expected, “the court found that it was the wife’s duty to attend upon her husband,” at which point Heraïs “loosed the dress that disguised her, displayed her masculinity to them all, and burst out in bitter protest that anyone should require a man to cohabit with a man”.¹⁹ Once Heraïs’ new

¹³ Smith, *Smith’s General Urology*, p. 655.

¹⁴ Robert Garland, *The Eye of the Beholder: Deformity and Disability in the Graeco-Roman World* (London: Gerald Duckworth & Co. Ltd., 1995), p. 130.

¹⁵ Diodorus Siculus 32.10.3.

¹⁶ *Ibid.*

¹⁷ *Ibid.*

¹⁸ Diodorus Siculus 32.10.4.

¹⁹ *Ibid.* 32.10.6-7.

masculinity became public knowledge, she began to “dress in the clothing of a young man, changed her name to Diophantus, [and] was enrolled in the cavalry”.²⁰ Diodorus provides details of the surgical procedure performed by the physicians on Heraïs, in order to correct the “aperture [that] had formed through which excretions were discharged”.²¹ The physicians needed to “scarify the perforated area and induce cicatrisation: having thus brought the male organ into decent shape”.²²

The second detailed account of male pseudohermaphroditism provided by Diodorus Siculus involved an Epidaurian girl named Kallo.²³ Although she was considered female at birth, “the orifice with which women are naturally provided had in her case no opening”.²⁴ Upon reaching puberty, she was married and while living with her husband for two years, she was being “obliged to submit to unnatural embraces” because “she was incapable of intercourse as a woman”. During this time, “a tumour appeared on her genitals” which caused severe pain.²⁵ In Kallo’s case an apothecary had offered to cure and “cut into the swollen area, whereupon a man’s privates were protruded, namely testicles and an imperforated penis”.²⁶ Steps were taken by the apothecary to “remedy the remaining deficiencies”; including “cutting into the glans [to make] a passage into the urethra, and inserting a silver catheter [where he] drew off the liquid residues”.²⁷ Finally, by “scarifying the perforated area, he brought the parts together”.²⁸ Diodorus indicates that Kallo embraced her new masculinity by “[laying] aside her loom-shuttles and all other instruments of women’s work, and [...] changed her name to Kallon”.²⁹ Although there is no indication of the husband’s reaction to the newly discovered masculinity of his wife, it does indicate that the apothecary seemingly took advantage of the situation by demanding “double fees, saying that he had received a female invalid and made her into a healthy young man”.³⁰

The accounts provided by Diodorus Siculus imply that he was not only aware of the possibility of what we would call male pseudohermaphroditism,

²⁰ *Ibid.* 32.10.8.

²¹ *Ibid.* 32.10.7.

²² *Ibid.* 32.10.8.

²³ *Ibid.* 32.11.

²⁴ *Ibid.* 32.11.1.

²⁵ Diodorus Siculus 32.11.1.

²⁶ *Ibid.* 32.11.2.

²⁷ *Ibid.* 32.11.3.

²⁸ *Ibid.*

²⁹ *Ibid.* 32.11.4.

³⁰ *Ibid.* 32.11.1-2.

but that he also felt compassion towards those who suffered from the condition. This is clear through the third account of his relating to a hermaphrodite, married to an Italian man and living near Rome, as well as through his account of a similar situation occurring in Athens.³¹ The husband of the hermaphrodite near Rome “laid information before the senate, which in an access of superstitious terror [...] ordered the creature to be burned alive.”³² Diodorus demonstrated his empathy for the hermaphrodite when he went on to say the following: “Thus did one whose nature was like ours and who was not, in reality, a monster, meet an unsuitable end through misunderstanding of his malady”?³³ He demonstrated his understanding again, when he emphasizes that the hermaphrodite in Athens was burnt alive because of a “misunderstanding of the affliction”.³⁴

Diodorus’s View on Hermaphroditism

Diodorus has a sober and compassionate view of hermaphrodites according to his narrative, although his accounts seem to be sensationalizing the issue. The procedures for correcting the newly discovered genitalia described by Diodorus Siculus can be explained by comparing them to modern treatment methods for the symptoms of pseudohermaphroditism. Diodorus describes the male genitalia that developed on Kallo as being an imperforated penis.³⁵ This term likely refers to the medical condition hypospadias, characterized by the placement of the urethra on the underside of the head or shaft of the penis, and in extreme cases the urethral opening is found “between the genitals and the anus, and the testes are undescended”.³⁶ In these severe cases, the genitals may be mistaken for female genitalia resulting in some confusion over the true sex of the child.³⁷ Based on this explanation of hypospadias it is possible to

³¹ *Ibid.* 32.12.1-2.

³² Diodorus Siculus 32.12.2.; of the three laws in the Digest of Justinian that pertain to hermaphrodites, none of them suggest that hermaphrodites ought to be burned alive or punished for their condition; Alan Watson, *The Digest of Justinian*, Vol. 1 & 2 (Philadelphia: University of Pennsylvania Press, 1998). Cf. Digest of Justinian 1.5.10, 28.2.6, 22.5.15.

³³ Diodorus Siculus 32.12.2.

³⁴ *Ibid.* 32.12.3.

³⁵ *Ibid.* 32.11.2.

³⁶ Clayman, *The American Medical Association Encyclopedia of Medicine*, p. 561.

³⁷ *Ibid.*

conclude that Kallo's imperforated penis would be better described as a case of hypospadias. Diodorus describes the steps taken to surgically repair Kallo's genitalia in the following way:

[...] a certain apothecary, who offered to cure her, cut into the swollen area, whereupon a man's privates were protruded, namely testicles and an imperforate penis. While all the others stood amazed at the extraordinary event, the apothecary took steps to remedy the remaining deficiencies. First of all, cutting into the glans he made a passage into the urethra, and inserting a silver catheter drew off the liquid residues. Then, by scarifying the perforated area, he brought the parts together.³⁸

Similarly, Diodorus described the procedure of scarifying the perforated area on Heraïs' genitalia after correcting the location of the "aperture" or urethra for the discharging of excretions.³⁹ This perforated area is most likely the prior location of the urethra as caused by hypospadias. Common elements in all these methods of repairing hypospadias "involve the straightening of the penis, [followed by] urethral reconstruction and advancement." The most successful surgical methods "use local skin and foreskin in developing the neourethra".⁴⁰ Diodorus presented Heraïs' treatment as follows:

[...] and the physicians, on being shown the evidence, concluded that her male organ had been concealed in an egg-shaped portion of the female organ, and that since a membrane has abnormally encased the organ, an aperture had formed through which excretions were discharged. In consequence they found it necessary to scarify the perforated area and induce cicatrisation: having thus brought the male organ into decent shape, they gained credit for applying such a treatment as the case allowed.⁴¹

Aristotle's View of Hermaphroditism

The condition of hermaphroditism is also addressed in the works of Aristotle, one of the most influential Greek philosophers writing in the fourth century B.C. Aristotle, like Diodorus Siculus, was not a physician, but his work on the body influenced later medical writers and physicians in Greece and Rome. Aristotle describes hermaphroditism as a dual-sex in his discussion of sex and gender differences. Aristotle's works include

³⁸ Diodorus Siculus 32.11.2-3.

³⁹ *Ibid.* 32.10.7.

⁴⁰ Smith, *Smith's General Urology*, p. 618.

⁴¹ Diodorus Siculus 32.10.7.5-8.1.

treatises on human and animal bodies. Few have argued that the Aristotelian model of the body was not open to the possibility of hermaphroditism because it “saw sex difference as either male or female, with no intermediate possibilities”.⁴² The claim that Aristotle’s model did not allow for variations like hermaphroditism is not entirely accurate. Aristotle discusses the possibility of dual sexes in a single creature on more than one occasion in his writings. In the first instance Aristotle is describing the possibility that a human can be born with a full set of male and female genitals at the same time.

Again, they may have the generative parts doubled, the one being male, the other female; this is known in men and especially in goats. For what are called ‘*tragaenae*’ are such because they have both male and female generative parts; there is a case also of a goat being born with a horn upon its leg.⁴³ It is clear from this passage that Aristotle’s model of the body is not one “with no intermediate possibilities” at all, but one where the possibility of a sex other than simply male or female does exist. Although Aristotle does not call this “third” sex a hermaphroditos or androgynos, it is clear that his dual-sex, simultaneously male and female, is exactly that. Aristotle goes on to describe this duality in more detail.

In certain cases we find a double set of generative organs (one male and the other female). When such duplication occurs, only one generative organ is always functional but the other one is not. This is because it is always insufficiently supplied with nourishment and it is against nature. The organ that is not functional is attached like a growth (for such growths also receive nourishment though they are a later development than the body proper and contrary to nature). If the (embryological) formative power prevails, both are similar; if it is altogether vanquished, both are similar; but if it prevails here and be vanquished there, then the one is female and the other male. Whether we consider the reason why the whole animal is male or female, or why the parts are so, makes no difference.⁴⁴

⁴² Martha Few, “‘That Monster of Nature’: Gender, Sexuality, and the Medicalization of a ‘Hermaphrodite’ in Late Colonial Guatemala,” *Ethnohistory: the Bulletin of the Ohio Valley Historic Indian Conference* 54 (2007), pp. 159-176; esp. p. 166.

⁴³ Aristotle, *Generation of Animals*. Translated by A. L. Peck. Loeb Classical Library (London: W. Heinemann, 1943), IV.iv.770b33-35.

⁴⁴ Aristotle, *Generation of Animals*, IV.iv.772b26-35.

The Hippocratic Corpus Model of the Body

Aristotle described the nature of a dual-sexed individual as always having one functioning set of genitalia, either male or female, and the opposite set was merely attached to the body with no function. This was perhaps one way of understanding how true hermaphroditism could occur.⁴⁵ One collection of medical writings from which some of Aristotle's conclusions were drawn is the Hippocratic Corpus. The Hippocratic Corpus, compiled between the fifth and third centuries B.C., "pioneered an empirical system of observing how illnesses and traumas arose and developed".⁴⁶ "The Hippocratic Corpus is made up of sixty or so works" and "the collection in the form in which we have it today, goes back to only 1526".⁴⁷ It has been argued by some that the Hippocratic model of the body was more open to the possibility of hermaphroditism than the Aristotelian model, stating that the Hippocratic model was "a spectrum between male and female on either end with possibilities for intermediate sex lying in between".⁴⁸ The Hippocratic Corpus' mention of hermaphroditism in the work *Regimen* occurs in a different context than Aristotle's.⁴⁹ Whereas Aristotle discusses the possibility of humans being born dual-sexed, the Hippocratic Corpus provides an explanation for how such anomalies can occur right from conception.⁵⁰ The Hippocratic Corpus describes the secretions that come from the male and the female that blend together to determine the foetus' sex. It postulates that both the male and female secretions can be

⁴⁵ True hermaphroditism "is typically defined as having both ovarian and testicular tissue [...] either present separately as one testis and one ovary; or mixed as an ovary and an ovotestis; two ovotestes; a testis and one ovotestis; or one single ovotestis only." In: Catherine Harper, *Intersex* (New York: Berg, 2007), p. 13. Modern scientific evidence has proven this to be inaccurate. Although in many cases of true hermaphroditism only the male or female set of genitalia are partially functional, it is equally common for such an individual to have one or more ovotestes in which the tissue is a combination of a male testis and a female ovary (Smith, *Smith's General Urology*, pp. 664-665). For this reason an individual with true hermaphroditism is truly intersexed, having genital tissue that cannot be described as male or female, but rather as both male and female simultaneously.

⁴⁶ Nigel Spivey and Michael Squire, *Panorama of the Classical World* (London: Thomas & Hudson Ltd, 2004), p. 74.

⁴⁷ Vivian Nutton, *Ancient Medicine* (London: Routledge, 2004), p. 60.

⁴⁸ Few, *That Monster of Nature*, p. 166.

⁴⁹ Hippocrates, *Diseases III; Internal Affections; Regimen in Acute Diseases*. Translated by P. Potter (Cambridge, MA: Harvard University Press, 1988).

⁵⁰ Aristotle, *Generation of Animals*, IV.iv.770b33.

either male or female in their nature and it is the different combinations of these secretions that result in the level of masculinity or femininity in the child.⁵¹ The discussion begins with the three types of men that develop out of the possible combinations of male and female secretions. This serves to explain “why children may not resemble the same-sex parent [...] depending on the potency of the sperm, some biological females will tend toward the masculine, or vice versa.”⁵² The Hippocratic Corpus argues that “the degree of manliness depends upon the blending of the parts of water, upon nourishment, education and habits”.⁵³ It describes the optimal combination as a male secretion coming from both the male and the female at the time of conception. In this instance “the babies become men brilliant in soul and strong in body”.⁵⁴ The second combination is a male secretion from the male and a female secretion from the female at the time of conception resulting in a man that is “less brilliant than the former, nevertheless [...] they turn out brave, and have rightly this name”.⁵⁵ It is the third type of man that is of particular interest here. The Hippocratic Corpus not only presents a potentially intersexed man, but refers directly to this third type of man as a hermaphrodite or androgynos. But, if the male be secreted from the woman but female from the man, and the male get the mastery, it grows just as in the former case, while the female diminishes. These turn out hermaphrodites (“men-women”) and are correctly so called.⁵⁶ The above is the only mention of an androgynos or hermaphroditos in the entire Hippocratic Corpus. It is interesting to note that the Hippocratic Corpus includes the hermaphrodite among the different types of men and not as a distinct type all on their own. Although a similar category is included among the three types of women, it does not include a hermaphrodite among them; instead it refers to women simply being called manly, but not actually being that way.⁵⁷

⁵¹ Hippocrates, *Regimen*, I.28.

⁵² Marilyn B. Skinner, *Sexuality in Greek and Roman Culture* (Malden: Blackwell Publishing, 2005), p. 152.

⁵³ Hippocrates, *Regimen*, I.28.33-36.

⁵⁴ *Ibid.*, I.28.12-14.

⁵⁵ *Ibid.*, I.28.24-27.

⁵⁶ *Ibid.*, *Regimen*, I.28.27-32.

⁵⁷ *Ibid.*, *Regimen*, I.29.10. For more on the body in the Hippocratic Corpus see: Nutton, *Ancient Medicine*; Helen King, *Hippocrates' Woman: Reading the Female Body in Ancient Greece* (New York: Routledge, 1998).

Galen and Hermaphroditism

Galen, a Roman physician working in the first and second centuries A.D., also mentions the medical condition of hermaphroditism. Although Galen describes the differences between the male and female sexes, he does not provide a thorough description of the condition of hermaphroditism as he understood it. That being the case, he does mention hermaphroditism, albeit briefly, in his book "*On Semen*".⁵⁸ The subject of hermaphroditism comes up in his discussion of the female semen. Galen is attempting to answer the question of why the female has semen, and why then the female does not reproduce alone. In attempting to determine the answer to these questions Galen mentions the theory of Empedocles. For on his [Empedocles] view the semen will have everything within itself and will be composed of all the parts of the animal, artery obviously, and vein and nerve and bone and ligament and flesh and each of the others, lying side by side in disorder, and obviously needing a source of arrangement and order, so that an animal may be produced from it.⁵⁹

Galen criticized this theory and described how it cannot possibly be accurate. He explained that Empedocles' theory would require that "there would be one big bone in the foetus, when all the bony particles have arrived at the same place, and one cartilage, one artery, one nerve, and so with each of the rest".⁶⁰ He went on to say that Empedocles' theory of all the parts of a body being present in semen would be "impossible when one considers each of the organic parts and especially each of the reproductive organs".⁶¹ It is here that Galen brought up the subject of hermaphroditism. He explained hermaphroditism as being the certain end result of all offspring, if Empedocles' theory of semen were true. Either each of the semen contained the parts of both the female and male organs, or the parts of the female organs were in the female semen, those of the male organs in the male semen. Whichever way it was, when they were mixed together both (sets of reproductive organs) would have been fashioned in the foetus, so that all our offspring came into being with a form such as that of the so-called hermaphrodites that artists fashion, with both sets of reproductive parts complete, those of the male and those of the female.⁶²

⁵⁸ Galen, *On Semen*. Translated and edited by Phillip De Lacy (Berlin: Akademie Verlag, 1992).

⁵⁹ Galen, *On Semen* 11.3.5-7.

⁶⁰ *Ibid.* 11.3.8-9.

⁶¹ *Ibid.* 11.3.15-16.

⁶² Galen, *On Semen*, 11.3.16-18.

Galen did not provide a detailed description of hermaphrodites except to say that they had both sets of reproductive parts, those of the male and those of the female. What is worthy of note is that Galen described hermaphrodites as being something that “artists fashion”. This could indicate one of two things. Firstly, that Galen felt hermaphrodites were primarily fictitious creatures that form the subject of popular art. Secondly, that by referring to hermaphrodites in art, Galen attempted to create a mental image that his reader would have been familiar with. The latter is most likely as it would be ill advised to assume that despite his lack of descriptions of hermaphrodites, Galen was completely unfamiliar with the condition of hermaphroditism.⁶³

Paulus of Aegina and Hermaphroditism

Hermaphroditism continued to come up as a subject in Greek medical texts right through the Byzantine period. Perhaps the most interesting description of hermaphroditism from this period was provided by Paulus of Aegina. Unfortunately very little is known about the life of Paulus of Aegina. He was a seventh century Byzantine Greek physician who “flourished in Alexandria around the middle of the seventh century”.⁶⁴ Paulus was “a physician of very high repute” and wrote the *Epitomae Medicae* “a medical encyclopedia”.⁶⁵ As a testament to his ability as a physician, Paulus’ work covered “the entire field of medicine” completely with a high level of detail.⁶⁶ Included in his *Epitomae Medicae* is a section devoted specifically to the condition of hermaphroditism. This is

⁶³ For more on Galen and his work see: Nutton, *Ancient Medicine*.

⁶⁴ Plinio Pioreschi, *A History of Medicine, I: Primitive and Ancient Medicine* (Lewiston: Mellen Press, 1991), p. 65.

⁶⁵ Francis Adams, *The Seven Books of Paulus of Aegineta with a commentary embracing a complete view of the knowledge possessed by the Greeks, Romans, and Arabians on all subjects connected with medicine and surgery*. Vol. 3 (London: Sydenham Society), p. 1847.

⁶⁶ Pioreschi, *A History of Medicine*, p. 65. “The last major work of medico-historical value to be done on [Paulus of Aegina] was over a century ago by Francis Adams, whose third and final volume of his great translation of Paul appeared in 1847. The reason for this is simple: to Adams, Paul was transmitting a living medicine, one that could still be used in his daily practice in Scotland, and it was precisely for this reason that Adams, on the basis of his own experience as a doctor, could reach such a sound judgment on the merits of this compiler” (Nutton, *Ancient Medicine*, p. 2). Vivian Nutton, “From Galen to Alexander: Aspects of Medicine and Medical Practice in Late Antiquity,” *Dumbarton Oaks Papers*. Vol. 38, Symposium on Byzantine Medicine (1984), pp. 1-14.

unique in the ancient sources because no other source includes hermaphroditism on its own; rather they mention it briefly and almost in passing. Paulus not only provides a discussion of hermaphroditism, he also describes different forms of the condition and offers a cure for certain forms.

In his section on hermaphroditism, Paulus explained four distinct types of hermaphroditism that he was familiar with:

On Hermaphrodites [...] there being four varieties of it, according to Leonides; three of them occur in men and one in women. In men, sometimes about the perineum and sometimes about the middle of the scrotum, there is the appearance of a female pudendum with hair; and in addition to these there is a third variety, in which the discharge of urine takes place at the scrotum as from a female pudendum. In women there is often found above the pudendum and in the situation of the pubes the appearance of a man's privy parts, there being three bodies projecting there, one like a penis, and two like testicles.⁶⁷

From Paulus' description it is possible to determine what these types of hermaphroditism are called in modern medical terminology. The four distinct types of hermaphroditism that Paulus describes were as follows: The first was characterized by a vaginal type opening appearing at the perineum of the male external genitalia. The second is characterized by the same vaginal type opening this time appearing near the scrotum, likely at the base of the penis. The first two forms of hermaphroditism are most likely defects consistent with male pseudohermaphroditism resulting from "a deficiency of the enzyme 17-hydroxysteroid oxidoreductase" in which the individual has "mildly ambiguous external genitalia" and accompanied by "a blind vaginal pouch".⁶⁸ The third form is characterized by the urethral opening appearing near the scrotum at the base of the penis. This type of hermaphroditism is most likely a condition called hypospadias which occurs in males where the urethral opening is not located at the tip

⁶⁷ Paulus of Aegina, *Epitomae Medicae*, VII 6.69.1.3-11.

⁶⁸ Donald R. Smith, *Smith's General Urology*, Fifteenth Edition. Edited by Emil A. Tanagho, and Jack W. McAninch (New York: Lange Medical Books/McGraw-Hill, 2000), p. 724. The 17-hydroxysteroid oxidoreductase enzyme "utilizes NADPH as a co-factor and catalyzes the reduction of androstenedione to testosterone." This is the "last step in testosterone and estradiol biosynthesis by the gonads [and] involves the reduction of androstenedione to testosterone and estrone to estradiol." The modern medical solution to this type of defect is for patients to be reared as females and the "appropriate treatment is castration, followed by estrogen replacement therapy at puberty" (*ibid.*, p. 724).

of the penis. Hypospadias is characterized by the placement of the urethra on the underside of the head or shaft of the penis, and in extreme cases the urethral opening is found “between the genitals and the anus”.⁶⁹ This form of hermaphroditism is the only one Paulus said to appear in females. It is characterized by the appearance of a penis and testicles above the vaginal opening. This form of hermaphroditism that Paulus claimed occurred only in females is most likely a condition now referred to as male pseudohermaphroditism resulting from pseudovaginal perineoscrotal hypospadias caused by a defect in metabolizing testosterone.⁷⁰ This type of male pseudohermaphroditism can also be accompanied by a blind ended vaginal pouch.⁷¹

In addition to providing a description of the symptoms associated with four types of hermaphroditism, Paulus also provided a brief description of a procedure used to repair the ambiguous genitalia consistent with these types of hermaphroditism:

The third of the male varieties in which urine is voided through the scrotum is incurable; but the other three may be cured by removing the supernumerary bodies and treating the part like sores.⁷²

Although Paulus did not provide a great deal of detail in his description of the cure, he did make note of the one type of hermaphroditism that he deemed incurable. The third male type he describes is most likely a condition known as hypospadias and although in Paulus’ time this is incurable, modern medical advancements have resulted in this condition being relatively minor in terms of severity and of difficulty in correction. Considering that current findings indicate that hypospadias occur in as many as one of every three hundred male births it is not surprising that it is now relatively easy to correct.⁷³ In fact, there is over “150 methods of corrective surgery for hypospadias” most of which are performed before

⁶⁹ Clayman, *The American Medical Association Encyclopedia of Medicine*, p. 72.

⁷⁰ Smith, *Smith’s General Urology*, p. 727.

⁷¹ *Ibid.*, p. 728. “Phenotypically, these patients may vary from those with a microphallus to patients with pseudovaginal perineoscrotal hypospadias. At birth, in the most severely affected patients, ambiguous external genitalia are manifested by a small hypospadiac phallus bound down in chordee, a bifid scrotum, and a urogenital sinus or onto the urethra, immediately behind the urethral orifice. The testes are either inguinal or labial. Mullerian structures are absent, and the wolffian structures are well differentiated” (*Ibid.*, p. 727).

⁷² Paulus of Aegina, *Epitomae Medicae*, VII 6.69.1.11-14.

⁷³ Smith, *Smith’s General Urology*, p. 730.

age two.⁷⁴ The course of action recommended by Paulus for the other forms of hermaphroditism that he described is of particular interest. His only suggestion is to remove “supernumerary bodies and [treat] the part like sores”.⁷⁵

In other words, Paulus recommended that any additional structures or genital parts that are present should be surgically removed from the individual and the area should be treated much like any other wound, presumably dressed and monitored for infection. Ultimately Paulus’ seemingly simple suggestion was to castrate the individual by removing the genitalia that does not suit the gender which that individual has been ascribed. It is difficult to make a comparison between Paulus’ technique for “curing” hermaphroditism and other techniques that may have been suggested in the ancient Greek and Roman world as Paulus was the only physician who provided any details of a cure.

Conclusion

Although the ancient medical writers and physicians had varying ways of explaining the human body in terms of its sex, they were still able to conceive the possibility of a dual-sex or a hermaphrodite condition. Although sex differentiation and sex determination was more complicated than it appeared in the works of Aristotle, the Hippocratics and Galen, these medical writers and physicians provided explanations of sex as they understood it using the methods they had available to them during those times. Given the limited number of hermaphrodite individuals that would have existed in antiquity, it is unlikely that any of the physicians discussed here had ever encountered such an individual. Nevertheless, these physicians were aware of the possibility of such a condition and made note of this in their medical treatises. Aristotle’s view of the body was that the female form is merely a deformity of the male form. The Hippocratics viewed the male and female bodies as being completely different from one another. Galen, taking from both Aristotle and the Hippocratic Corpus, considered the male and female genitalia to be inversions of the same parts. Despite these differing views, the condition of hermaphroditism

⁷⁴ *Ibid.*, p. 619. “All types of repair involve straightening the penis by removal of the chordee. The chordee removal can be confirmed by producing an artificial erection in the operating room following urethral reconstruction and advancement. Most successful techniques for repair of hypospadias use local skin and foreskin in developing the neourethra. In recent years, advancement of the urethra to the glans penis has become technically feasible and cosmetically acceptable” (*Ibid.*, p. 619).

⁷⁵ Paulus of Aegina, *Epitomae Medicae*, VII 6.69.1.13-14.

was present in at least one of all their treatises. This evidence provides a basis from which an understanding of the medical condition of hermaphroditism can be perceived from an ancient physician's perspective.