Hermaphroditic malformation of the external genital organs in the female, with remarks upon the so-called "transverse hermaphroditism" / by John Yule Mackay.

Hermaphroditic Malformation of the External Genital Organs in the Female, with remarks upon the so-called "Transverse Hermaphroditism." By John Yule Mackay, M.D., Senior Demonstrator of Anatomy, University of Glasgow.

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The appearances about to be detailed were presented by a fœtus of about the eighth month of intra-uterine life, kindly put in my possession by Dr. George Dickson. The special abnormality met with is interesting as belonging to a class of malformations which are but rarely seen, viz., the so-called "transverse hermaphroditism," in which the external organs belong more properly to the male sex, while the internal appertain to the female. But the individual case to be described is peculiarly noteworthy on account of its extreme simplicity as compared with others classified under this heading, and standing, as it does, almost half-way between what is usually described as "spurious hermaphroditism" and those complicated cases in which the external organs are entirely male, it affords a very simple explanation of the latter. So far as I have been able to determine, no case showing a similar arrangement of parts has as yet been reported.

The fœtus is about 14 inches in length. The skin over the whole body is greatly thickened and is thrown into rough folds and wrinkles. The hands and feet are clubbed, and the fingers are reduced in number to four upon the left side, and on the right side to three.

Examination of the external genital organs shows the following arrangement of parts:—a penis slightly over an inch in length and about half-an-inch in diameter, and behind the penis a longitudinal groove or furrow extending backwards to the anus, which opens into its posterior angle. The penis is perforated at its extremity by a longitudinal slit of $\frac{1}{6}$ of an inch in length. The extremity of the organ or glans is slightly thicker than the rest, but is marked off by no fold of skin corresponding to a prepuce. The skin over the whole organ is rough and thick, similar in this respect to the rest of the cutaneous surface of the body. The groove behind the

penis is marked by two slightly prominent margins, which on being traced forwards are seen to unite with one another and then to be continued still further forwards, forming the under surface of the penis.

The mesial depression which is contained between these margins possesses in its anterior part a depth of about one-eighth of an inch, and is apparently blind, but further back it shallows to the anus. The whole of the inner aspect of this cloacal depression is lined by mucous membrane, while the lips on their outer surface are covered with skin, continuous with that of the general integument.

The external organs of generation, therefore, present appearances which make it extremely difficult to determine the sex. On the one hand, the presence of a penis of moderate size, furnished at its extremity with a vertical slit, apparently continuous with a canal behind, suggests the male. But, on the other hand, the absence of a scrotum, and the presence in its place of a mesial depression, the walls of which are lined with mucous membrane, throw considerable doubt upon the supposition.

The internal organs are entirely female. The ovaries are small, but distinct, and are contained within the folds of the broad ligaments. The Fallopian tubes are short. The uterus is large and triangular in shape, its walls thickest at the sides, where they are directly continuous with the Fallopian tubes. The cervix is very thick, and opens by a large aperture into the vagina. The vagina, in its upper part at least, forms a large canal, with comparatively strong walls. The whole of the inner surface of cervix and vagina is covered with a mucous membrane of an exceedingly rugose description, the transverse folds being specially marked in the cervix and anterior wall of the vagina.

The bladder is a large thick-walled cavity reaching up the whole way to the umbilicus.

Upon examination, the lower end of the vagina appears at first to end blindly, but, on closer inspection, it is found that it is continued downwards as an exceedingly fine canal for about one-eighth of an inch, and opens into the apex of the median depression before described, situated just behind the root of the penis. Through this small canal a fine bristle may easily be passed, so as to demonstrate the continuity of the vagina with the anterior part of the cloacal aperture.

Turning now to the urinary bladder, it is found that, shortly beneath the entrance of the ureters, a well-marked neck is formed

by a dense band of muscular fibres. The aperture of the neck is comparatively a small one, but immediately beyond it the canal of the urethra presents a large dilatation, which extends forwards for nearly one-fourth of an inch. From the anterior extremity of the dilated portion, two distinct canals proceed. The two canals lie in one median vertical plane, the upper one being a male urethra, while the lower opens into a female urinary meatus. They are nearly of similar size at their origin, but as they pass forwards the male passage becomes very much reduced, while the other maintains its size until its termination. Close to its end, however, in the substance of the glans penis, the male urethra again dilates into a very large cavity, similar to that occupying the same position in many monkeys.

The corpora cavernosa are firmly bound to the rami of the pubes, and pass forwards closely united to one another upon the upper surface of a distinct corpus spongiosum. At its anterior extremity the corpus spongiosum forms the glans which, though apparently very large when viewed from the outside, is, upon dissection, seen to consist only of the walls of a large cavity which occupies its substance opening by a vertical slit at the extremity, and receiving the slender urethral canal behind. There is no bulb, but the corpus spongiosum splits behind into two large vascular masses which surround the lower end of the vagina, circumscribing it so closely as almost to occlude it altogether. Between the two lateral parts of the corpus spongiosum a small median portion passes back for some distance, lying between the male urethra and the passage beneath it already described.

The male urethra, taking its origin, as has been already mentioned, from the dilated portion of the common canal, is at first of a size to admit easily a very large bristle. Passing forwards, however, in the substance of the corpus spongiosum, the canal becomes very much reduced, almost indeed to obliteration as a passage, but before it ends in the expanded portion occupying the glans, it is again considerably dilated. The wall of the urethra consisting externally of firm fibrous tissue and internally of mucous membrane, is easily followed. It is so strong that it may be without difficulty separated from the surrounding erectile tissue and entirely dissected out. The mucous membrane is thrown into several longitudinal ridges which are continued forward throughout the whole length of the canal.

The passage to the female meatus courses obliquely downwards

and backwards through the anterior wall of the vagina, which it finally pierces immediately above the narrow constricted portion which has been already described. The canal is more than $\frac{1}{8}$th of an inch in length, and posseses strong membranous walls. Its diameter is sufficient to allow the passage of a very large bristle. The other organs are of the normal female type.

Looked at from the developmental point of view, the abnormality admits of a simple explanation. The lateral halves of the corpus spongiosum in the male exist as the bulbi vestibuli and partes intermediæ in the female. The corpora cavernosa remain similar in both sexes, except in respect of comparative size. The lower vascular portions differ, however, very markedly in their subsequent development. They are originally vascular plexuses, lying upon each side of the genito-urinary cloaca. In the male they unite with one another across the middle line forming the bulb, and they are also projected forwards on the under surface of the penis, forming by their median junction the corpus spongiosum and glans. In the female only the extreme anterior ends of these plexuses unite with one another as glans clitoridis, the succeeding portions atrophy, while the most posterior portions remain ununited on either side of the genito-urinary aperture as the bulbi vestibuli and partes intermediæ of Kobelt.

The present case shows an intermediate stage of development, the two vascular masses being partly joined and partly still separate. The anterior ends are united as glans penis, the middle portions, usually atrophied in the female, form here a corpus spongiosum as in the male, while the posterior ends, although separate from one another as in the typical female, are yet brought into such close proximity by the persistence and the junction of the parts in front that they have almost completely shut off from the surface the vaginal portion of the genito-urinary sinus. The anterior portion of the sinus is surrounded and carried forwards as the male urethra, while the posterior portion remains as the nearly obliterated vestibule.

The cases which Simpson* has quoted of "transverse hermaphroditism with the external organs of the male type," and which he has included under the heading of "true hermaphroditism," are very readily explained by comparison with this case. The first,

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* Todd's *Encyclopædia of Anatomy and Physiology.* Vol. ii., p. 684.

a case described by Eschricht,* was that of a child. A well-formed male penis was present. The urethra terminated at its extremity and was of the normal male type. There was a scrotum, but it contained no testicle. The anus was imperforate and the rectum opened into the bladder. There was no vagina; but uterus, Fallopian tubes, and ovaries were present; the uterus being firmly bound to the back of the bladder above the spot at which the rectum entered.

The other case of a similar abnormality is described by Bouillaud.† The subject, a person of the name of Valmont, who had been married as a male, presented a penis of medium size. The urethra opened on the under surface of the glans, but was otherwise normal, containing a verumontanum, and being surrounded by a prostate gland. There were, however, no openings of seminal canals. The scrotum was normal but empty. Internally, ovaries, Fallopian tubes, uterus, and vagina were found, the vagina being much constricted towards its lower end and terminating by a small opening in the membranous portion of the urethra.

In both of these cases the abnormal development is of a similar nature to that already described, but it has been carried to a comparatively greater length. The two lateral portions of the corpus spongiosum have united completely, and have thus formed the under-surface of a penis and male urethra. The first case, that of Eschricht, is additionally complicated by an imperforate anus and the disappearance of the vagina following upon the fistulous opening of the rectum into the urinary bladder. In the second case the union of the lateral masses representing the corpus spongiosum has not been quite complete in front, and the urethra opens on the under-surface of the glans.

On the other hand, Simpson *(loc. cit.)* describes, under the heading of "Spurious Hermaphroditism," cases which have evidently arisen from the same process of mal-development—carried, however, to a less extent. Two of these cases of spurious hermaphroditism are interesting in this connection.

The first of these, described by Beclard,‡ was that of a woman in whom the clitoris was enlarged to 10½ inches. The body of this organ was furnished with a canal, the under surface of which was pierced by numerous small apertures. The labia were small, and the aperture between them was blocked by a dense membrane

* Müller's *Archiv. f. Anat., &c., 1836.*

† *Journal Hebdom de Med.* Vol. x. ‡ *Bulletins de Faculté, 1815.*

which almost completely closed the cavity, leaving only a small opening. Through this small hole, however, the menstrual fluid and a portion of the urine passed. Urine also escaped by the cribriform apertures in the floor of the canal on the under surface of the clitoris. The other case, reported by Arnaud,* presented a very similar abnormality, but, unfortunately, was not brought to dissection. The clitoris was almost 3 inches long, and showed on its under surface a depression which seemed to underlie the position of a collapsed urethral canal. Towards the posterior end of the organ, however, this canal seemed to be pervious, as it became distended largely during micturition. The orifice from which the urine flowed is said to have occupied its usual position, but the lower end of the vagina was imperforate, and menstruation took place *per rectum*. An opening into the vagina was, however, made by operation, and through this the menstrual fluid afterwards flowed.

In these cases, as in those already described, there has evidently been a junction of the two vascular masses into an imperfect form of corpus spongiosum, so that the case which I have dissected forms a very natural link between them. They all represent merely variations in the extent of abnormal union between two large vascular plexuses. A question now arises as to whether they should be classified under the headings of true or of spurious hermaphroditism. Fortunately the nature of the process renders the answer simple. In true hermaphroditism the genital glands or ducts of opposite sexes are found coexisting in one individual; but in the class of cases under consideration, the malformation is due simply to the abnormal adhesion to one another of vascular masses which are present in both sexes, coupled with a certain amount of hypertrophy. The whole of that class of cases forming what has been called true hermaphroditism of the tranverse type, in which the external genital organs are present of the male formation, while the internal are female, should be relegated to the ranks of spurious hermaphroditism.

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* *Dissertation sur les Hermaphrodites*, p. 265.