THE CAUSES AND TREATMENT OF STERILITY IN THE FEMALE.

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I. General Considerations.

A CHILDLESS marriage may be the fault of the husband as well as of the wife. Much has been said as to the proportion of cases due to the husband on the one hand, and the wife on the other. It has been said by some that nine times out of every ten the sterility is the fault of the wife; while others state that one-half of all the instances are due to the husband. These statements are exaggerated. The most reliable observations would lead one to conclude that about one-quarter of all the cases arise with the husbands, and three-quarters are chargeable to the wives. It should be remembered that the husband may not be impotent, and may emit seminal fluid during the sexual act, and yet be quite sterile. There may be azoöspermia.

The parts of the female to be considered in studying the causes of sterility are the entrance to the vagina, the vaginal canal itself, the external os uteri, the cervical canal, the internal os uteri, the cavity of the uterus, its cornua, the fallopian tubes, the peritoneal opening of these tubes with their fimbriated processes, and the ovaries. Disease or malformation in any of these structures may be competent to cause sterility. It should also be remembered that from the peritoneal opening at the fimbriated extremities of the fallopian tubes to the os externum the canal is supplied with ciliated epithelium, moving fluid constantly outwards from the peritoneal cavity to the external os. There

is, therefore, a continuous flow of fluid from the peritoneal end of the fallopian tubes to the external os. This flow, together with the movement of the cilia, aids the onward passage of the ovum.

Against this flow of fluid and movement of the cilia, the spermatozoön must make its way inwards. The flagella of the spermatozoön accomplishes this onward movement. At some point in the utero-tubal canal the ovum and spermatozoön meet.

The study of pregnancy shows that impregnation may take place in the tubes, or beyond them, even in the ovary. It is more than likely that the fallopian tubes are the general location where impregnation occurs.

The essential conditions requisite for a pregnancy to occur are:— The formation of a healthy ovum, the meeting of this with a healthy spermatozoön in the upper part of the genital canal, and a healthy condition of the ciliated mucous membrane. We know nothing of the diseases of ovum and spermatozoön. It has been alleged that alcoholism, syphilis, tuberculosis, obesity, debility and exhaustion may give rise to conditions in these products so as to prevent conception. But it is more likely to be true that they cause some abnormal state in the mucous membrane that may be incompatible with the product of conception gaining a foothold suitable for its development.

So far as the female is concerned, sterility may be due to non-impregnation of the ovum, or to the fact that, though it becomes impregnated, it does not mature, but is lost early. Absolute sterility and abortion are very closely connected with each other.

The frequency of sterility among married women varies considerably. In the peerage it occurs about once in every six. In the general community in Britain, one married woman in every eight or nine is sterile. The proportion will be less in this country.

It has been said that over-intellectual development is a cause for sterility, but this has been denied by others, and the view put forth that too great muscular exertion may bring about the condition. These theories are rather vague.

There is what is known as acquired sterility, or what has often been designated as "one-child sterility." There is strong reason for assuming that by far the greater number of these instances is due to gonorrhœa. It has been estimated that perhaps 40 per cent. of the cases of "one-child, or acquired, sterility" is caused by gonorrhœa, while as high as 30 per cent. of primary sterility is set down to the same cause. Thus, gonorrhœa would be responsible for about 70 per cent.

of all cases, and these, according to some writers, almost exclusively due to the male imparting the disease.

II. Abnormal Conditions of the Vulva and Orifice.

Diseased conditions of, and abnormalities at, the orifice of the vagina may sometimes give rise to sterility. Atresia at the vulva is rare. Sometimes there may be a closure of the orifice, causing retention of the menstrual flow, but this can be remedied generally, unless there is absence of the genital organs. There may be cysts of Bartholin's glands, tumors around the orifice, or the rigid and sensitive remains of the hymen, resulting in vaginismus during coition. While these states do not necessarily prevent impregnation they interfere very much with penetration and lessen the chances of fertilization. The removal of the cysts, or tumors, and the dilatation of the vaginal orifice, removing, if necessary, the remains of the hymen, may completely cure sterility due to the dispareunia arising from such conditions. In order to be successful, the stretching of the vaginal sphincter must be thorough and must be repeated until it remains relaxed. It may be well to pack the orifice with gauze, or to insert a dilator from time to time.

III. Preventive Causes Found in the Vagina.

In the vagina itself a number of causes for infertility may be found. There may be atresia or constrictions of the canal. These may be congenital or the result of injury. These conditions may be successfully treated by incisions and dilatations. Another condition of the vaginal canal that may cause sterility is a marked narrowing of its upper end. This has the tendency to prevent the seminal fluid remaining long enough there to enable the spermatozoa to find their way into the uterus. This condition may be overcome by thorough dilatation. Cases are on record where a spasmodic action of the muscular tissue in the vaginal walls caused the premature expulsion of the semen. This may be overcome by a high position of the pelvis during and after coition. Cystocele of the vagina, often due to a ruptured perineum, may be the cause of infertility. Fistulæ in connection with the vagina and adjoining organs are also causes. There may be secretions in the vagina that are injurious to the spermatozoa. The uterine secretion is alkaline and that of the lower vagina acid. When the uterine os is too low down it may bring it into too acid and septic a region. Alkaline douches are useful in such cases, and under such treatment impregnation may occur, by correcting the acidity and removing offending secretions.

In an abnormally deep vagina the semen is deposited at a distance from the os and the walls will coapt, thus emptying the vagina and effectually preventing impregnation. I have a case of this where every manœuver has failed to bathe the os in the semen.

IV. The Relationship of the Uterus to Sterility.

The cause for sterility may be found in the uterus itself. Lacerations, endometritis, fungoids, portions of the retained placenta, resulting from a former labor or miscarriage, may be the causes of acquired sterility. Lacerations must be repaired; granulations and glandular endometritis must be treated by curettage and proper intra-uterine applications to relieve the abnormal conditions present and to render the secretions normal.

Myomatous tumors may result in sterility by causing a chronic endometritis, or by keeping up unhealthy discharges. They may also be the cause of abortions by their effect upon the endometrium or by preventing the proper growth and expansion of the uterus.

An elongated cervix and a stenosed os externum are common causes of the complaint of non-childbearing. The constricted os renders it difficult for the spermatozoa to make their ascent into the uterus. In like manner the elongated cervix produces displacement of the os, carrying it downwards where the conditions and secretions are less normal for the seminal fluid, and where it is more difficult for the spermatozoa to remain long enough for their entry into the uterine cavity. The os should be high up in the vagina and be directed against the posterior wall. Any departure from this position lessens the prospects of conception. Further, these conditions tend to cause an endometritis. These conditions may be remedied by dilatation, curettage and the removal of the elongated cervix. Splitting the cervix has been practised.

Retroflexion, anteflexion, and versions of the uterus must be placed among the causes of absolute and acquired sterility. The displaced uterus is usually carried too low down, bringing the os into the septic and acid area. There are also derangements in the circulation of the misplaced organ, and inflammatory conditions follow, especially endometritis. These are causes for both non-conception and early abortion. These displacements should be corrected by a proper pessary, and it may be necessary to follow this up by a curettage, and some fixation operation upon the uterus.

Sometimes an imperfectly developed uterus may be found. But little can be done for such cases. Treatment that will stimulate the vascularity of the organ may have the desired effect. Packing with

ichthyol and glycerine, the use of electricity, and the employment of massage and hot douches have all had their advocates as a means of increasing the functional activity of the uterus.

The uterus may be of the unicorn or bicorn type, or be congenitally absent. In the unicorn and bicorn uterus, if pregnancy does occur, abortion is likely to take place, or the labor to be complicated.

A very short vagina, one in which there is marked disproportion between the short vagina and the length of the penis, will cause sterility by a spasmodic closure of the os externum, the result of coming too violently in contact with the penis during coition. The os is perfectly normal in this class until irritated by contact with the penis.

V. The Fallopian Tubes.

The fallopian tubes play an important *role* in the process of conception. They are the oviducts that convey the ovum from the ovary to the uterus. They also afford the passage for the spermatozoa upwards to meet the ovum. The fallopian tubes may fail to perform their part through the loss of the ciliated epithelium, by the existence of inflammation, or the pressure of strictures. The vast majority of these cases are due to gonorrhœal infection extending into the tubes, though other infective germs may be responsible for some. When the tubes are in a condition merely of hydrosalpinx, an opening in them and probing the tubes to the uterus may cure the cause of sterility. If, however, the tubes are too distorted and thin this will not prove successful.

When the tubes are in a purluent condition, this method of treatment cannot be resorted to. Their removal is the only course open to the surgeon, and this, of course, ensures permanency of the sterility.

The fimbriated extremity of the tubes may be distorted as the result of inflammation, or they may be walled off and closed by inflammatory adhesions. In fact this may extend inward to the tubes binding it down so as to close the lumen.

VI. The Ovaries.

In these organs several causes for sterility may be found.

Following some fever, there may be atrophy of the ovaries, which renders them incapable of producing healthy ova.

The capsule of the ovary may become thickened from inflammatory conditions in the pelvis, or there may be a deposit of lymph upon their surface preventing the rupture of the Granfian follicles.

Chronic inflammation of the ovaries may render them functionless, or may cause their displacement, preventing the ovum finding its way into the tubes. The opening through the tubes between the peritoneum and the outer world is the source of infection in many cases, and a common cause for pelvic inflammation in women, during the progress of which the ovaries become involved. In the pus-ovary the sterility is incurable. When the ovary is only encapsuled by too firm a membrane or adhesions, these may be stripped off, an opening made in the tube and all the organs raised by a fixation operation. These procedures have been known to cure.

The presence of cysts, or fibroid or malignant tumors of the ovaries may destroy their ovum producing function. In the case of cysts careful surgery may remove them and still leave enough normal ovary to perform its normal duties.

While gonorrhœa is not the only cause for purulent inflammation in the tubes and ovaries, there is no doubt but that it is the greatest sinner in this respect. It is certainly one of the most important causes of sterility through its damaging effects upon the tubes and ovaries, and uterine mucosa.

Careful treatment of ovarian and tubal inflammations by means of medicated tampons, hot douches, rest, hygienic and tonic measures, may enable some women to become mothers.

In every case of infertility where the physician's advice is sought, both husband and wife should be carefully examined. In the case of the wife the entire sexual canal must be passed under review, and the treatment directed to the parts at fault. Impotency, or azoöspermia, would lay the fault upon the husband, while pus tubes would as clearly make it that of the wife. Every avenue of information must be sought out.

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