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PATHOLOGICAL AMENORRHŒA FROM OTHER THAN CONSTITUTIONAL CAUSES, WITH ILLUSTRATIVE CASES. ✓

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In the absence of pregnancy and deteriorated constitutional states, amenorrhœa is by no means a common condition.

From a general point of view it may be classified as of two types, primitive and acquired; and from a physiological aspect each may be considered as due to—(1) Atresia of the canals; (2) uterine conditions; (3) ovarian conditions.

Under the first heading of atresia we may have the block to the exit of the menstrual fluid, situated either in the cervix (atresia cervicis), in the vagina (atresia vaginalis), or at the hymen (atresia hymenalis); this last type may be considered as a variety of atresia vaginalis, but from the differences in its clinical signs it is usually described separately.

I shall merely relate an example of each of these varieties which has come under my notice.

CASE 1.—*Atresia hymenalis*.—K. W., æt. 15, had complained of severe periodic monthly pain for about nine months, which latterly had become more or less constant. She had never menstruated. On examination, a slightly bulging mass projected from the vulva, and per rectum the pelvis was felt to be filled by a fluid swelling, most distinctly felt through the anterior rectal wall. The treatment consisted of excision of a portion of the bulging hymen, through which the tarry, retained menstrual fluid was allowed gradually to drain into cotton-wool for forty-eight hours. After this time antiseptic vaginal syringing was adopted. The patient is now the mother of two children.

CASE 2.—*Atresia vaginalis*.—J. D., æt. 14, complained of a right-sided abdominal swelling about the size of a cocoanut, and also gave the history of having suffered from paroxysms of pain of an irregular nature for nearly a year. Menstruation had not occurred. Examination showed vulva well developed, but no introitus vaginæ. Rectal examination elicited a fluid swelling bulging through the anterior wall about $1\frac{1}{2}$ in. from the anus; the swelling was continuous with the abdominal tumour. The diagnosis being clear, a careful dissection was made, commencing between the anus and urethral orifice. Two loculi were opened into, from each of which escaped a small quantity of thickish yellowish fluid. The lower extremity of the large cyst was then incised, and a thickish glass tube inserted. By this means a large quantity of thick tarry fluid was allowed to drain for forty-eight hours; after this the patient was again anæsthetised, the previous opening was then enlarged, and the cavity washed out with 1-40 carbolic. Into the canal was now fixed a large crystal dilator, which was worn for two months.

The patient was operated on five years ago, and has menstruated regularly ever since. Vaginal examination, however, now shows great contraction of the upper portion of the canal, which with difficulty admits the tip of my forefinger.

It will be noted that, in the evacuation of the contents, slow drainage was employed in preference to immediate emptying and thorough washing out, as I considered by this means a safer adaptation of the distended organs would occur, and thus the danger of tearing possible adhesions to surrounding structures would be minimised. I need hardly add, the strictest antisepsis was enforced.

CASE 3.—*Atresia cervicis*.—B. M., æt. 24, was sent to me by Dr. Haddow of Govan. She complained of having for the last seven years suffered from irregular attacks of pain of a severe nature, situated in the lower abdomen, and chiefly in the right side. Menstruation had not appeared. On vaginal examination, the vagina and vulva appeared normal, the cervix was small and conical, and into it the sound could scarcely be passed an inch. Bimanual examination showed the pelvis to be occupied by a very tender, indistinct, adherent mass, particularly prominent on the right side. The diagnosis made was enlarged, and adherent Fallopian tubes and ovaries, with an atrophic uterus, and removal of the appendages by abdominal section, was undertaken.

The abdomen when opened showed evidence of previous general peritonitis, and the intestines and omentum were found adherent to the anterior parietes. The pelvic swelling was found to be composed of a uterus unicornus. The right horn was very rudimentary, and distended with a tarry substance, while between the layers of the broad ligament a considerable amount of the same tarry material was found, as if it had escaped from rupture of the distended uterine horn. The ovaries on both sides were much enlarged, and showed signs, from the number of blood cysts and extravasations in their substance, of intense congestion. They were embedded in the pelvis by strong inflammatory adhesions. By careful dissection they were enucleated and removed, and the rudimentary horn was divided as near the larger horn of

the uterus as possible, and the contents evacuated. The edges of the sac were then invaginated and stitched together with a continuous suture, and over all the peritoneum was drawn and carefully stitched. The extravasated blood between the layers of the broad ligament was carefully washed out, and the upper edges of the ligament stitched together. As can be surmised, the operation was prolonged and tedious, but the patient, a strong, healthy girl, recovered without an untoward symptom.

The case in its essential characteristics simulates in some degree that described by Dr. Lackie to the Society, and which through his courtesy I had the pleasure of closely observing. In his case, however, the uterus was in a more forward state of development, and the patient menstruated regularly from one horn.

The only feature of special interest in these cases, generally, was the irregularity of the pain complained of. In Case 1 it was markedly periodic, and occurred at monthly intervals, but in Cases 2 and 3 there was no periodicity, long periods were present between the paroxysms; a circumstance which tended greatly to obscure the diagnosis, and in Case 3 closely simulated recurrent attacks of appendicitis.

Of more general interest, from their greater frequency, are those cases of amenorrhœa due to functional inactivity of the uterus and ovaries. In fact, it is questionable if the cases already quoted are true examples of amenorrhœa. They may be properly described as examples of concealed menstruation.

Absence of menstruation, whether primitive or acquired, must, in the present uncertain state of our knowledge of the physiology of normal menstruation, be surrounded with difficulty of explanation. But there are certain known facts which, from a practical standpoint, are of importance in the elucidation of this difficult subject. In the first instance, it is incontrovertible that the ovaries are essential for the institution of the menstrual function; want of development of these organs is always attended with amenorrhœa. In like manner, it must be admitted that a totally undeveloped uterus is always associated with a similar condition. *A priori*, then, one must assume that menstruation is instituted by the development and functional activity of both organs. Development of either alone is insufficient. Puberty may be defined as a phase in female life, associated among other things with principally the development of the sexual organs and instincts. Normally, they are developed coincidentally, but are quite independent of each other. Thus we may have pathological states resulting from irregular development. The imbecile may be developed in her sexual organs as a veritable Hebe, yet at the same time be utterly devoid of sexual instincts. In like manner, sexual instincts may be acute in women totally devoid of functionally active sexual organs.

Further, well-developed functionally active ovaries may be present without any development of the uterus, and *vice versa*.

In these last instances primitive amenorrhœa is present, as evidenced by the following cases:—

CASE 4.—M. F., æt. 25 ; never menstruated ; complained of irregular severe pain in lower abdomen, which had lasted for several years, and incapacitated her from working. On examination, the cervix uteri was found to be extremely small, while each side of the pelvis was occupied by an exceedingly tender matted mass. Abdominal exploration by laparotomy showed an extremely small uterus, about the size of a filbert nut, and on either side an adherent irregular purplish mass. These were removed, and, on examination, were found to be large, congested ovaries and distended Fallopian tubes. Since their removal the patient has been entirely relieved from pain, and is now working steadily. The presence of blood in the Fallopian tubes is of interest in regard to tubal menstruation.

CASE 5.—F. G., æt. 27, married three years ; sterile, never menstruated ; consulted me regarding her sterility and absence of menstruation and leucorrhœa. On examination, the uterus appeared normal, sound passed $2\frac{3}{4}$ in., no ovaries could be palpated. All forms of treatment proved unavailing in instituting menstruation.

In Case 1 we have a typical example of want of uterine development as the cause of amenorrhœa, while in Case 2, which is one of several similar that have come under my notice, it is probable undeveloped ovaries were the cause of the absence of menstruation.

Another class of case of primitive amenorrhœa, of which I have seen several examples, is more difficult to explain, namely, where, as far as can be recognised by examination, both ovaries and uterus are apparently normally developed in so far as size is concerned.

A striking example of this class I saw with Dr. Milne Murray, the patient being a particularly well-developed girl of 22, in whom the ovaries were palpable and appeared normal in size, while the uterus admitted the sound for $2\frac{1}{2}$ in., and in shape and consistence appeared normal also.

The cause of the abeyance of the menstrual function here (assuming that the size of the ovaries and uterus shows development) can only be looked for in the hidden precincts of that great unknown, namely, central nervous system. There is probably here present a much greater influence on the regulation of sexual functions than is generally credited, as we will later see in discussing acquired amenorrhœa.

To the practical physician, cases of primitive amenorrhœa, though doubtless interesting, are from a clinical standpoint unsatisfactory, in so far as successful treatment is concerned. Want of development of an organ, be it organic or functional, is usually beyond the scope of therapeutics. By removal of the organs, as in

Cases 2 and 4, the pain and suffering can be removed; but this is not curing the primary disease, it is merely removing the secondary manifestations. In some instances, however, treatment may be attended with success. These cases are met with as the result of long-continued anæmia and constitutional debility in early womanhood, where, after the anæmia has been cured, a permanent want of functional activity of the organs remains. Much may here be attained by the judicious use of electricity, so long as the organs show little want of development physically. These cases, however, are closely allied to acquired amenorrhœa, under which they will be more satisfactorily described.

Acquired amenorrhœa.—Inactivity of the sexual organs, so far as concerns menstruation, may be the result of impairment of the functions of the ovary, uterus, or controlling nerve centre.

Perhaps the most frequent is the last, and it is one which is too often overlooked. That the sexual organs are intimately associated with and controlled by nervous impulses, is supported beyond controversy; as examples might be quoted, the amenorrhœa of fear after illicit intercourse, the effect of a sudden shock, the inertia which follows depression during labour, or the stimulating action on labour pains of encouragement. Many other examples might be mentioned.

It is to this cause that the delayed or suppressed menstrual function, so frequently noted in girls the subjects of over-study, is probably due, as evidenced by the beneficial effect of prolonged rest from work. It is perhaps not too much to anticipate that the "new woman," in her competition with man, may in due course propagate a race of feminine individuals, who will still further imitate the male by having the menstrual function entirely suspended. Fortunately, however, apprehension on this score is unnecessary, as from want of functional activity in these organs further propagation will be impossible, and the anomaly cease.

Permanent absence of functional activity in the ovaries and uterus, with resulting amenorrhœa, may be induced by a prolonged period of enforced cessation of the menses, through anæmia and other enfeebled constitutional states. The uterus, previously well developed and active in these cases, may from its inactivity become atrophied and small, and the ovaries more or less inert, and it is here that some benefit may be derived from treatment. A similar condition may be met with without any known cause. As an example of several of such cases I have met with, the following may be quoted:—

CASE 6.—Mrs. Y., æt. 25, married four years; no family, one miscarriage a few months after marriage, was sent to me by Mr. Hudson. She complained of amenorrhœa and sterility, the former having lasted for eight months; for a year previous to that time the menses had steadily diminished in amount. She looked and felt in perfect health, and had always been so.

Vaginal examination showed the uterus and ovaries to be apparently normal; the sound, however, entered the uterus slightly short of $2\frac{1}{2}$ knob.

Treatment by the intra-uterine application of electricity, negative pole (Apostoli), was adopted. After four applications, menstruation returned. One period only occurred, the subsequent one was arrested by impregnation, which resulted in the birth of a healthy child.

Acquired amenorrhœa may be also due primarily to want of ovarian activity alone. In these cases the uterus remains for a time, at any rate, normal in size, but in due course diminishes from secondary inactivity. I have here found treatment by ovarian extract in several cases entirely successful, after absolute cessation of menses had been present for more than a year. Particularly beneficial, however, have I found this method of treatment in relative amenorrhœa, where, though not entirely absent, the flow was scanty and the patients suffered from plethora and obesity. One marked case was sent to me by Dr. Simla Paterson, and is worthy of mention.

CASE 7.—Mrs. P., æt. 29, no family; complained of headaches, flushings, great obesity, and scanty but regular menstruation, which for the previous year had lasted for only a few hours each period. She weighed almost 15 stones. Bimanual examination being impossible, the sound was used to examine the uterus, and it was found to pass quite $2\frac{1}{2}$ in. Treatment by ovarian extract was adopted. In the course of ten days a profuse uterine hæmorrhage occurred, accompanied by complete relief of the headache and lassitude. The periods occurred regularly, were most profuse, and lasted over a week, and in three months she had diminished in weight $2\frac{1}{2}$ stones.

Typical cases, such as those I have detailed, cannot but incline one to the view that amenorrhœa may be caused by simple inactivity of the ovaries or uterus, independently of one another. That the organs are in close sympathy with each other there can be no doubt, as is evidenced by the very general though not absolutely certain cessation of menses and atrophy of the uterus following oöphorectomy, which demonstrates the ovarian influence on the uterus. What the action of removal of the uterus on the ovaries is, has yet to be determined.

From this intimate functional connection with each other, a cessation of activity in one would appear to tend towards a similar condition in the other secondarily, and thus a complete incurable condition of amenorrhœa results, or, in other words, a premature menopause occurs. The question of premature climacteric is of great interest in this connection. The normal menopause may be defined as a phase in female life, associated with the cessation of uterine and ovarian functional activity, and subsequent atrophy. Usually this is coincident, but not necessarily so, as evidenced by the prolonged periods of flushings, headaches, and molimia, after cessation of the actual uterine discharge. The

cause of this normal change is as yet one of nature's unfathomable problems, which, as usual in similar conditions, directs one's thoughts to the equally hidden mysteries of the central nervous system. It must be looked upon, however, as indeed all nature's handiwork is, as desirable and irrevocable. Attempts to delay its accomplishment would be as futile as to stem the flowing tide.

Early or premature menopause, on the other hand, must not, however, be viewed in the light of the inevitable, and accepted with folded hands. Although, doubtless, some of these cases may be due to nervous origin, similar to the normal process, and thus beyond treatment, others must be considered as merely examples of want of functional activity in the ovaries and uterus, which, as has been already shown, can be treated if desired with a reasonable hope of success. Here, as has been indicated, the sooner treatment is adopted the more likely is it to be beneficial, as continued inertia tends towards atrophy and secondary changes, which are incurable.

Treatment.—There can be no doubt that in acquired amenorrhœa much may be done in the way of re-establishment of menstruation, as evidenced by the typical cases I have cited.

Uniform success cannot be expected, and repeated failures may have led to treatment being in so many cases unattempted. Further, in many instances it may be open to discussion whether attempts to restore the function are worth while, should the patient describe herself as in good health otherwise. Most women, however, are extremely apprehensive over the absence of their periods, and it is usually poor consolation to assure them of it being a function unnecessary either for life or complete health.

Haphazard treatment is at all times unsatisfactory; cure or failure in one case gives no clue to proceed on with regard to its successor. Until within recent years the galvanic intra-uterine stem was the almost universal treatment adopted, irrespective of the factor in the causation of the disease. The benefits derived by this means were so uncertain, and were obtained at such a risk of peri-uterine inflammation, that it is little wonder that it was generally decided to leave cases alone, and even at the present time there still remains the same disposition among many of the profession. From the medical practitioner's personal point of view, if the patient is otherwise in good health, this attitude is commendable; but should it be the patient's desire, as it so often is, that if possible the function be restored, it is our duty, should there be any reasonable hope of success without any risk to the patient, to treat her accordingly. It is principally with this object, of as far as possible placing the methods adopted on definite lines, that I have brought these observations before you.

Recognising, from what has already been stated, that the condition may be due to defective function of the uterus or ovaries, alone or

together, one must as far as possible first determine which organ is primarily at fault. Defective uterine function is usually associated with diminution in the size of the organ, so-called superinvolution, while in ovarian inactivity of not too long standing the uterus remains more or less normal in size. According, therefore, to the size of the uterus, our line of treatment must vary.

Uterine activity can undoubtedly be very forcibly stimulated by a continuous electric current of 40 to 60 milliampères, the negative pole being inserted into the uterine cavity. That electricity stimulates uterine activity has long been known, and treatment in this direction by the galvanic stem and the faradic current, passed through the lower abdomen, has for many years been adopted. This mode of electrical treatment I have, however, found extremely unsatisfactory, and have consequently abandoned it. On the other hand, with the constant current applied as described, the success I have noted certainly warrants its continued trial.

Where, apparently, ovarian inactivity is the cause of the condition, I have adopted treatment by means of ovarian extract. In these cases the results have been very irregular, but on occasions strikingly successful (see Case 6).

That ovarian extract has a specific action of a beneficial nature, in certain instances, where, after removal of the ovaries, vasomotor irregularities cause marked symptoms, I am quite convinced from observations on many cases. The flushings and headaches, which in those cases are such disagreeable sequelæ to this operation, can frequently be relieved. What the exact physiological effect produced is, so far is unknown, but it would appear that an analogous agent usually present in ovarian activity is absorbed into the system. We must therefore infer that the active principles of ovarian secretion remain unchanged in the extract, and can thus be administered. That this agent is intimately associated with menstruation, is supported by the recurrence of that function, in some cases of amenorrhœa, where the extract has been given. Of three cases in which I have successfully treated amenorrhœa by this means, none have subsequently become pregnant; in two of these only, menstruation continued after the extract had been stopped. It is doubtful, therefore, whether any recurrence of ovulation was attained. Though the results thus acquired have been but partially successful, they seem to warrant future attempts. Particularly beneficial, however, is the use of ovarian extract in diminished menstruation, where the woman suffers from obesity and symptoms of full-bloodedness. In some instances the flow is markedly increased along with amelioration of symptoms, in others the symptoms are relieved without any appreciable change in the amount of the flow; also, in cases where the completion of the climacteric is irregular. When the cessation of menstruation is associated with

similar manifestations of plethora, ovarian extract may often be given with much benefit. The adoption of this method of treatment, even if unsuccessful, has the advantage of the fact that it is entirely harmless, 40 grs. daily may be administered without untoward symptoms, while the usual dose necessary is only 15 grs. per diem.

In justification of the treatment on the lines I have described, I may here mention the results I have obtained. In seven cases of acquired amenorrhœa, from apparent uterine cause, three were absolutely successful: menstruation was permanently re-established, and two of these subsequently have borne children. One case was only temporarily cured, the remaining three being complete failures. In seven cases treated by ovarian extract, two were permanently successful, and one temporarily so, in restoring the function; none, however, have become pregnant subsequently. In all the fourteen cases treated, menstruation had been absent over six months. In one of the cases cured by ovarian extract, intra-uterine electrical treatment was also employed.

I have on five occasions extended the treatment to cases of primitive amenorrhœa; in one of these only has success attended my efforts. As this woman, however, was only 21 years old, though married three years, the case cannot be looked upon as of much weight, as it is possible it was merely an example of delayed menstruation.

All the uterine cases treated were married women. So far I have maintained an attitude of entirely refraining from local treatment for amenorrhœa in the unmarried. Whether this attitude, from purely sentimental reasons, is justifiable, may be questionable; but from the uncertainty of results, due probably to our inability to diagnose the true cause of the disorder, I feel the time has not yet arrived when sentiment can be thus rudely set aside.

From what has been attained by the methods adopted in married women, however, I cannot but maintain that cases of so-called superinvolution or early climacteric should not be accepted as inevitable and incurable, and treated accordingly with folded hands. Should the patient desire that an attempt be made to restore the lost function, a reasonable chance of successful treatment may be held out on the lines I have indicated. It might be that by the judicious use of the negative pole, or even ovarian extract, a peamage might owe its direct succession, and the death duties on the family acres reduced to a third. In any case the restoration of a function so dear to the woman of middle life, if it can be attained, is desirable to attempt. In conclusion, I might be allowed to emphasize the following—

1. That acquired amenorrhœa may be due to functional inactivity of either uterus or ovaries alone, and may in these be treated effectively.

2. That treatment is to be directed along lines indicated by the dimensions of the uterus.

3. That the lines thus indicated are uncertain, from the influences of the central nervous system, which may be the primary cause.

4. That, from the fair amount of success obtained, treatment is justifiable, and should be attempted if the patient so desire.

REFLEX SALIVATION FROM ABDOMINAL DISORDERS.

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THE normal¹ flow of saliva on eating may be partly excited by psychical causes, and partly reflexly by stimulation of the mucous membrane of the mouth and stomach. Everyone knows that the mouth of a hungry person may "water" at the smell, sight, or even thought of savoury food. The reflex flow of saliva from stimulation of the gastric mucous membrane is perhaps a little less clearly proved, for in some of the experiments made on this subject the flow of saliva, apparently excited by placing food in the stomach, might possibly have been of psychical origin, the animal or human being in question having seen or smelt the food. Thus Milner Fothergill² mentions that Gairdner, in a case of severe cut-throat, found that the presence of food in the stomach, without any possible action on the mucous membrane of the mouth, caused a distinct flow of saliva. However, even if the possibility of the psychical origin for the salivary discharge in such cases has not absolutely been excluded, one will hardly doubt that a flow of saliva can be induced reflexly by stimulation of the gastric mucous membrane. At all events, in disordered conditions, the connection between a flow of saliva and gastric disturbance is often very obvious. An intense discharge of saliva may in some persons precede the vomiting in sea sickness and mountain sickness, and in nausea due to dietetic errors, etc. J. P. Pawlow³ suggests that

¹ It is not always easy to draw a sharp line between what must be regarded as a normal flow of saliva, and what must be regarded as abnormal. For instance, salivation during dental operations is common enough, but the facility with which it is induced certainly varies much in different individuals, and probably in the same individual at different times. The relative facility with which excessive salivation is induced may be compared to the relative liability to vomit, which varies much in different individuals, and in the same individual at different periods. Some persons vomit from very slight causes, from slight gastric disturbance, from indulging in a very copious meal, from merely tickling their throats, or from running quickly upstairs after a rather full breakfast. In other persons vomiting is of excessively rare occurrence, and if desired can only be obtained with relative difficulty by the use of strong emetics.

² Fothergill, "The Practitioner's Handbook of Treatment," 4th edition, London, 1897, p. 31.

³ "Die Arbeit der Verdauungsdrüsen," German translation from the Russian, Wiesbaden, 1898.