

Amenorrhoea Traumatica (Atretica)

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UNDER the above name I shall describe a specific type of amenorrhoea which, in spite of its prevalence, has not yet found a fitting place and description in gynaecological literature.

Following complicated labour or abortion a stenosis or blockage of the internal os of the cervix may occur under certain conditions, thus producing amenorrhoea. This amenorrhoea is not functional but organic; ovulation continues but the uterus does not react and the endometrium remains in a state of inactivity. Hormonal therapy is neither reasonable nor effective, whereas simple removal of the blockage is sufficient to restore menstruation to normal.

The diagnosis and recognition of this type of amenorrhoea is therefore not merely of academic interest, but is also important in practical therapeutics.

Aetiology. Stenosis may occur under the following conditions:

(a) Curettage during the puerperium, because of a potential polyp or atony of the uterus.

(b) Curettage for a "missed" abortion.

(c) Single, or repeated, curettage after a spontaneous or induced incomplete abortion.

(d) Curettage for a hydatidiform mole.

(e) Severe postpartum atony without instrumental but with other mechanical interference (manual removal of placenta, intrauterine packing).

Anatomy. The degree of stenosis varies from case to case; from those with complete occlusion, in which even a thin sur-

gical sound cannot be passed, to a slight narrowing in which very little force is needed to pass the usual uterine sound. Clinical manifestations are not dependent upon the extent of narrowing.

Diagnosis. The outstanding feature is the absence of menstruation, though sometimes a slight "spotting" occurs. There may be pain in the lower abdomen and back coming on once a month, even in women giving no previous history of dysmenorrhoea. At the same time the patient develops the usual allergic or vegetative disturbances specific to her menstruation, such as eczema, headaches, rapid pulse, etc., apart from which she feels well. The basal body temperature is biphasic. Upon sounding a block is encountered at the level of the internal os. Bimanual examination is normal except for incidental findings such as myomata, etc., but there is definitely no diminution in uterine size.

Differential diagnosis. Many women suspect pregnancy, but the differential diagnosis is not difficult. It is important to differentiate between the traumatic type of amenorrhoea and the other known types, in order to avoid waste of valuable time on useless therapeutic measures. A careful history with the signs enumerated above serves to prevent error.

Prognosis. The amenorrhoea may persist for months and years. In most cases there is a minimal restoration of the uterine function which will not respond to hormonal therapy, even surgical intervention not exerting any prolonged influence.

Appropriate therapy, however, brings about a return of menstruation, which is not always of the same intensity and duration as previously. In such cases, lapse of time and extent of injury are of major importance.

Further observations are necessary in order to determine the extent of impairment of fertility.

Prophylaxis. In order to obviate the development of stenosis it is advisable to: (a) Inspect the placenta carefully after delivery and, if there is any doubt as to its integrity, make a manual exploration of the uterine cavity; (b) use conservative treatment as far as possible in every case of early or late uterine atony; (c) evacuate the uterine cavity in cases of missed abortion as soon as diagnosed, without waiting weeks or months for spontaneous abortion to occur; (d) secure complete evacuation of the uterus in cases of spontaneous or induced abortion.

If the necessity for an intervention which might possibly cause amenorrhoea arises in spite of all precautions, the patient should be asked to return for a check 6 to 8 weeks later and should be instructed to avoid sexual intercourse meanwhile. If menstruation has not appeared, bimanual examination is not sufficient and a sound should be passed into the cervix to determine its patency.

Therapy. Treatment is surgical and not hormonal. Following suitable disinfection and bimanual examination to ascertain the size and position of the uterus, the cervix is gripped and an attempt made to pass a sound into the uterus. If resistance is met, the attempt is renewed with narrower surgical sounds which have been bent like the uterine sound. If one of these sounds succeeds in passing the obstacle, the cervical passage is gradually dilated, dilatation ceasing when difficulty is met (usually Hegar 7 to 8). This marks the end of inter-

vention, and menstruation will ensue at the proper time, namely 4 weeks after the last menstrual pains or at the end of the second phase of the basal body-temperature curve (provided that measurement of the latter commenced early enough).

If the stricture is so great that even a fine sound does not pass, the operation should be stopped. In most cases the slight mechanical irritation involved in this unsuccessful attempt will prove sufficient to initiate the onset of menstruation, with slight loss lasting a few days only, and returning at regular intervals. If the results do not satisfy the patient or the physician the attempt to pass the sound may be repeated following a period of observation.

Complications. Necessary as gentleness and care are in this measure, the use of a certain amount of force is inevitable. However, any exaggeration in this respect may lead to a perforation of the tissues. When this occurs the operation is immediately suspended and the patient is put back to bed, but may get up and walk about next day without fear of any complications.

Proposed name. Amenorrhoea traumatica, or amenorrhoea atretica.

CASE REPORTS.

The present account omits all reference to the initial cases, in which a suitable method of treatment was sought. The material used is restricted to the period since 1944. During the 3 years 1944-1946, 29 cases of traumatic amenorrhoea were dealt with. These were classified as shown below (Table I).

First place among the causes of traumatic amenorrhoea is taken by postpartum haemorrhage. It was considered important to ascertain the proportion in which the amenorrhoea develops following postpartum curettage, manual removal of the placenta or packing of the uterus after delivery. Unfortunately, the available

TABLE I.
Cases by Causes of Amenorrhoea.

Pregnancy complications	No. of cases	Curettage	Repeated curettage	Manual removal of placenta	Packing of uterus
Metrorrhagia postpartum	11	7	2	1	1
Missed abortion	7	6	1	-	-
Incomplete abortion	8	7	1	-	-
Procured abortion	2	1	1	-	-
Hydatidiform mole	1	1	-	-	-
	29	22	5	1	1

material cannot indicate percentages, not only because there is not enough of it, but also because in most cases the injury had been inflicted prior to the period covered by the report, and treatment only fell within this time; while certain cases had their confinements in other institutions and came to us only for subsequent treatment. Finally, it is not impossible that women injured in our hospital went elsewhere for subsequent treatment. During the years 1944-1946, our department carried out 13 curettages in childbed (5 of these women underwent later treatment for amenorrhoea), 71 manual removals of the placenta (1 treatment), and 6 intrauterine packings (1 treatment). So that it seems that postpartum curettage constitutes the chief factor in the development of traumatic amenorrhoea.

The following cases illustrate the course of the disease, its causes and cure.

CASE 1. Amenorrhoea traumatica following curettage in the puerperium.

L. R., nurse, aged 34. In 1940 she had an abortion in the second month and was curetted. In 1942 normal birth and manual removal of the placenta. On 15th May, 1945, a normal birth and puerperal fever. She was treated with penicillin and discharged after 7 weeks in hospital. A week later she came back with a considerable haemorrhage and a placental polyp was removed by curettage. She reported on 23rd April, 1946, complaining of amenorrhoea, pains once a month, nausea and headache. Her child had been weaned 7 months earlier. Examination showed

the uterus to be enlarged by a small myoma. Uterine sounding was performed on 28th April, 1946. A slight stricture was found at the level of the internal os. A fortnight later menstruation appeared, continued for 3 days (previously 4/28), and has been regular since. Nausea and headache have vanished.

CASE 2. Amenorrhoea traumatica due to repeated curettage during the puerperium.

I. A., aged 31, 2 normal deliveries. About a month after the second delivery she was admitted with a considerable haemorrhage. Curettage was performed and repeated 5 days later. On each occasion fragments of placenta were removed. Blood transfusion was performed twice. Re-admitted on 18th July, 1944. Five months after the second birth, complaining of amenorrhoea. Slight discharge and pains were experienced every month. Uterine sounding was performed and the narrow internal os was dilated. Since then menstruation has been 3/28 (formerly 5-6/28) without pain. Last menstruation 15th September, 1946. Pregnant when seen on 17th November, 1946.

CASE 3. Amenorrhoea traumatica due to difficult removal of placenta.

B. H., aged 33. 1939: craniotomy followed by the development of a vesico-vaginal fistula. Four months later the fistula was repaired, after which menstruation recommenced. 1941: 5½ months miscarriage. 1943: incomplete abortion and curettage.

5th August, 1943, 5½ months miscarriage, 36 days after rupture of membranes and manual removal of a firmly adherent placenta.

Following this there was amenorrhoea. 26th January, 1944: attempted sounding produced a perforation. Thereafter menstruation was normal. 29th October, 1944, not yet pregnant; sound

passed without difficulty. 8th May, 1945: Rubin test positive. 16th October, 1946: induction of premature labour at eighth month, a week after intrauterine death of the infant. Since then, menstruation normal.

CASE 4. Amenorrhoea traumatica due to intra-uterine packing.

T. H., aged 33. Married 9 years. In April, 1940, she had a forceps birth and postpartum haemorrhage, which required packing of the uterine cavity and blood transfusion. Since then, menstruation has been absent. Intensive hormonal treatment had no effect. On 17th July, 1944, a uterine sound was passed. Two obstacles were found, one at the level of the internal os, and the second, more obstinate, at the height of 2 in. (5½ cm.). After passage was forced the sound penetrated to a depth of 3 in. (8 cm.). Dilatation up to Hegar 9 and curettage was done, no material being obtained. After this, menstrual pains were experienced every month and there was a slight pink discharge, but no menstruation. Hormonal treatment, diathermy and autohaemotherapy were all tried but without effect. On 25th December, 1946, there was a second soundage, with similar findings and measures. A little material was withdrawn by curettage, and upon microscopic examination atrophied mucous membrane was found. Since then she has had 2 days of weak menstruation monthly. Her temperature is biphasic all the time. We are preparing to conduct a third soundage, leaving a swab soaked in sterile paraffin in situ for a day or two.

The cause which is second in importance is missed abortion. During the period covered by this report, 207 cases of missed abortion passed through our department and were treated by curettage. This number is very high, and can be accounted for by the exaggerated use of progesterone in cases of impending or commencing abortion. Cases of amenorrhoea following missed abortion numbered 7, but here, as well, it was impossible to calculate percentages for the reasons given above. In one case 1½ months had elapsed between the death of the ovum and the curettage, 3 months in another case; more than 4

months in 3 others; while in respect of the remaining 3 cases information was not sufficient.

The small number of cases does not allow any conclusions to be drawn as to a definite relationship between amenorrhoea and length of time during which the dead ovum remains within the uterus. More uncommon are cases of amenorrhoea following normal abortions (natural or induced) or mole. Of this group I shall quote only 1 case.

CASE 5. Amenorrhoea traumatica due to curettage after incomplete abortion

D. S., aged 41, married ½ a year. Four years ago she had peritonitis suppurativa following appendicitis, later complicated by empyema. Operated on 3 times. During sickness and convalescence, menstruation was absent for 7 months, but afterwards returned. In June, 1946, there was a natural abortion in the third month followed by curettage at the Hadassah Hospital without complications. On 20th September, 1946, she was readmitted, stating that since curettage there had been menstruation. At the Sick Fund dispensary she had received Di-Menformon and Progestin treatment without effect. A slight left version of the uterus was found, with a myomatous node about as big as a plum on the right side, and slight enlargement of the right ovary. She was ordered to take her basic temperature for 2 months and to wait, in case menstruation returned meanwhile. Temperature was biphasic, the end of the second phase being marked on each occasion by menstrual pains, without loss.

On 18th November, 1946, she was admitted to hospital and sounding performed. A stricture was found at the level of the internal os. Dilatation to 6½ Hegar was performed, followed by curettage. Microscopic examination (by Dr. Casper) showed somewhat enlarged glands with no indication of secretion. Cyclic changes could not be observed.

On 30th November, 1946, there was blood for 1 day. On 19th December, menstruation for 3 days, preceded by temperature of 39°C. (102°F.), accompanied by considerable pains. On 14th January, 1947, there were 3 days of normal menstruation. Since then, menstruation has been normal.

RESULTS OF TREATMENT.

Mechanical treatment proved immediately successful in all save 2 cases. Menstruation reappeared in the same month. Table II shows the results.

In 18 cases normal menstruation was

August, 1945, incomplete abortion. Curettage was performed and repeated on 7th September, 1946, on account of continued loss of blood. A week later—3 days loss, and a fortnight later—4 days loss, since when no menstruation.

On 27th November, 1946, an attempted sounding produced a perforation. Since then there have

TABLE II.
Duration of Amenorrhoea and Results of Treatment.

Duration of amenorrhoea	No. of cases	Normal menstruation	Hypomenorrhoea	Delayed onset
3 months	5	3	1	1*
4-6 "	12	9	3	-
7-12 "	5	4	1	-
1-2 years	3	1	2	-
2-5 "	2	-	1	1
5-8 "	2	1	1	-
	29	18	9	2

* Sounding unsuccessful, perforation of uterus.

restored, though in some it weakened in due course. There was an appreciable difference between the previous and the renewed menstruation in 9 cases, in several of which the mucous membrane was examined. Little material was removed, and this showed a characteristic picture on microscopical examination (by Dr. Casper). Besides the area in which cyclical phenomena were well developed and adequate, other areas were found in which only proliferation could be recognized, while secretion was inadequate; and other areas showed scar tissue changes and closed inactive glands.

In 2 cases menstruation in weaker form recommenced only after several months had passed. In 1 of these (Case 4), the amenorrhoea lasted for almost 5 years until sounding was performed. In a second, to be described below, sounding was unsuccessful and led to perforation.

CASE 6. Amenorrhoea following repeated curettage.

N. D., aged 32, married 12 years. Previous history: therapeutic abortion, normal delivery (5 years ago), spontaneous abortion. On 5th

been pains for 2 days each month. Since 17th June, 1946, monthly menstruation lasting 3 days with small loss of blood.

Special attention should be paid to the following case, in which the sounding was effective and restored the menstrual cycle. Because of the renewed stricture, however, blood was retained within the uterus, thus producing haematometra. Only after the obstacle was dealt with a second time did the collected blood leave, since when menstruation has been normal. This case has been included in the column "normal menstruation".

CASE 7. Amenorrhoea traumatica following repeated curettage.

B. B., aged 38, reported on 6th August, 1946, married 8 years, 2 previous deliveries. Induced abortion 6 months earlier, followed 2 weeks later by recurettage on account of strong haemorrhage. Menstruation absent since, but slight pains return every month. Pills and injections ineffective. Examination shows retroflexion of the uterus. Instructed to take basal temperature. 27th October, 1946, biphasic temperature. No menstruation. Sounding. At the level of the inner os the sound met with resistance and was forced

through. Depth of uterus 3 in. ($7\frac{1}{2}$ cm.). Dilatation to $7\frac{1}{2}$ Hegar. 6th December, 1946, no menstruation. No change in basal temperatures. Second passage of sound meeting with the same obstacles. After bursting the barrier blackish blood comes out of the uterus. Since then menstruation has been regular, lasting 2 days monthly.

In 2 cases the sound entered the abdominal cavity. In 1 of them (Case 3), menstruation appeared at the proper time and continued normally until interrupted by pregnancy. In the second (Case 6), it appeared in attenuated form, following a delay of 3 months. In 1 case (Case 8), we were unable to force the barrier and the measure was suspended. Menstruation appeared at the normal time and continued regularly as hypomenorrhoea. Twelve weeks later the measure was attempted again, but without success on this occasion too. The form of menstruation did not change.

CASE 8. Amenorrhoea traumatica due to curettage in puerperio.

H. G., aged 33, married 9 years, normal delivery 7 years before. Second delivery on 25th July, 1945. Three weeks later considerable haemorrhage, curettage (placental polyp). Since then menstruation has been absent. Pains monthly in the lower abdomen, lasting 2-3 days.

8th May, 1946. Unsuccessful attempt to pass sound.

20th May, 1946. Menstruation lasting 24 hours.

16th June, 1946. Menstruation lasting 2 days.

18th July, 1946. Menstruation lasting for $1\frac{1}{2}$ days, with considerable pains.

29th July, 1946. Second attempt to pass sound, again unsuccessful.

Thereafter menstruation continued as described above.

In summing up it is necessary to stress the fact, emerging in Table II, that when amenorrhoea lasted up to a year, the ratio between normal and weak menstruation was 16:5. In cases where it continued longer the ratio was 2:5.

PREGNANCY FOLLOWING AMENORRHOEA TRAUMATICA.

The observation period of 3 years is too brief for any definite opinion to be expressed in respect of pregnancy following traumatica amenorrhoea.

It will therefore be sufficient to report the facts.

Up to the present, information is available on 10 cases of pregnancy, which constitute a relatively high percentage. In 6 menstruation was normal after treatment and prior to conception. In 4 it was weak. Two pregnancies have not yet reached their term. Two ended in natural abortion, 3 in missed abortion, 1 in death of the child within the womb in the eighth month. One birth was normal with manual removal of placenta, and 1 required Caesarean section.

The large proportion of irregular pregnancies is striking. Most cases showed grave irregularities in previous pregnancies as well, hence these phenomena do not need to be attributed purely to the effects of the measures taken.

DISCUSSION.

Amenorrhoea developing because of injury, and its simple treatment by passing a sound and dilatation, raises a number of questions the answers to which cannot, for obvious reasons, be supported by anatomical and histological examination of the affected organs. Any attempt to classify them can therefore be based only on theoretical assumptions.

The first question is how to explain the stricture in the vicinity of the inner os. The generally accepted view that undue or sudden force used in the dilatation preceding curettage may cause definite cervical injury, and that curetting the cervical canal vigorously will denude the opposed cervical folds, leading to agglutination and stenosis, might be correct in isolated cases,

but cannot serve as a general explanation. Our material includes 2 cases in which there was neither dilatation nor curettage, and 11 cases in which only curettage was performed. Apart from which the walls of the uterus, and not those of the cervix, are curetted.

In our opinion, under certain conditions, the uterus reacts to curettage by tetanic contractions, which may pass after a few moments or hours, but may also continue so long as to become permanent. The contraction of the circular muscles round the uterine os, causes the os to narrow at the close of any abrasion. In the cases under consideration here, prolonged spastic stricture becomes organic in the course of time. The mechanism may be compared to that which affects the blood vessels in toxæmia of pregnancy.

This pathological reaction of the uterus is the outcome of a graver injury than usual, such as repeated curettage or deep curettage for missed abortion (in which it is sometimes difficult to differentiate between organized placenta material and uterine muscle), or as a result of a normal or even very slight injury when the uterus has been harmed by large-scale hæmorrhage.

The second question is: Is the mechanical factor of narrowing the uterine os sufficient to account for absence of menstruation? The reply would be in the affirmative if this mechanical factor were to inhibit the hormonal cycle, or if the blood were to accumulate behind the stricture with the development of hæmatometra.

The actual facts, however, point to neither one nor the other. The hormonal cycle is not affected and ovulation remains normal. In all cases basal temperature remains biphasic; and menstruation reappears punctually at the end of the second phase, if the obstacle is removed during the cycle. What is affected is the reaction of the uterus to hormonal stimuli. The inter-

esting phenomenon known as non-ovulating bleeding, in which regular menstruation appears despite absence of ovulation, has long been familiar. What has been described above is the precise antithesis, an absence of menstruation in spite of regular ovulation, a sort of "ovulating non-bleeding".

The endometrium remains in a state of entire quiescence for a long time, sometimes for years on end. It is restored to activity as soon as the sound is introduced into the uterus; sometimes even when nothing more is achieved than an attempt to introduce it.

This would be impossible without involving the nervous system; and we must assume that both inhibiting and restorative stimuli are transferred by the reflexes to the point where their effect is exerted. This hypothesis also makes it possible to understand the traumatic amenorrhoea which is occasionally met with from a different source, namely, the amenorrhoea following the development of a vesicovaginal fistula, which vanishes rapidly after surgical repair of the fistula. In this connexion, mention should also be made of an analogous phenomenon in the field of urology; reflex anuria as a reaction to a stone in the ureter.

AUTHOR'S ADDENDUM.

Some time after completing this paper I came across an abstract (published in the *American Journal of Gynecology and Obstetrics*, 53, 1060, 1937). The author has kindly supplied me with a copy of the original paper (Stamer, S. "Partial and Total Atresia of the Uterus after Excochleation", *Acta Obstetrica and Gynecologica Scandinavica*, 26, 263-297, 1946).

The author gives a brief review of 37 cases of uterine atresia published between the years 1894 and 1933, 20 of them by B. Bass in 1927, the others by a number of

authors, among them classics like Wertheim, Kustner, Fritsch, Veit, Halban and others.

To the above cases he adds and details 24 cases seen by him in the Gynaecological Department 1 of the Rigshospital in Copenhagen during the past 2 years. His conclusions are in many respects similar to mine. But his conception of the mechanism of atresia deserves some criticism.

Stamer believes that a too energetic abrasion removes a thin layer of the musculature and thus produces a condition favouring occlusion.

As I have pointed out above, we have to revise this old viewpoint, and have to find an explanation suiting not only the exceptional cases of mutilated uterus, but every case of stenosis and atresia following curettage, and this I have tried to do in the discussion.

Stamer believes that the menstrual flow continues undisturbed behind the blockage:

On exploration the uterus will sometimes prove to be enlarged by haematometra, but in most cases it will feel normal in size or even a little diminished. If the uterus is enlarged it means that it has not been able to get rid of the menstrual products formed every month. These products remain in the uterus and increase in amount from month to month, bringing about a distension of the uterus, which thus increases in size and thus may simulate a condition of pregnancy. In those cases in which the uterus is of normal size or a little diminished the menstrual products are every month evacuated into the tubes. Under such conditions no haematometra is formed, but why the uterus then often feels small is difficult to explain.

In most cases the tubes appear to be perfectly normal, but sometimes they are transformed into haematosalpinges, and all transitions may be encountered from slight thickening of the tubes to large massive intumescences which, in connexion with adhesions, may completely fill the pelvic cavity. In those cases in which the uterus evacuates its contents into the tubes, and the

latter evacuate the greater part of the contents through the abdominal ostium into the peritoneal cavity, the uterus and tubes will feel normal—or, as mentioned, the uterus will sometimes appear a little small. In these cases the menstrual products may be absorbed from the peritoneal cavity or—if the menstruation is more profuse—settle in the pelvic cavity, where eventually they may undergo organization and perhaps in certain cases give rise to the formations of adhesions.

In cases where the menstrual products do not pass out into the peritoneal cavity—either because of changes in the tubes as salpingitis and similar phenomena, or because the menstrual products contain some flakes too large to pass even through normal tubes, or a combination of both factors—haematosalpinges will result. If the obstruction to the passage is located laterally in the tubes, haematosalpinges will first develop, and later be followed by haematometra. If the obstruction is located medially in the tubes or even at the uterine orifice, only haematometra will result.

This description is in contrast to the real findings, even in Stamer's own cases. He never met a haematometra and only in 3 cases "a tender and soft intumescence of one adnex" and in 3 cases one adnex "a little thickened and tender." Bass, who published 20 cases of cervical atresia after induced abortion "never found the lesion associated with haematosalpinges or haematometra." The same applies to our cases.

Moreover, it is an indisputable fact that in the many instances when the endometrium was examined immediately after breaking through the atresia, no cyclic changes could be observed. We must, therefore, conclude that Stamer's supposition of the occurrence of menstruation is erroneous.

But for these differences, which mainly concern the mechanism of the disturbances, we have both reached the same conclusion, about diagnosis, treatment and the frequency of the disease hereby titled: "Amenorrhoea traumatica".