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BY

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On the so-called Fatty Degeneration of the Placenta.

By James M. Cowan, M.D., Edinburgh.

The subject of fatty degeneration, ever since the microscope came to be extensively employed in pathological investigations, is one which has much engaged the attention of the morbid anatomist. We have had described, and no doubt very properly, fatty degeneration of the heart, kidneys, and liver; not to speak of those instances met with in the arteries, effused lymph, and extravasated blood, with which every pathologist must be familiar. At one time, indeed, there seemed to be a general tendency to refer every lesion displayed by the scalpel of the anatomist to the category of fatty degeneration—so much did this seem to be the case, that the phrase became a sort of by-word, and served as a synonym for every morbid condition that seemed mysterious, or was found difficult of explanation.

In the course of time, however, as a result of the conjoined labours of the microscopist and chemist, certain tests were discovered easy in their application, and, as some imagine, of unimpeachable accuracy, the mere application of which, if followed by certain effects, was held to determine whether the lesion under dispute should be regarded as an instance of fatty degeneration or not.

Thus the microscopist detected the highly light-refracting quality of the fatty granule, and its invariable simplicity of form and structure—characters, deemed by him almost sufficient of themselves to demonstrate its pathological significance. To these, however, the chemist added a third, which the former by way of confirmation almost habitually employs, although some—and it would seem with reason—have doubts as to its real importance and value. I of course allude to the solvent action of sulphuric ether on all bodies into

whose composition fat enters as an important element. It may be added that if the mere appearance presented to the naked eye be trusted to as a criterion of the existence of this lesion, it will, with very few exceptions, even in the hands of experienced pathologists, almost infallibly lead into error. Fat, as is well known, is met with in the human system, both as a normal and abnormal element. In the shape of adipose tissue it is extensively diffused throughout the body, and serves many most important purposes. This amount of natural fat must not, however, exceed certain limits—if it be excessive, or present itself in situations where normally comparatively little fatty tissue is to be found, then it becomes a diseased condition, known to pathologists under the title of "fatty deposition." Of this we have a striking example in the case of the heart. Again, certain of the tissues of the healthy body, as muscular fibre, sometimes undergo a peculiar transformation, in whose ultimate composition fat can be recognised both microscopically and chemically. Seeing this transformation is attended by certain morbid phenomena, it is not unreasonable to consider it as a degeneration; hence the phrase "fatty degeneration." Other distinctions exist between these, somewhat allied and often confounded conditions; thus the one can be detected by the naked eye, the other needs for its demonstration the assistance of the microscope—the one presents an arrangement of minute vesicles lodged in the meshes of areolar tissue, the other an aggregation of corpuscular forms, not individually defined. It is necessary to bear these distinctions in memory, for the two phrases have been used synonymously;[1] and as the placenta is an organ in whose intimate composition fat cannot be detected, even by the refined processes of chemical analysis,[2] we perceive at once it cannot be the subject of fatty deposition, provided the limitation just stated to that phrase be admitted as correct.

One other remark I wish to preface, which seems to be called for by the vagueness with which some pathologists express their ideas, and it is this,—that in applying the phrase "fatty degeneration," to a morbid condition of any organ, it is intended to represent that the true and essential component structures of that organ and not the product of any morbid action that may have been accidentally excited, as exudation or extravasation, have been transformed into fat. In saying the heart and bloodvessels are in such a state, it is usually understood the muscular fibrillæ in the one, and the true com-

[1] See Report of London Medico-Chirurgical Society (*Lancet*, May 24, 1851.)

[2] According to Mr Hassall's statement.

ponent tissues of the walls of the other, and not the blood or nerves supplied to those organs, have undergone such a degeneration. So, in speaking of "fatty degeneration of the placenta," it is to be presumed to signify, the villi, that is the true and essential structures of the organ, have undergone such a morbid process.

It is with a view of precision in thought and expression, to avoid misunderstanding, I have entered into the above few explanations, and shall now proceed to consider the so-called fatty degeneration of the placenta, with the object of pointing out what seems to me to be its true pathology. Having had occasion two years ago to peruse a communication read by Dr Barnes to the London Medico-Chirurgical Society on this subject, my attention has been for some time applied to its investigation; and as, after a rather extensive examination of specimens, and careful inquiry into the general facts of each case, I have been led to a different conclusion from that arrived at by Dr Barnes,—and the subject seems invested with a great pathological, not to speak of therapeutic importance,—I venture to lay before the profession the results of my investigation.

In Dr Barnes' paper, as reported in the *Lancet*[1] (May 24, 1851), two cases of this lesion are given, with an account of the symptoms experienced by the mother during utero-gestation, and of the examination of the diseased placentæ after they had been expelled from the uterus. Dr Barnes then, in some comments upon the cases, goes on to state "that he regards the occurrence of this change of structure in the placenta as highly interesting, both to the pathologist and obstetric practitioner. . . . . The conversion of portions of placentæ into solid unyielding structure, and the consequent imperfect attachment of these portions and the surrounding healthy structure to the womb, give rise to hemorrhage, and premature labour may occur possibly during the life of the child." From this statement we are led to infer that Dr Barnes regards the essence of this lesion to consist in a degeneration of the proper tissues of the placenta; that is, of the villi into a fatty abnormal matter. What I wish to point out is, that the appearances presented by this morbid condition, and described by Dr Barnes, in most respects accurately, are capable of a totally different explanation; in short, it is not the villi of the placenta, but some of the constituents of blood which have become extravasated into its substance, that have undergone this so-called fatty degeneration; and

[1] This Paper is now published in the Society's Transactions, vol. xxxiv.

that, consequently, we have to do with the results of a hemorrhage into the placenta.

The facts upon which this opinion is based will be found to be derived from two distinct sources :—

1*st*, From the general and minute examination of the diseased structure ; and,

2*d*, From a consideration of the causes of the lesion, and the symptoms experienced by the mother previous to the expulsion of the placenta from the uterus.

It may be here stated I have heard it objected to accepting such evidence as the narration of symptoms experienced by a patient, and the account of her general state as certified by a physician, in support of a pathological question. But I need hardly say, considering the intimate and interesting relation the placenta stands in to the female economy, it would be a most anomalous circumstance indeed in the history of medicine, to find any great disease of this organ without some corresponding constitutional derangement.

3*d*, After stating the facts under each of these divisions, I shall discuss the views that have been taken of the pathology of this lesion, and hope to shew that that of the fatty degeneration of the constituents of extravasated blood is the only explanation comprehensive enough to account for the whole phenomena, and as such is entitled to our support.

I.—*The general and minute examination of the diseased structure.*

In my own experience I have met with ten cases of this lesion. If to these be added the two reported by Dr Barnes, and one mentioned by Professor Kilian of Bonn, an abstract of which appeared in the *Medico-Chirurgical Review* for 1851, we collect together thirteen cases.[1]

Let us first examine a placenta which affords a well-marked and advanced specimen of this lesion. The first glance of it will suffice to shew two very distinguishing characters, —a diminution in size, as compared with the organ in a healthy state, and an excessively bloodless appearance. The former holds true both as regards the thickness and breadth of tissue. I have seen specimens which did not exceed in size the half of the normal placenta, and which were expelled from the uterus at the full term of utero-gestation. It not only, however, appears of diminished proportions, but

[1] Ten additional cases have been cited in a recent paper by Dr Barnes, in the 30th vol. of *London Medico-Chirurgical Society's Transactions*.

also much more compact than normally; in place of its spongy, loose, and soft appearance in health, it seems contracted and condensed in bulk, as if atrophied. When taken into the hand these characters are more distinctly brought out. In some points it feels very condensed and indurated, like a piece of boiled liver—to use the simile employed by Ruysch;—hence from the anatomists of the last century it received the appellation of "scirrhous." Its colour is yellowish-white; not a trace of the usual dark red, congested appearance of the healthy organ is visible. From this it is evident very little blood can have circulated or been contained within its vessels. Both the fœtal and maternal aspects of the organ present an unevenness of surface, and appear studded over with little projections, separated by sulci; some flattened, others more or less conical,—perhaps most distinctly so underneath the amnion; hence it has been described as "tuberculated." If the disease be principally situated between the chorion and decidua—for it is met with in one or both of two positions, either amid the true tissue of the placenta, or between the chorion and decidua—then the uterine surface will be comparatively smooth, for the blood coagulating has filled up the sulci. The characters of condensation and induration I consider owing to the extravasated blood having undergone coagulation, and the anæmic appearance to the effect of these coagula pressing upon the bloodvessels, and so obliterating the circulation. The degree of condensation and anæmia will be in proportion to the extent of the extravasation. I have seen it confined to one spot not exceeding one inch in diameter, and again so extensively diffused that it became impossible to find a remnant of structure presenting the usual colour and degree of consistence of the healthy tissue of the placenta. It is likewise to be anticipated, that the longer the placenta has remained within the uterus, after the occurrence of extravasation, the greater will be the degree of induration, for the farther advanced is the process of coagulation. Frequently, and most especially in those cases in which more than one extravasation has happened, we find the uterine surface covered with thin layers of coagulated blood, which can be easily separated the one from the other, like the coats of an onion. When a section is made through a thick deposit of these layers, the same appearance is presented as in a section of any aneurismal tumour in which some coagulation has taken place. These laminæ are found to extend even between the membranes and internal surface of the uterus, particularly in

those cases in which hemorrhage *per vaginam* has occurred during utero-gestation. It is found impossible to inject placentæ so affected; the bloodvessels are so compressed they cannot allow of the penetration of the matter of the injection, and on the employment of the slightest amount of force their walls speedily rupture.

On making a vertical section through the diseased portion, a sensation is imparted to the hand as if the knife were being made to penetrate something hard and resisting like a fibrous tumour. On looking at the surface of the section with the naked eye, we perceive here and there spots of a yellow colour and granular in appearance, by scraping which gently with the point of the knife we disclose the villi of the placenta, very much condensed and altered in appearance, but still preserving their true form, and not at all broken up. In the neighbourhood of these spots we find little deposits of a much harder consistence, not very accurately defined in outline, of a pale yellow colour, and not at all granular, but smooth in aspect. On breaking up one of these masses, we find in the centre bodies presenting quite the appearance of those already described,—only the villi are in much fewer numbers, present their usual form, and appear even more compressed than in the former situation. Offshoots are sent from these deposits in all directions, surrounding and compressing the villi. In certain specimens we are enabled to trace the gradual steps of coagulation the blood has gone through from a recent fluid state, presenting its usual dark scarlet colour, up to the transformation into a yellow deposit of no inconsiderable consistence. In one part of a placenta we meet with a deposit of quite recent fluid blood; in another some of the colouring matter has been absorbed, but it is still soft and not much altered in appearance; in a third we find a kind of encysted clot consisting of a nucleus of yellow fibrine surrounded by clear serous fluid; while lastly—and this is the most advanced stage in the process—we find a hard yellow mass of semi-cartilaginous density. It is rare to meet with true encysted coagula; according to my experience they are seen in one situation only, that is, between the chorion and decidua: the clot had so pressed upon the villi as to form a little cup-shaped depression; in which it was deposited and lined by an apparently serous structure. In some cases of very partial occurrence of this lesion, we meet with small rounded masses imbedded in the substance of the organ, quite hard and isolated to touch, surrounded by healthy soft compressible tissues, which on section present no cyst-wall, but still shew a distinct and

amorphous granules, which on the addition of nitric acid are completely dissolved. In the specimens, again, of this lesion in which we can trace with the naked eye the changes the blood undergoes, and of which a delineation has been given by Cruveilhier,[1] the microscope in one part detects the ordinary red blood-corpuscle of its usual form and size; in another spot these become less numerous, and shew a more corrugated external wall, and are mixed up with other cellular bodies of an irregular form, containing neither nuclei nor colouring matter; in a third place, these last are seen occurring in connection with oleo-albuminous granules, which, in a fourth portion of the diseased structure, form the only object in the field of the microscope.

Such is the result of the general and minute examination of placentæ affected with this lesion. From it I would deduce the following conclusions:—

1*st*, That this is a morbid condition denoted by a peculiar condensation and consequent atrophy of the true placental tissue; 2*d*, By a degree of anæmia—characters explicable on mechanical grounds. 3*d*, Under the microscope certain bodies are seen which can be traced as transformations of certain of the constituents of extravasated blood, and which present a characteristic behaviour under the action of chemical tests,—oleo-albuminous granules, in short, which are met with in no other morbid state of this organ with which the pathologist is as yet familiar.

II.—*The causes of this diseased condition, and the symptoms observed during utero-gestation.*

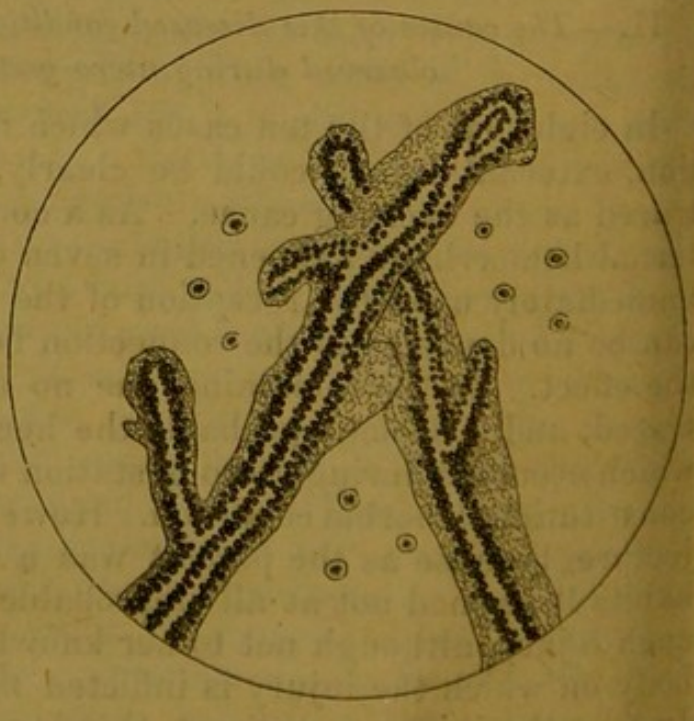
In eight out of the ten cases which fell under my observation, external injury could be clearly, with one exception, traced as the exciting cause. As a consequence of this, external hemorrhage happened in seven of these cases almost immediately upon the reception of the injury, so that there can be no doubt as to the connection between this cause and the effect. In the remaining one no direct injury could be traced, and it seemed probable the hemorrhage *per vaginam* which occurred during utero-gestation was due rather to some constitutional morbid condition. However it is matter of conjecture, because as the patient was a woman of abandoned habits it seemed not at all improbable that she did sustain such injury, although not to her knowledge. The part of the body on which the injury is inflicted may vary in each case. In four the injury was direct, that is to say, inflicted on the abdominal region. In three it was indirect, that is, received on other parts of the body not in immediate relation with the

[1] Anatomie Pathologique, tom. i. liv. 16

uterus. The effect of the injury is to produce a sudden and abrupt contraction of the uterine fibres, which causes a rupture of those vessels which form the bonds of connection between the uterus and placenta; the hemorrhage of course will be in proportion to the extent of the laceration. If this explanation be admitted we at once get rid of the difficulty Dr Simpson experienced in assigning the particular source of hemorrhage in what Cruvelhier has called "apoplexy of the placenta." Such external injury, if this be its mode of operation, can have no effect on the umbilical vessels.[1] In the normal contractions of the uterus the pains gradually increase in intensity up to a certain point, at which they attain a maximum, and from which they gradually decline. I apprehend it is in consequence of this arrangement that in natural labour laceration of the utero-placental vessels takes place so rarely. That such an occurrence does sometimes however occur is undoubted. In the North of England Medical and Surgical Journal is reported a case in which a woman died suddenly during parturition, and on the *post-mortem* examination a coagulum of blood was found between the placenta and the fundus of the uterus, which weighed 18 oz.

In the remaining two cases of the ten the lesion seemed to owe its existence to a condition of the bloodvessels ramifying in the villi of the placenta, which has never yet been, so far as I know, described, and which is identical in appearance with that observed in the vessels of the pia mater in some cases of apoplectic extravasation. The bloodvessels were completely and equally coated over all their extent with oleo-albuminous granules (*vide* figs. 4 and 5). That these granules were part and parcel of the walls of the vessels, and did not result from any exudation exterior to the villi, is proved by their remaining unaffect-

Fig. 4.



Appearance of simple fatty degeneration of the vessels of the villi.—(Case "Henderson.")

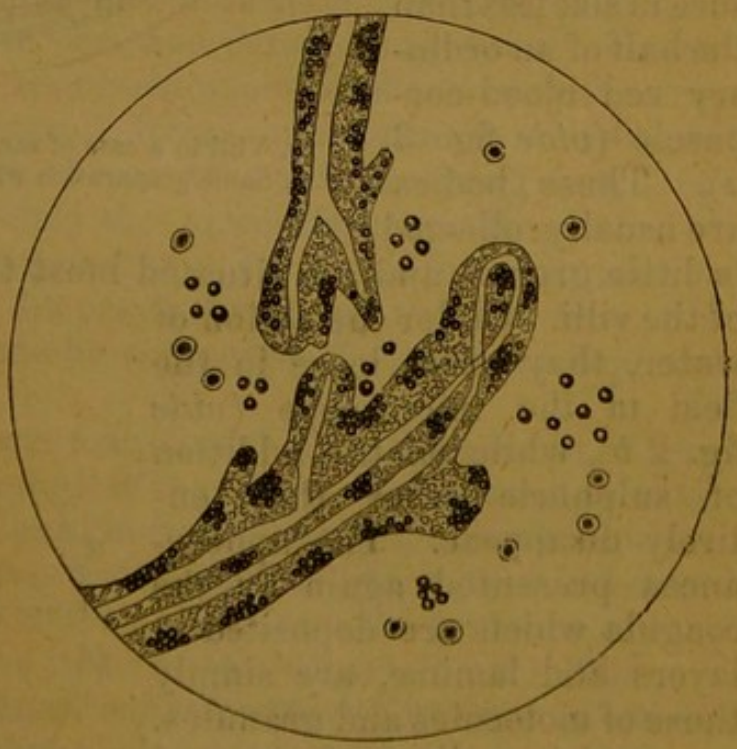
[1] M. Murat, in the *Dict. de Médecine*, states, laceration of the placenta may be produced by external violence or shocks communicated to the system of the mother, and of this lesion hemorrhage is a frequent

pointed line of demarcation separating them from the rest of the placenta. The tissue of the organ is so lacerable and easy of distension, that the blood, when extravasated, finds no difficulty in insinuating itself amid the intra-villous spaces. This anatomical condition seems a sufficient explanation of the rarity of encysted coagula as a result of hemorrhage into the placenta.

Another appearance sometimes seen in placentæ affected with this lesion, and which occurs in connection with the other appearances already described, is that of a rounded melanotic mass, quite granular in section, and of the same consistence as the contents of a steatomatous tumour. We have twice seen this degeneration, never however very extensive. In the Edinburgh University Museum[1] is a preparation shewing little rounded masses of a melanotic aspect, scattered over the uterine surface of a placenta—no particular description however is given. Dr Simpson[2] regards this as a regular step in the process before the stage of yellow hepatization—if we may be permitted the expression—is reached; but from the rarity of its occurrence I am inclined to regard it as due to some special conditions not existing in every case.

The microscopic appearances presented by well-marked specimens of this lesion are very distinct and highly characteristic—indeed they are sufficiently diagnostic to distinguish it from all other diseased conditions to which the placenta is liable. Under a power of 240 linear diameters, the villi do not appear much altered from their normal condition. What has been remarked with the naked eye, in respect of the bloodlessness of the tissue is

Fig. 1.



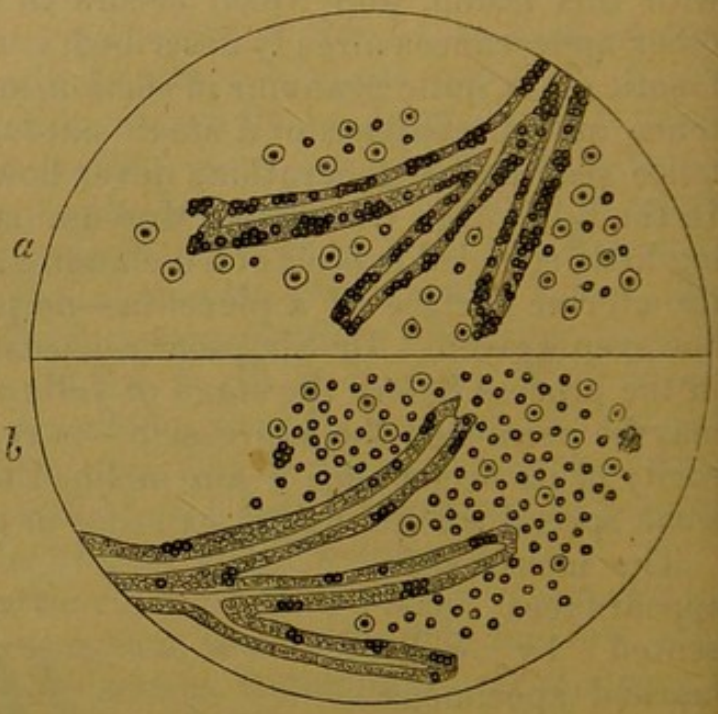
Appearances presented by the villi and bloodvessels in a case of simple sanguineous extravasation.—(Case "Kelly.") Mag. 210 lin. diam.

[1] *Vide* Catalogue of Museum, p. 256.

[2] Edinburgh Medical and Surgical Journal, 1836, vol. xlv.

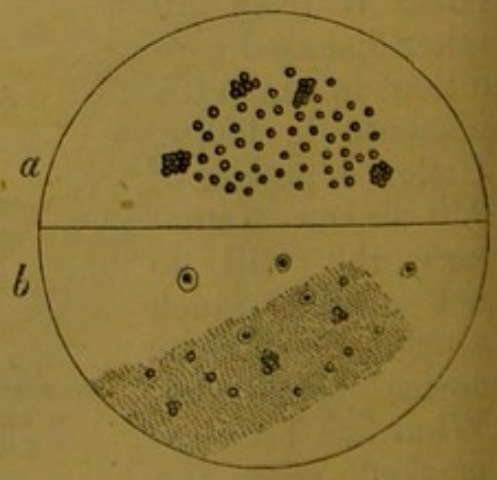
now quite confirmed; scarcely a red blood-corpuscle can be distinguished within the walls of a vessel—the villi in the vicinity of the extravasation seem compressed, and do not present their usual extent of surface—with the exception of a slightly more defined, because thickened external wall, their organization shews nothing abnormal. Those villi which are found imbedded amid the coagulated blood do not only present a compressed appearance with thickening of the external wall, but are also covered with numerous rounded granules which strongly refract light and contain no nuclei (*vide* fig. 1). They measure in size less than the half of an ordinary red blood-corpuscle (*vide* fig. 3 *a*). These bodies are usually collected in little groups, and are situated most thickly near the bases of the villi. Under the action of water, they swim loose in the field of the microscope (*vide* fig. 2 *b*), while on the addition of sulphuric ether they entirely disappear. The appearances presented again by the coagula which are deposited in layers and laminæ, are simply those of molecules and granules, arranged in a linear form, and which present the same behaviour on the addition of chemical agents as those bodies already described (*vide* fig. 3 *b*). The dark melanotic masses present nothing under the microscope but a collection of

Fig. 2.



a. Villi in a case of sanguineous extravasation.
b. Same preparation when water has been added.

Fig. 3.



a. Appearance presented by coagula when situated amid the tissue of the placenta or sub-amniotic. (Case "Kelly.")
b. Same when in contact with uterus or surface of chorion.

effect of checking it. Soon it became diminished in quantity, and at last disappeared. She saw no more of it for four weeks, when it again appeared at the time at which, in her unimpregnated state, she would have expected the catamenial discharge. It lasted on this occasion five days, and again gradually disappeared. She did not now consult any medical man, not feeling alarmed about it, although she was affected for some time with nausea, loss of appetite, and rigors. Twice more the same phenomenon presented itself at an interval of three weeks and a few days, until on the ninth month she was delivered of a male putrid child. The other case was that of a woman in her third pregnancy, who never had any miscarriage, and who appeared free of any constitutional taint. At the fourth month of utero-gestation, consequent on a hurt she received on the left haunch-bone, she sustained a hemorrhage *per vaginam*. Labour supervened at the end of the seventh month; and on three different occasions, corresponding exactly to her ordinary menstrual molimina, the same discharge returned in no very abundant quantity. In both of these cases, the placentæ presented characteristic specimens of this morbid condition; in both they appeared to bear a normal proportion to the size of the fœtus,—they felt hard and indurated. Overlapping the surface of the chorion in one, and penetrating down between the intra-cotyledonous spaces, in some places even to the amnion, was found a compact, tough, membranous substance, of greatest thickness in the centre, and becoming gradually thinner as we approached the circumference; it presented a yellowish-white colour, and on section was found to consist of layers which could be easily separated the one from the other, thus shewing it to be composed of successive deposits of coagulated blood.

The general symptoms manifested after the receipt of the injury were very similar in all of the cases,—for the most part the patients complained of pain in the abdomen and back, nausea, anorexia, tendency to fainting, dizziness in the head and coldness of the extremities, and rigors. From the presence of this last symptom, some have inferred the lesion to be of inflammatory origin. No man at all conversant with uterine disorders need be told in how many instances shivering is a prominent symptom, although not the slightest trace of inflammation can be detected. The sympathy existing between the uterus and the general female economy is so intense, that the slightest disturbance of the former gives rise to a severe commotion of the latter.

According to Dr Barnes, in one case, flooding occurred

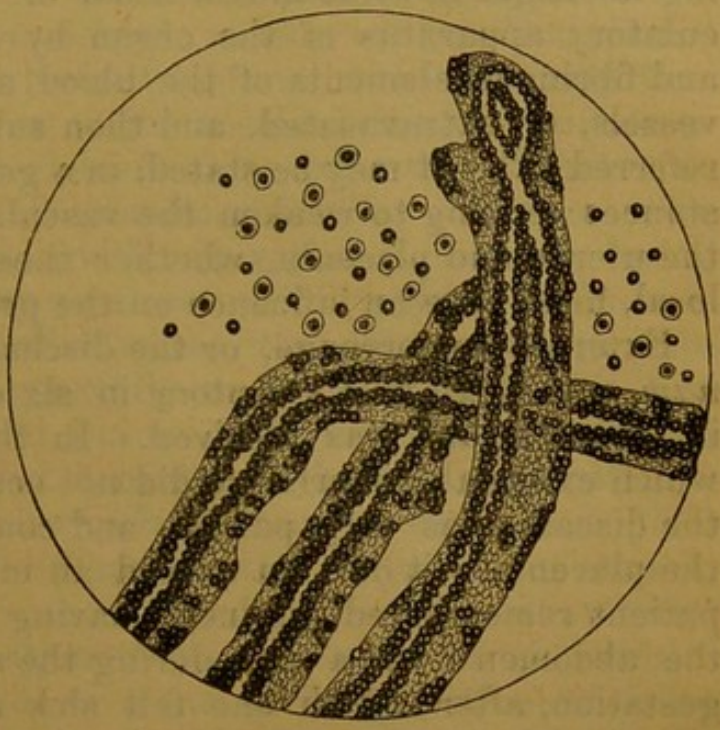
twice without obvious cause, and unaccompanied by pain, at the third month, and again at the seventh, when labour followed. In the second case there was no hemorrhage previous to delivery. In neither is any idea given as to the relative extent of the disease; in both death of the child had occurred some time before delivery, from which it is to be presumed the extravasation must have been considerable in amount.

External injury, then, seems the great exciting cause of this lesion, which, when produced, if at all extensive, must inevitably lead to the death of the child.[1] Indeed, from my own experience—which is perhaps as yet rather too limited—and from what I have heard in conversation with older practitioners, I am inclined to believe—and beg to draw the attention of obstetricians to the point—that it is extravasation of blood into the placenta, arising from rupture of the utero-placental vessels, and leading to the death of the fœtus, and not "inflammation of the womb"—or of the placenta" or "rheumatic stitches of the uterine parietes," or even premature parturition itself, that is most to be dreaded from a woman considerably advanced in pregnancy receiving any bodily injury, especially in the lower parts of the body. The practical precept I should draw from this fact is, the necessity, on being summoned to such a case of careful auscultation, and watching the state of the fœtal heart; if pregnancy should have reached the seventh or eighth month, and the fœtal pulse tends to become slower and more feeble, the obligation the medical man is laid under of inducing premature labour, with the view of saving the life of the fœtus in utero. I am quite convinced many lives might be saved by practice based on such principles. Indeed, I had occasion myself, when a medical student, to witness such an occurrence happening before my eyes. It was the case of the wife of a gamekeeper in a distant part of the country, who, in the eighth month of pregnancy received accidentally a rather forcible blow upon the abdomen. Immediately thereafter she felt squeamish and sick, had rigors, slight pains in the back, not very severe nor regular in their time of accession, and was obliged to lie down in bed. I saw her in the course of an hour after the accident. I found her with a feeble pulse, cold surface, and tendency to syncope. On examination *per vaginam* there was no hemorrhage, the os uteri was occluded, the vagina was cool and moist. I then proceeded to auscultate the abdominal tumour, and found the "placental souffle"

[1] It may be remarked, causes which might operate quite unobserved by the patient herself, are sufficient to produce a sudden contraction of the uterus and consequent severance of the utero-placental vessels.

ed on the addition of water, and not dissolving when sulphuric ether was added. In both cases the patients suffered previous miscarriages, the one two, the other three. The exact appearance presented by the placenta on each of these occasions could not for obvious reasons be ascertained. Most probably, however, as the patients were of a leucophlegmatic habit of body, the cause of abortion was the same in each particular pregnancy. In neither did external hemorrhage occur previous to labour, and in both the extravasation was limited, and in some parts quite recent.

Fig. 5.



Appearance of villi in a specimen of both lesions of sanguineous extravasation and fatty degeneration.—(Case "Wilkinson.") Mag. 260 lin. diam.

In addition to an exciting cause, there must be also some pre-disposition, for it would be too much to say every woman who sustained an injury during pregnancy would suffer from this lesion. It is very liable to occur in women who have previously aborted,—like the fœtus, the placenta has a strong tendency to the perpetuation of a particular type. In four of the cases that came under my observation the patients had miscarried more than once previously; and, it is to be presumed, from the same cause,—although from the circumstance of dispensary patients being rarely attended in two accouchements by the same medical man, and not unfrequently by women only,—it becomes impossible to ascertain this point with any degree of accuracy. Dr Lee of London mentioned, in the course of the debate which followed the reading of Dr Barnes' paper, that he had attended a lady who sustained eight abortions in succession, the pathological cause of which, according to his statement, was, "a change in the villi of the chorion, which had the effect of obliterating the circulation." Schulzius met with a woman who had twenty successive miscarriages—the state of the placenta he does not particularly mention. Dr Williams thinks an altered state of the blood, or some defect in nutrition, may have some in-

fluence in producing fatty degeneration of the placenta. This lesion, again, Dr Quain is inclined to regard as having its origin in some modification of the nutritive and circulatory apparatus of the organ by which the albuminous and fibrinous elements of the blood are retained within the vessels, or extravasated, and then subjected to the process referred to.[1] It may be stated, in a general way, all circumstances tending to weaken the vascular connection between the uterus and placenta, whether these be constitutional or local, must have an influence on the production of this lesion.

External hemorrhage, or the discharge of blood *per vaginam*, was noted as a symptom in six out of the seven cases in which injury was received. In the remaining case, in which external hemorrhage did not occur previous to labour, the disease was very partial, and confined to the centre of the placenta,—it did not exceed an inch in diameter. The patient remembered distinctly having received a blow upon the abdomen from a man during the sixth month of utero-gestation, after which she felt sick and languid, and was seized with rigors; in the course of two or three days these entirely disappeared, and she carried her child to the full term, when it was born alive, though rather emaciated, and of smaller size than normally. It is only in certain circumstances we can look for the presence of this symptom—only when the seat of laceration of the vessels is situated at the circumference of the placenta, or the extent of rupture so great as nearly to dissever the whole organ from the interior of the uterus. The hemorrhage may occur only once after the reception of the injury, or, as was observed in two cases, it may occur every month during the remainder of utero-gestation. It is curious to remark, that the hemorrhage in these cases occurred at periods corresponding exactly to the ordinary monthly molimina,—to the time at which the patient, had she not been pregnant, would have expected to menstruate. Perhaps the matter extravasated acted as an excitor of reflex action on the interior of the uterus, and that the uterus was thrown into action at those periods at which normally it is in its most irritable state. One of these patients, in whom repeated hemorrhages occurred, was a strong healthy woman æt. forty-five, who was confined of her fifth child, and never had a previous miscarriage. At the fifth month of pregnancy following a blow upon the belly she perceived a red discharge *per vaginam*, somewhat abundant, on which she applied to a medical man, who ordered rest and cooling drinks, which had the

[1] *Vide* Report of Meeting of London Medico-Chirurgical Society (*op. cit.*)

very limited, but quite distinct over a portion of the uterus, midway between the umbilicus and the right anterior superior spinous process of the ilium. After a good deal of attentive examination I heard the pulsations of the fœtal heart; they were faint and feeble in character, and numbered 100 per minute. The patient told me most distinctly that for several days previous to the accident she was quite conscious of violent intra-abdominal movements, and that since the accident she had felt no motion at all. Not possessing any legal qualification, and being rather timid of inducing premature labour on my own responsibility, without the concurrence of another medical man, I thought the more prudent course of treatment, especially as it was the patient's first pregnancy, was to adopt "la médecine expectante," and use those measures which I considered the best calculated to check the extravasation which I presumed was taking place into the substance of the placenta. Next day, nothing remarkable having occurred in the interval, after the most attentive and searching examination over every point of the uterine tumour, and in all kinds of position of the patient, I failed in detecting the pulses of the fœtal heart, not only at the place where I formerly had heard them, and which was marked with ink, but at nowhere else. A week afterwards, having in the meantime felt no movement in her abdomen, she began to complain of a strange sensation of something rolling in her belly whenever she moved in bed; she was seized with loss of appetite, depression of spirits, and vertigo; the mammæ, formerly large and well developed, became small and flaccid; in short, it became evident death of the fœtus in utero had occurred. At the end of six weeks the uterus threw itself into action, and expelled a dead male child, quite putrid, in all other respects well developed. The placenta presented quite the appearance I anticipated—the disease was very extensive, and principally confined to the central portions of the organ. I remain to this hour convinced that that woman might have been delivered of a living and viable child, had I had the courage to act on the principles I have been attempting to enunciate.

The mode in which this lesion proves fatal need not be a matter of conjecture. By obstructing, and in some cases completely preventing, the circulation of the blood through the placenta, it must lead to one or both of the following results, as regards the fœtus. It must interfere with the due oxygenation of the fœtal blood, thus tending to produce death by asphyxia—and this undoubtedly happens in cases of sudden and extensive extravasation; or by interfering with

the proper assimilative function of the placenta, of abstracting from the maternal blood substances necessary to the maintenance of nutrition and growth in the fœtus, will likely prove fatal by inanition: this will explain the great degree of emaciation presented by the fœtus in some instances of partial extravasation. Indeed it is matter of surprise how very small a portion of healthy placenta seems sufficient for the maintenance of life in, and carrying on of the processes of respiration and nutrition in the fœtus. A case happened in M. Dubois' ward, in Paris, in which a placenta fully two-thirds diseased was expelled from a woman, having been preceded by the birth of a child at the full time, perfectly well developed, and not a whit emaciated. That, and such cases, are doubtless exceptional; and I cannot see how such a lesion, if at all extensive, can exist with no prejudicial effect on the condition of the child. As regards the mother too, this morbid condition is not altogether devoid of danger. If coagulation does not take place, and a portion of the placenta remain adherent (supposing the present doctrines respecting the source of hemorrhage in placenta prævia to be correct), there is a risk of the mother dying from loss of blood. It may be sometimes fortunate for the mother, if coagulation does take place; although, as respects the child, it must always be attended with disastrous consequences. Might not compression exercised over the spot where the placental murmur is heard, be attended with advantage in such cases?

III.—*The pathological anàtomy of the so-called fatty degeneration of the placenta.*

Two views in particular have been taken of the pathology of this lesion; the one regarding it as a type of inflammation, the other as a true fatty deposition in, or degeneration of, the tissue proper of the placenta. The former was that maintained by the anatomists of the last century—thus, Ruysch has described, and caused to be delineated a placenta, the whole of whose fœtal surface is studded with numerous "tubercles" of a consistence so great as to deserve the epithet[1] of "scirrhous." He considers it the consequence of inflammatory action; on section, he adds, the tubercles displayed a homogenous appearance, and presented no trace of organization. Wrisberg has described a case in which he found the uterine surface of a placenta covered with a layer of membrane 2½ lines thick in the intralobular spaces, and from 1½ to 2 lines

[1] From this hardened or hepatized state of the placenta, the distinguished pathologist Rokitansky has been led to regard this lesion as a result of placentitis.—(*Patholog. Anatomy*, vol. i., p. 142—Sydenham Society's edition.)

in thickness where it overlapped the lobes. This membrane was white in colour, and of a hard and compact consistence. Its structure was cellular and nearly tendinous. To inflammation he imputes its origin. It may be added, the placenta was non-adherent to the uterus. Albrechtus writes "he has seen small tumours scattered throughout the substance of the placenta, of a whitish colour, and closely resembling scirrhous glands. And Mauriceau, in his book on Midwifery, gives several cases of placentæ he calls "scirrhous," or "affected with chronic inflammation."

As to the signification to be attached to the term "*scirrhous*," as used by these authors in their description of morbid conditions of the placenta, it may be stated that, primitively and etymologically, nothing is intended to be implied by the term, beyond a certain physical quality, viz. hardness. It was only as pathological science advanced, hardness being found a constant and most striking property of certain morbid growths which were coincident with a cachectic state of the system, and shewed a peculiar tendency to invade all neighbouring tissues, that "scirrhous" came to be applied to and associated in every person's mind with a growth of a *mali moris* or malignant character. Now-a-days, when one speaks of a scirrhous tumour, he usually means cancer. Formerly every tumour, provided it was possessed of a certain degree of hardness, received the same appellation. This opinion seems to derive some support from the experience of the present day, for we know that if there is any organ of the body more than another exempt from malignant disease, it is the placenta. I believe it possible to affirm, without the slightest risk of error, that cancer of the placenta is a lesion never met with, at all events so rare as to be unworthy of consideration. In Dupuytren's Museum at Paris, there is a preparation labelled "cancerous tumour of the placenta." No account is given of any examination this tumour has been submitted to, and to me I confess it seemed nothing else but a considerably hypertrophied placenta deprived of its blood by long maceration in spirits.

Pathologists of more modern times, and some even of the present day, have attempted to defend the inflammatory view of this lesion on the grounds of the microscopic appearances; the oleo-albuminous granules they regard as arising from an exudation of liquor sanguinis from the interior of the bloodvessels; these bodies in short they consider as diagnostic of an inflammatory lesion. I hope to shew immediately this opinion is based upon very limited pathological observation, and that these same granules, in place of being met

with in states of inflammation only, are met with so frequently, it becomes a difficult task to enumerate the morbid conditions in which they do not occur.

That this lesion is not of an inflammatory character may be proved first of all by the general symptoms. Now shivering frequently occurs in the course of this disease, and some have grasped at this as indicative of inflammation. But rigors alone, in the absence of other febrile symptoms, such as pain in the belly, hot skin, bounding pulse, great thirst, &c., cannot be held as proving unconditionally a state of inflammation. In these circumstances they prove merely a derangement of the nervous system. By way of illustration let me instance the case of rigors occurring at the end of the first stage of natural labour. Who has seen anything of obstetric practice, and has not witnessed such a phenomenon; nay, perhaps frequently, and to a degree sufficiently intense? Yet who, in the absence of other febrile symptoms, ever thought shivering in these circumstances symptomatic of a type of metritis, or an indication for the use of the lancet. So in this case of disease of the placenta the patient no doubt shivers, but this is, as I have already stated, dependent on the intense sympathy which exists between the uterine and general system of the woman, and is caused by the irritation of the extravasated matter on the interior of the uterus. She presents, in addition, coldness of the surface of the body in place of heat; a depressed and weak, in place of a bounding pulse; thirst no doubt sometimes; and no pain on pressure over the seat of the placenta. In the face of such symptoms, who would argue the case was one of inflammation, acute or chronic, or be prepared to adopt the usual antiphlogistic treatment? The circumstance which militates most against the inflammatory theory of this lesion, is to be found in the fact, that a placenta so affected is never found preternaturally adherent to the interior of the uterus. It is contrary to all pathologists of the present day know regarding the results of the inflammatory process, to conceive it possible that such layers of coagulable lymph as are sometimes seen deposited between the uterus and placenta, could exist there without giving rise to the same results, as is generally seen when lymph is effused between two solid substances. In the ten cases which happened in my experience, not only was the placenta non-adherent, but it seemed to be unusually less adherent than commonly, for in several of the cases the whole of the contents of the uterus were expelled simultaneously. Another anomaly exists, which is difficult to be accounted for, if the inflammatory theory be ac-

cepted; it is this,—why if the most common and almost essential microscopic elements of an inflammation be recognisable, should these cells never attain any higher organization? why, in fact, should pus or abscesses be never met with in such conditions? It cannot be answered,—time is not allowed—for in many of the cases, months positively elapsed between the occurrence of the extravasation, and the birth of the placenta. In the analagous case of the bloodvessels of the pia mater, it has been explained by some pathologists, by saying there is no mucous membrane in their vicinity. But this reasoning cannot be applied to the uterus, for there they are in immediate proximity to mucous membrane in the shape of deciduæ. Another set of arguments in favour of this explanation has been attempted to be drawn from the microscopic examination. Peculiar bodies, argue these pathologists, have been detected by the microscope as composing the essential characters of this disease; these granules are identical in appearance and chemical properties with those seen in ordinary states of inflammation,—hence this lesion must be also inflammatory. This reasoning, however, is inconclusive, in as much as it is based upon a too limited generalization. While we admit, because we cannot deny, that bodies, so far as appearances go, identical with those met in this diseased condition, are to be found in the matter of abscesses, or in the exudation poured into the air-cells of a hepatized lung, we must not forget to notice, that precisely similar corpuscles are to be met with in many other morbid states of the body, which no one now-a-days would consider in the remotest degree inflammatory. They are to be found in great abundance as composing certain forms of cancer, viz., the encephaloid, in certain diseases of the liver and kidneys presenting not the least trace of inflammation; in certain softenings, such as that of muscular fibre in contact with pus, or of bone, or of the brain, nothing is more common than such microscopic appearances. If such be the case,—if such corpuscles are to be found so generally in diseased states of the human system, they must have some other value; their presence must be indicative of something else than any individual lesion, or particular species of morbid action. Any conclusion, therefore, to be deduced from their existence in favour of inflammation becomes equivocal. Now, to my mind I confess, I consider any conclusions to be derived from the presence of such granules as of trivial importance, except as a kind of confirmatory proof of an otherwise tolerably distinct morbid condition. Isolated *per se*, and not contained within other normal structures, it can-

not be held they determine the specificity of any lesion whatever. In the case of pneumonia, it cannot be said, oleo-albuminous granules are characteristic of the disease; for not only are they, but molecules and granules, epithelial scales, and true pus-corpuscles, highly organized cells, found in the matter poured into the air vesicles; the former are merely an early stage in the development of the elements composing the matter exuded. It is of little moment to our present purpose to inquire—besides, it is a disputed question—whether or not the true pus-corpuscle is really formed from these granules; this, however, is certain, the former are more highly organized than the latter. Again, in some soft cancers, they are found in great abundance. What shall we conclude from this fact? that soft cancer is an inflammatory lesion! It is impossible; for, in addition to these bodies, and in as great abundance, are seen cells highly organized, possessing one, two, or three nuclei, and these again often nucleoli. Besides, the general symptoms will not permit it. Shall we not rather conclude that the former are the source, or rather the remains of the latter, for it is in the softest forms that these fat-corpuscles are the most numerous;—they seem to me to be the lowest type of organization, the first in the series of cell growth, the penultimate in their decay. In the case of the placenta, that these granules do result from the softening of an exudation external to the villi is proved by their being loosely adherent to their walls, not incorporated in their true structure; easily acted on by water, which causes them to swim loosely in the field of the microscope; and, being easily dissolved on the addition of sulphuric ether,—a striking difference of action we have seen in those cases in which the oleo-albuminous granules were deposited around the bloodvessels within the villi, and therefore removed from the action of water and sulphuric ether. In this last case, it has been disputed whether the corpuscles are owing to an inflammatory exudation, or to a fatty degeneration of the true tissues of the walls of the bloodvessels. In the analogous case of the disease in the bloodvessels of the *pia mater*, in connection with cerebral softening, Mr Paget[1] maintains the lesion in that case consists of a true morbid condition of the proper tissue of the vessels, while Dr Bennett[2] has endeavoured to prove, it is in consequence of an exudation of *liquor sanguinis*, and is therefore inflammatory. I need hardly add, the same general arguments which have been stated already, apply with equal force against the in-

[1] Lectures on Surgical Pathology, vol. i., p. 142.
[2] Edin. Med. and Surg. Journal, 1843, vol. lix., p. 344.

flammatory view of this condition. I have not been able, in those two instances which fell under my observation, to satisfy myself that the layer of granules was deposited underneath an external membrane, as Mr Paget has pointed out in the vessels of the brain. The regular and equal distribution of the granules over the exterior of the vessels; the non-coincidence with any general inflammatory symptoms; their occurrence in patients of a certain cachectic constitution, in whom it is reasonable to suppose there existed some modification of the nutritive process; their continuance in a low stage of development, with the fact of fibrine occurring as a constituent of the coats of the vessels,—all such circumstances go in support of the view of fatty degeneration of the coats of the vessels.

That this morbid condition of the placenta is not an instance of fatty deposition,[1] I consider demonstrated already by what has been said in the preface to this paper regarding what is to be understood by the phrase "fatty deposition."

1*st*, The terms imply a certain amount of fat to be a normal constituent of the organ. True fat cannot be detected, even by chemical analysis in almost inappreciable quantity, in the tissue of the placenta; the first condition, then, for fatty deposition is awanting.

2*d*, The terms imply a deposit of true adipose tissue. In the placenta true adipose cells have never been seen under the microscope, either in its normal or abnormal state.

The only other view of the pathology of this lesion which remains is that of fatty degeneration, and this is divisible into two branches, according to the supposed material which undergoes degeneration; some regarding it as the tissue proper of the placenta, others, a material foreign to its normal constitution.

The facts opposed to the former view are the following:—

1*st*, The villi, even in the most exaggerated forms of the disease, present their natural configuration; they never appear broken up nor disintegrated; occasionally, they are more compressed, and present a smaller extent of surface than normally, but this is quite explicable on mechanical grounds.

2*d*, The placenta in these cases feels hard and condensed. If such were the real explanation of the phenomenon, it would be natural to expect the tissue of a softer consistence.

3*d*, The fat globules are situated on the surface of the villi, and do not form part and parcel of their structure. Besides

[1] Dr Quain, in his paper on "Fatty Heart," in the London Medico-Chirurg. Society's Transactions, restricts what is implied by the phrase fatty deposition in the same manner. (January 1851.)

these, there are certain characters presented by the placent so affected,—such as an atrophied and shrunken state of th organ, with an appearance of anæmia,—which are capabl of explanation only on the hypothesis of a foreign matte having been extravasated amid the tissue of the organ, an undergone a process of condensation.

It is to this view of the pathology of this lesion we ar therefore driven, as the only one comprehensive enough t include all the phenomena. I have said already amply suf ficient to shew the facts on which this hypothesis is grounded It would be a mere repetition stating these reasons in th present place. It will suffice to say, that this lesion present an instance of a degeneration of the fibrine of the blood, whic Mr Gulliver[1] has found to take place in certain conditions ex ternal to the body, as in the softening of fibrinous clots, an in the formation of "adipocere" from the fibrine composin muscles, and which several pathologists have witnessed i cases of pulmonary and cerebral apoplexy. Viewed in thi light, it cannot be regarded as a new morbid process, bu merely a diseased condition found in a previously unknow locality.

[1] London Medico-Chirurg. Society's Transactions, vol. xxii.—Mr Gulliv considers a low state of the vital powers as favourable to the formation an softening of coagula.