THE PATHOLOGY OF ENDOMETRITIS.

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A short time ago I was invited to take part in a discussion upon endometritis before the Obstetrical Society of Philadelphia. In preparing my remarks I was obliged to look over the literature of the subject a little, and was interested, but amazed, to find with what total disregard of pathological and biological consideration the subject is written upon by clinicians.

Almost any uterine discharge not clearly depending upon menstruation or cancer is referred to "endometritis," and is described and treated without much attention being devoted to its exact etiology.

Having reviewed the subject with some care, I determined to devote myself to simplifying it, hoping that as correct an exposition of the subject as might be possible would aid the student in forming a clear conception of the processes in progress in the endometrium, explain their symptoms, and suggest treatment.

Unfortunately, I had not progressed very far before I found a large number of cases which formed exceptions to my rules, yet I feel that these may simply serve to show that there are rules of which they are exceptions.

As there are many varieties of endometritis described, so there are various classifications made to include them. In the process of simplification, I found the following to work upon:

I. Pathological Classification.—Traumatic endometritis.
Catarrhal "
Polypoid "
Hypertrophic "
Atrophic "
Senile "
Malignant "
Congestive "
Virginal "
Tuberculous "
Syphilitic "
Puerperal "

II. Etiological Classification.—Constitutional endometritis.
Dislocative "
Reflex "
Neoplastic "
Infectious "

III. Symptomatic Classification.—Mucous endometritis.
Hæmorrhagic "
Purulent "

IV. Histological Classification.—Glandular endometritis.
Interstitial "

V. Classification According to Duration.—Acute endometritis.
Chronic "

VI. According to Position.—Corporeal endometritis.
Cervical "

If I had searched longer I would probably have found other varieties and still other means of classifying them.

In order that the data upon which we have to work may be presented in a clear manner to the reader's mind, it will not be out of place to give a brief description of the endometrium and its chief diseased conditions.

The endometrium is one of the most peculiar, variable, and irregular tissues of the body. It consists of a single layer of columnar, ciliated, epithelial cells, arranged upon a basement membrane, and of a subjacent stroma of fibro-connective and muscular tissues, in which the glands are embedded. The endometrial stroma is not differentiated sharply from the muscular tissue of the uterus, and there is no muscularis mucosa or sub-mucosa, as in the stomach, intestines, etc. The endometrial glands are mucous glands, mostly simply tubules, though where they are largest they are branched. They are large and numerous in the cervical region and toward the horns of the uterus, and are small and simple in the lower part of the corpus. The final branchings of the glands seem not infrequently to descend into the muscular tissue. There is no separate blood-supply for the endometrium; it derives its nourishment from the more superficial uterine capillaries.

The intimate relationship of endometrium to uterus is almost like that of the endocardium to the heart.

The normal appearance of the endometrium varies widely in health, and is subject to developmental peculiarities by which there seems to be a pronounced increase in the glandular tissue during adolescence, a great increase during pregnancy, a decline toward the menopause, and an atrophy and disappearance during senility. In addition to these changes, the endometrium is suffused with blood for quite a long time every month during the period of menstruation, and meets with considerable disintegration and subsequent regeneration of those times.

A moment's reflection will satisfy any one that when a tissue is as variable as this, it is very difficult to establish a normal appearance which can be regarded as typical. It will also help the gynæcologist to understand why the microscopist hesitates to express an opinion that may mean a radical operation when some small fragment of the tissue is presented to him for examination.

Much of our knowledge of the endometrium is made up from the study of uterine curettings. Unfortunately, little satisfactory knowledge can be gained in this way, as it is impossible to locate the fragments even approximately, and they are usually twisted and disturbed by the curette. What is normal in the cervical glands may, when supposed to come from the corpus, be regarded as a pronounced hyperplasia. The scrapings are also at fault in cases of suspected malignancy, for they are all superficial while the neoplasm may be deep. Of course, when satisfactory evidence of malignant disease is found by a study of scrapings, it is of importance and is highly satisfactory, but the negative findings which are the rule are of little value and serve to discourage clinician and microscopist alike by their failure to explain existing conditions.

The entire uterus is lined by the endometrium, which, as it descends toward the os, loses its cilia, becomes more and more flattened, and ultimately is transformed so as to blend by an inconspicuous union with the transitional squamous epithelium of the vagina upon the cervix near or at the os.

The surface of the endometrium is kept moist by the secretions of its mucous glands, which are always pretty active. There is usually a plug of the mucus in the cervical canal.

The mucus of the uterus is alkaline in reaction, is transparent and viscid, and much resembles white of egg. The secretions of the vagina are acid. This observation is of some importance in connection with the infectious lesions of the uterus which cannot take place from the vagina during health. No large variety of bacteria inhabit the acid vaginal secretions, and pathogenic cocci and other organisms that might occasionally enter from the skin find the conditions unsuited to their

growth. For this reason the uterus is nearly always sterile. In diseased conditions, however, the reaction of the vagina may be altered by the presence of inflammatory products or by hæmorrhagic contents, so that the conditions may be favorable and infection readily occur.

Both theory and experiments, of which many have now been performed, seem to agree that primary infection of the uterus only occurs by implantation of micro-organisms during sexual intercourse, or by the examining fingers and instruments. Secondary infection in the course of treatment for endometritis seems to be rather frequent. An instructive series of observations have been made by Gottschalk and Immerwahr (*Archiv f. Gynäk.*, Bd. 50, H. 3, 1896), who found after a careful study of 60 cases of corporeal endometritis, that in 21 the discharges were sterile; in 7 cases staphylococci were found upon the first examination. In 4 cases staphylococci were found secondarily immediately after an acute gonorrhœal infection. In the remaining 28 cases the micro-organisms which were found were not pathogenic but were the ordinary micro-organisms from the external skin.

The blood-supply of the uterus is subject to numerous alterations, depending upon nervous, reflex, and other physiological as well as pathological causes. In these changes the endometrium, no doubt, participates, and may become swollen and congested, perhaps, to a degree approaching that seen in menstruation. Chronic congestion probably leads to changes both in the glands and in the interstitial tissue. Of these, more will be said below.

A brief review of the described varieties of endometritis will be necessary for a comprehensive grasp of the subject.

Traumatic endometritis results from accidents and therapeusis. It is usually an active inflammatory process not infrequently depending more upon infection than traumatism. It is characterized by hæmorrhagic discharge, which rapidly becomes purulent.

Catarrhal endometritis is usually a chronic condition supposed to be analogous to chronic catarrh of the respiratory and alimentary mucous membranes. It is characterized by a muco-purulent or chiefly mucous discharge.

Polypoid endometritis—also chronic—is characterized by the formation of rounded villosities, which project from the mucous membrane. They consist of endometrial stroma, rich in glands, covered with columnar epithelium. The polypi often show an infiltration of round cells in their structure.

Hypertrophic endometritis, also a chronic form, is characterized by

thickening of the endometrium and hyperplasia of the mucous glands. Sometimes polyposis forms a part of the process.

Atrophic endometritis, a late stage of other forms of the disease, is said to be characterized by hyperplasia of the connective tissue and cicatricial contraction by which the glands are destroyed. The endometrium becomes thin and may be smooth and shining. The cilia of the cells are lost.

Senile endometritis, which is not sharply differentiated from the preceding form is similarly characterized.

Malignant endometritis is used by some to describe a peculiar proliferation of the glandular tissue without invasion of the muscular tissue. Van Cott has called it endometritis chronica malignans. Others describe any endometrial disease in cases with malignant disease of the uterus as malignant endometritis. Violently destructive acute infection of the uterus are also sometimes described as malignant endometritis.

Congestive endometritis is said to result from the congestions which follow excessive venery, masturbation, etc. They may also depend upon uterine displacements, neoplasms and other conditions associated with congestion.

Virginal endometritis is probably the same as the "granular erosion" of the cervix, and "congenital laceration of the cervix" sometimes spoken of. It is characterized by descent of the endometrium beyond the os uteri so that the neighboring portion of the cervix is bright red instead of bluish in color. The cause is unknown.

Puerperal endometritis occurring after abortion, miscarriage, and labor usually is due to infection often with retention of products of pregnancy. Retained disintegrating tissue is, of course, a marked predisposing cause of infection.

Tuberculous and *Syphilitic* endometritis being associated with their respective diseases need no comments.

Constitutional Endometritis is seen in the anæmias and cachexias. It is an irregular process, sometimes characterized by leucorrhœa, sometimes by bloody discharge.

Infectious endometritis results from the entrance of gonococci or other pathogenic micro-organisms.

Mucous, hæmorrhagic, and *purulent endometritis* are characterized by mucous, hæmorrhagic, or purulent discharges.

Glandular endometritis is a form supposed to affect the glands chiefly and bring about their proliferation and active secretion. The mucous

membrane may be thickened, polypoid, and may approach the adenoma in appearance.

Interstitial endometritis, the opposite condition to the glandular form consists in infiltration of the endometrial tissues with leucocytes, proliferation of the connective-tissue cells, multiplication and fibre formation and subsequent contraction of the newly found cicatricial tissue with atrophy of the glands and epithelium. It is like the atrophic and senile forms.

Acute and *chronic*, and *corporeal* and *cervical endometritis* are self-explanatory terms.

In reading over a list like this one cannot help being impressed with the utterly dissimilar character of the processes included under the name endometritis, and asking himself whether it is true, or even probable that the conditions are all real inflammatory processes. A careful analysis will certainly convince any thinking man that they are not. We have included in that long list inflammations, hypertrophies, hyperplasias, atrophies, neoplasms, and specific inflammations. It is a chaos out of which it is difficult to bring order.

The method of classification that I would recommend is that which deals with pathological processes only, and excludes all reference to clinical conditions. Thus, for example there is an inflammation of the interior of the uterus—an endometritis—but by no means every diseased condition of that tissue is inflammatory. The diseases of other similar tissues are dealt with, as anæmias, hyperæmias, degenerations, inflammations, specific inflammations, neoplasms, etc., and the same kind of treatment is the only one that can be made satisfactory here.

The data that can be collected at the present time are barely sufficient to include in their proper places all the cases that are seen, but accuracy will come with more careful study of a large number of cases and more accurate observation upon those at present before us. From the positive information thus far attained it is possible to arrange the endometrial diseases into Hyperæmias, Inflammations, Specific Inflammations, Neoplasms, and Atrophies. Taking these up in order an outline of their essential peculiarities will be given.

I. *Hyperemia* or *Congestion* of the *Endometrium*. This condition, which is characterized by the presence of an unusually active blood supply, is clinically characterized in nearly all cases by a thin serous, seromucus and sanguinolent discharge. When the condition is very chronic and the glands much hypertrophied, there may be a typical leucorrhœa. The process is in all probability somewhat akin to menstruation in that the endometrium is thickened, its blood-

vessels distended, its substance infiltrated with serum and blood, and its glands stimulated to unusual activity. The escape of blood corpuscles probably takes place by diapedesis. The discharge occasioned by the process is varied according to the degree of glandular activity, the amount of transudation and the diapedesis of the corpuscles. When examined microscopically in fragments removed by the curette, there is an unaltered surface membrane, the glands appear normal or are enlarged, the stroma is infiltrated irregularly with blood corpuscles, numerous leucocytes appear in the interstitial tissue, wandering to the epithelium at times and even insinuating themselves between the cells so as eventually to reach the surface. In cases in which the process is very chronic there may be hyperplasia of the endometrium, multiplication of the glands and polyposis, or as in other chronic congestions, there may be opposite changes of an atrophic nature.

The causes of the hyperæmia are numerous, and it is almost impossible to separate them into arterial and venous hyperæmias as the blood supply of the uterus is so complicated. The congestion may depend upon physiological causes, such as result from natural or unnatural stimulation of the sexual organs; or it may depend upon reflex causes, as in cases of diseases of the adnexa with congestion of the uterus. Uterine displacements and neoplasms may also become causes of uterine congestion probably in some cases by preventing the proper return of the venous circulation, in other cases by increasing the arterial circulation as in cases of interstitial fibroids which act like pregnancy in increasing the size of the uterine sinuses, and in sub-mucous fibroids which by stimulating the uterus to contraction while increasing its size cause it to make powerful expulsive efforts.

Other causes of uterine congestion may suggest themselves to the reader, and will, no doubt, at the same time also suggest their own explanation. That any of the causes suggested may not produce the described conditions is only to be regarded as exceptional.

The condition of congestion and the sero-sanguinolent discharge which it occasions are predisposing factors to infection when any possible occasion arises. When, however, bacteria begins to operate upon the endometrium, the case changes its nature and it becomes an inflammation instead of a hyperemia. When, as usually happens, the bacteria cease their operations, after a time, the original condition may return with such modifications as the destruction of tissue, etc., shall effect.

To congestion of the endometrium must be referred those cases of continuous bloody discharge from the uterus which occurs in women during the climacteric.

I cannot but feel that these cases not unfrequently depend upon causes situated within the spinal centers and depend upon irregular action of these centers in performing a function about to be suspended. The cause of menstruation is, of course, not determined, but surely does not depend upon causes resident within the uterus as it ceases when the ovaries are removed. It is, therefore, involved in some complicated nervous reflex mechanism associated with both organs. The ordinary periodicity of menstruation depending upon a proper operation of such mechanism, one can understand how irregular action of the apparatus may entirely check the menstrual flow, or maintain it indefinitely, and is therefore prepared to expect that when it is about to cease altogether, it may continue intermittently for a time.

In rare cases profound anæmia may be associated with a discharge from the uterus which is of a mucous or muco-purulent nature. This probably depends upon a hydremic condition of the blood, which no longer stimulating properly the nervous controlling apparatus of menstruation, still supports glandular activity and enables the uterine glands to continue even an exalted activity.

II. *Inflammation of the Endometrium.*

1. *Acute Endometritis.* This is a rare process which results from the activities of bacteria which have gained entrance into the uterus. The bacteria usually seen are the gonococcus and the streptococcus pyogenes.

The process is distinctly acute and occasions a purulent discharge from the uterus.

Acute endometritis is not always occasioned by local infection but at times occurs in the course of infectious diseases especially typhoid fever, cholera, scarlatina and diphtheria. Diphtheritic endometritis with the true Klebs-Löffler bacillus is also known. It is, however, probably extremely rare except in the infections following child-birth and abortions.

Birsch-Hirschfeld states that in the course of certain toxemias such as poisoning by phosphorus, etc., an acute endometritis occurs. It is however, more than probable that instead of a true acute inflammatory process, it is degenerative.

Traumatic injuries by instruments and foreign bodies, etc., whether septic or not, produce an acute endometritis.

The *morbid anatomy* of acute endometritis, is simple and interesting. The membrane is swollen, hyperæmic and rather ragged from desquamation of parts of its superficial layers. The surface is bathed with a rather thick, purulent or muco-purulent secretion. Small hæmorrhagic patches are described by some observers. The disease is usually much

more distinct at the upper part of the uterus than at the cervix and may therefore be described as corporeal endometritis. Both the corpus and cervix may be affected.

Microscopically the lesions consist chiefly of round cell infiltration of the stroma, a desquamation of the surface epithelium, and an exudation of corpuscles upon the surface of the membrane. The pus corpuscles are found in larger or smaller numbers everywhere. They crowd the interspaces of the glandular stroma, squeeze in between the cells of the surface and glandular epithelium, not infrequently enter the cells themselves where they appear to be contained in vacuoles, and by escaping from between the glandular cells enter their secretions so that they have a muco-purulent character before they leave the alveoli.

The bacteria causing the trouble are found only in the beginning of the process. Secondary infections with modifications of the process may occur at any time.

Acute endometritis usually runs a course of moderate duration with a tendency to spontaneous recovery. From the acute cases, however, by persistence of the cause, by structural alterations, and because of nutritive disturbances, slightly different sub-acute and chronic processes may develope.

Chronic Endometritis.—Chronic endometritis can probably only be diagnosticated by careful exclusion of other pathological conditions. It is probably not an affection of frequent occurrence, though nearly every uterine condition with a discharge has been called by this name.

As has been said, the disease follows the acute form when the cause of inflammation persists. It is occasioned by foreign and retained bodies in the uterus. It also occurs as a secondary process engrafted upon the numerous congestions of the uterus and endometrium.

As a diseased condition there is nothing distinctive about it, and its lesions are very irregular.

In the early stages there is some round cell infiltration which reminds us that the process has originally been acute. There is little hyperæmia yet the blood vessels are full and there may be some extravasation of blood. The glands are prone to hyperplasia or hypertrophy (glandular endometritis) and pour into the cavity of the organs a considerable quantity of viscid slightly purulent mucus. Obstruction of the glandular outlets is followed by cystic dilatation. There may be signs of connective-tissue hyperplasia in the glandular stroma. As in other forms of chronic inflammation of mucous membranes, there may be occasional papillary or polypoid excrescences upon the surface of the membrane.

The course is indefinite, and there is no tendency for spontaneous cure to occur.

In the very chronic cases an atrophic condition results from the connective tissue proliferation and contraction by which the glandular tissue being pressed upon gradually atrophies. (Interstitial endometritis.) In this form there is a rather frequent obliterative endarteritis by which a considerable number of vesels are destroyed.

III. *Specific Inflammations,* such as tuberculosis, syphilis, etc., do not come within the scope of this paper.

IV. *Atrophy* of the *Endometrium* is part of the changes which old age produces in the sexual organs. It is a normal process which has nothing to do with endometritis. The cilia of the epithelial cells are lost, the cells become of a more cubical shape than usual, the glands are gradually lost and the entire endometrium may be changed into a smooth, shining, colorless tissue.

It is of course true that infections and congestions may modify the picture here given, which refers to typical cases alone. In the cases of old women with excessive mucous or bloody discharge, some additional factor is involved and there is more than a mere senile process to be looked for.

In the senile atrophy one sometimes meets the inexplicable parodox of diminished glandular tissue with apparently increased secretion.

V. *Neoplasms of the Endometrium.*—The most frequent of these are the adenoma and the adeno-carcinoma which usually spring from the endometrium of the corpus and project into the cavity as sessile growths, or inconspicuous elevations. Their growth is often downward into the muscular tissue. Only the immediate neighborhood of the tumor shows other changes in the endometrium than can be accounted for on the grounds of hyperæmia, etc. Not all cases of neoplasms are accompanied by much congestion, not all are infected, not all degenerate, therefore the clinical characters of the case must be most carefully considered.

It is a difficult problem to solve, whether or not some of the rare cases of universal hyperplasia of the endometrial glands such as have been described by Van Cott as endometritis chronica malignans are malignant or not. The more I deliberate upon the subject, the more disposed I am to regard them as benign.