THE GYNÆCOLOGICAL ASPECT OF FOCAL SEPSIS.

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The theory of "focal sepsis" has been tested by much investigation over a number of years, and now there appears to be sufficient evidence to justify belief in the power of a local chronic infection to cause a distant lesion and general ill-health. As usual, the new idea was hardworked in the beginning. Early enthusiasm invoked it as a cause of many conditions which, hitherto, had eluded satisfactory explanation. The teeth, tonsils, bowel, urine, cervix, and other parts liable to stubborn infection have, in turn, been incriminated as the possible site and origin of the bacterial toxins underlying fibrositis, chronic disease of joints, bones, and anæmias.

Out of the mass of alleged causal infections, some have become established as real, if perhaps occasional, sources of toxæmia, but nevertheless we often see true focal infections without general disease, such as I have given above, unattended by any discoverable focus of infection. The two conditions are undoubtedly coexistent in some cases, but it is equally true that each can be found alone, and even when the two are found together, eradication of the local infection is by no means always followed by disappearance of the metastatic condition. However, there is now an immense mass of accumulated clinical and pathological material which is strong evidence of the truth of the general principle of focal infection. The principle is proved, but the data need sorting out and integrating in order to correlate more exactly the sequence of septic focus and general ill-health.

At present there is no very fine appreciation of what constitutes a lesion of focal sepsis as a cause of other disease or ill-health. Almost any infected orifice or viscus, irrespective of the infecting microbe, the site, the amount of drainage or local reaction, is described as a focal lesion. Failure to recognize the necessity for definition and correlation leads to much useless and elaborate treatment with consequent disappointment. In the gynæcological department the foregoing remarks are well illustrated, and I assume by analogy that they are not peculiar to the pelvic foci.

In the pelvis we find several sites of possible chronic infection. For example, chronic gonorrhœa may infect the Fallopian tubes, cervix, urethra and Bartholin's glands, while pyogenic infection may remain fixed also in the tubes, cervix and occasionally in the vulval glands. It is seldom that the corpus uteri harbours chronic infection except in pyometra after the menopause, while the vagina, though often suffering from chronic inflammation in the form of trichomonas-streptococcal infection, provides such complete drainage that toxic absorption must be highly improbable.

The frequency of apparent infection of the cervix, causing the visible symptom of leucorrhœa would appear to provide a wide and suitable field of enquiry, firstly into the general truth of the principle, and secondly into a new range of therapeutics. The anatomy and pathology of the cervix provide a theoretically ideal focus of local infection as a cause of general diseases. We have the branching mucous glands opening into a narrow canal, many opportunities for infection which the imagination can visualize as hidden deeply in inaccessible crypts, and obvious evidence in the form of a white pus-like discharge. Further, the very chronicity of leucorrhœa suggests a tenacious undying infection, which,

in the light of our theory, must surely be the origin of the systematic toxæmia to which is attributed rheumatic and other disease. Much clinical experience, assisted by bacteriology and histology have led me, however, to doubt whether the cervix is often the true seat of toxic sepsis. There are enthusiasts, numbering among them some gynæcologists, who attribute much pelvic pain and backache, as well as arthritis, and more distant lesions to "cervicitis." Their views are based on considerations of the anatomy of lymphatic "drainage" and the subjective results of treatment as reported by the patient, but if the objective results of treatment of the cervix are carefully observed and rigidly assessed, there is very often little evidence that the cervix was the source of the disease.

I should like therefore, in this paper, firstly to consider critically the evidence on which the theory of cervical focal sepsis is based, and secondly, to define more exactly the group of clinical and pathological conditions which may really render the cervix a dangerous member.

Let us consider a few elementary facts about **leucorrhœa**. As it is the obvious symptom of abnormality of the cervix, and as it looks so much like pus, it is often regarded as sufficient evidence of cervical infection. If, however, the white discharge is examined as a film and by culture, it is very frequently found to consist of nothing more than mucus, large masses of epithelial squames and an occasional leucocyte, while a culture will grow nothing but the normal bacillus vaginalis (Döderlein's bacillus) and a few diphtheroids. Moreover, the majority of vaginal discharges during the childbearing period of life show a pH 4 to 5, a degree of acidity which is incompatible with the ready growth of pathogenic organisms, and forms an adequate defence against infection of the vagina. The semi-solid "curdy" discharge which is often found is relatively intensely acid. Its solid material is composed wholly of blocks of desquamated epithelium and masses of Döderlein's bacillus. If the cervix be inspected, even if there is much mucoid secretion and an erosion, an uncontaminated swab taken from inside the canal, even after squeezing the cervix with a ring forceps, will seldom grow a culture of pathogenic organisms, and usually nothing at all. The secretion is clear water-white mucus and contains nothing but an occasional leucocyte or epithelial cell. Frequently the cervix contains small retention cysts, felt as firm little follicles on the portio vaginalis, but again, if the retained mucus is carefully drawn off by a fine syringe needle, it usually proves to be sterile after both aerobic and anaerobic culture. Occasionally one or two colonies of bacillus coli or staphylococcus albus may be grown. A truly purulent vaginal discharge is seldom seen during the childbearing period except as a symptom of *trichomonas* vaginitis, and even when this is present, there is wide drainage, no retention, and no infection within the cervix. Acute and subacute gonorrhœa are admittedly associated with a purulent discharge, not only in the vagina, but also oozing from the cervical canal.

After the menopause leucorrhœa is usually purulent, only slightly acid, and caused by pathogenic microbes. It may arise entirely and only from the vagina, or less often from the cervix and even the corpus uteri.

It is, however, true that before the menopause comparatively few leucorrhœal discharges are purulent, but rather they are excessive amounts of the normal secretion—too much mucus from the cervix, too much desquamated epithelium from the vagina.

If now the cervix be examined histologically, what evidence can we find of infection in the usual condition of enlargement, laceration and perhaps erosion, commonly called "cervicitis"? The general appearance is that of hypertrophy and not inflammation. All the tissue elements are increased. There is a thicker

fibro-muscular wall, the glands are enormously enlarged, branched, and extending under the squamous epithelium of the portio vaginalis. The gland cells are bulging with mucus. But, apart from subacute gonorrhoea, the infiltration of round cells characteristic of inflammation can very seldom be found except in a minute zone at the junction of the squamous and columnar epithelium, and in the small polypoid projections into the canal or from an erosion.

Almost never do we find pus cells within a gland, and never are inflammatory exudates grouped around the bases of the glands. The erosion certainly shows a little infiltration, extremely shallow, where the epithelium is missing, but the appearance has that of reaction to mild surface irritation such as exposure to the acid of the vagina rather than that of deep infection within the cervix. There are many other histological features which could be described, but it would be tedious to set them out more fully. Suffice it to say that, though, in conjunction with Dr. L. T. Bond, I have searched the sections stained by the Giemsa method for organisms, we have never found them either in the tissues or loose in the lumina of the glands. They can, however, be easily found in control specimens of cervixes which have been injected with suspensions of organisms. I have emphasized the negative results of searching for organisms and signs of inflammation in so-called cervicitis, but naturally do not wish to maintain that cervicitis never occurs. It is a feature of gonorrhoea, and a temporary part of postpartum infection, but as a general rule, little or no evidence of infection or inflammation can be found in other cases. I believe it will be recognized after further observation that most, if not all the changes commonly described as cervicitis will be explained as the result of disturbance of the sex hormone balance, and/or exposure of a traumatized cervical canal to the acid medium of the vagina.

If a septic focus is to act as a centre from which are disseminated bacterial toxins, or even the microbe itself, there must be infection by a true pathogen, and retention or inadequate drainage of bacterial products. Whereas the vaginal drainage is obviously adequate, escape from the cervix can be held up in its branched and tortuous glands. The formation of the glandular retention cysts (Naboth's follicles) is evidence of the actuality of complete retention.

The structure of the cervix, therefore, is well suited as a site for incarcerated infection. The remarkable fact is that we should find so little evidence of it. Further research into this problem promises much interesting work, for there is undoubtedly a defence against infection in the cervix, probably inherent in the specific mucoid secretion of the glands. Further, we must be clear on the *kind* of infection commonly found in a leucorrhœal discharge, and therefore possibly originating from the cervix. Anyone who has given any time to vaginal and cervical bacteriology cannot but be impressed by the comparative infrequency of truly pathogenic organisms such as Group A. streptococci. The majority of colonies are those of unnamed saprophytes, non-hæmolytic, short-chained faecal streptococci, staphylococcus albus, occasional bacillus coli and sometimes a heavy growth of proteus. And even when the more hostile organisms, such as *bacillus coli*, *S. viridans*, or *S. aureus* are found in the vagina, they cannot usually be recovered from the cervix.

Lastly, there is the evidence of the effect of specific vaccine treatment. During 1913, the writer had the advantage of testing the vaccine reactions from organisms obtained from leucorrhœal discharges in patients in a clinic in Sir Almroth Wright's laboratory at St. Mary's Hospital. The work, disorganised by the war, was lost and never published, but the memory and impressions remain. Very large numbers of vaccines were made and administered, sometimes to patients suffering from various

"rheumatic" conditions, such as arthritis, but, with the sole exception of two cases of gonorrhœa, never was any local negative phase or positive improvement observed.

My own impression, therefore, is that discharge from the cervix is seldom a focus of general toxæmia or metastatic lesion, largely because such conditions are seldom due to active, even if chronic, infections. Some exceptions must be made. Gonorrhœa is a specific and definite infection of the cervix, from which may arise various forms of arthritis and fibrositis. There is also strong clinical evidence that amputation of the gonorrhœal cervix, together with adequate treatment of the urethra and glands of Bartholin, is followed by disappearance of irido-cyclitis. There are also exceptional cases where a streptococcal infection recovered from the cervical canal (not only from the vagina) may be the cause of various forms of ill-health as shewn by the result of amputation, or thorough cautery of the canal.

After the menopause the cervix ceases to be of much importance, but pyogenic infection of the body of the uterus (senile endometritis) may lead to pyometra whereby, from a few drops up to several ounces of pus may be locked up in the cavity. In the absence of carcinoma as a cause of pyometra, it is surprising that these patients can be as well as they are with an ounce or two of fœtid pus retained within the senile uterus. There is, however, usually, a loss of general condition, fatigue, malaise and possibly pyrexia—all cured immediately by providing adequate cervical drainage and brief irrigation with glycerine. Chronic suppurative salpingitis is an obvious and well known cause of constitutional sub-health. It may be difficult or impossible to culture the infection by ordinary methods, but prolonged cultivation, sometimes anaerobically, will usually reveal the infecting agent, often *bacillus coli* with a form of streptococcus. It is doubtful, however, if an old plastic salpingitis in which the tubes contain nothing more than a serous exudate can be a source of ill-health.

Finally, gynæcologists are sometimes asked if they can find a pelvic cause of chronic evening pyrexia, often no more than a degree or less, together with a mild malaise and loss of flesh. Usually all other possible foci of sepsis have been already explored. The dispirited patient arrives in our consulting rooms minus teeth, tonsils, and appendix. All other investigations have been done, and nothing remains but the pelvis. Perhaps the reluctant admission of a one time trifling leucorrhœa, a mild disturbance of menstrual rhythm, a transient backache, or possibly no more than the history of some long forgotten miscarriage, will inspire further hope that the focal origin of infection will be found. Chronic pyrexia may well be caused by chronic salpingitis, but here the other symptoms of a lesion capable of causing continued fever, will long before have indicated its existence. It is possible, however, that a tubal infection has been overlooked, and if in doubt the patient should be carefully examined and X-rayed after lipiodol injection.

The cervix has never, in my experience, caused continued pyrexia, but I recall one patient who had suffered for many months, and arrived sans teeth, tonsils and appendix, complaining of steadily increasing menstrual loss and pain. The uterus showed no physical signs except slight enlargement and tenderness. Hysterectomy was followed immediately by disappearance of pyrexia and the associated ill-health.

Summing up, we may fairly claim that the important focal infections in the pelvis are gonorrhœa in any of its usual sites, and chronic salpingitis. Apart from these conditions, there are very few others which can be incriminated as centres of general disturbance, and though they may be treated successfully by drugs, cautery and minor operations, we cannot as a general rule expect anything more than relief of the local condition.