

5-1935

Endocervicitis

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E N D O C E R V I C I T I S

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Senior Thesis

1935

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I. INTRODUCTION

Although endocervicitis has been known as an entity since the time of Hippocrates (McCrossing) and has been treated in all imaginable ways, the disease still continues to be the most common gynecological problem. Physicians have written volumes of material on the subject and yet little progress has been made toward control of the disease.

Rowlett states, "While endocervicitis is more general than the ordinary cold, it is potentially more dangerous than tuberculosis. Invalidism is often the result and indirectly, the economical cost to the country is greater than any other disease today. Yet there is less publicity and effort to educate the people of this danger than of the common cold.

"Unfortunately, few physicians have patience to treat locally in their offices, a case of acute or subacute infection of the cervix. The nose and throat specialists will spend weeks, even months, in treating an infection that can do far less damage to the health of the patient than an infected cervix, and yet, on account of the unpleasantness and inconvenience of treating the latter, the physician contents himself by prescribing a simple douche."

The more recent statistics show that 70 to 80% of multipara and 7 to 12% of nullipara suffer from cervical infection, (Howe, 1933). With a disease of such prevalence, I believe a review of the literature up to the present time, including the results of types of treatment, is time and energy well spent.

II. HISTORY

Tampons and douches have been the main stand by as far back as the literature is available. The offending persistent discharge was either absorbed by wool or cotton pledgets placed in the vaginal vault or washed away with solutions containing all the way from pure water to highly corrosive chemicals.

Oseander (1802) advocated and performed cervical operations, (McCrossing) but the first plastic amputation of the cervix uteri utilizing a cuff of vaginal mucosa as a stump covering was performed by Dr. M. Sims in 1861. This type of operation has been variously modified and the principle is still in use to-day. One year following Dr. Sims' operation, T. A. Emmet performed the first successful trachelorrhaphy although he did not publish his work until 1874.

Antiseptics, astringents, and the like were advocated by F. Churchill in 1868. He preceded his application by a thorough inspection of the cervical canal using an endoscope. In addition he used the curette in certain cases that failed to respond to topical applications.

About ten years ago the electro-cautery was brought into active service but the use of a burning instrument is by no means new. In 1872 F. H. Getchell gave a lecture on the use of glowing charcoal sticks for destroying the cervical glandular tissue. He included directions for making the charcoal sticks with the following formula;

Potassii Nitratis	grains	xx
Carbo Ligni	drams	vij
Pulv. Acaciae	drams	j
Aquae	q.s.	

After the burned tissue had sloughed in 4 or 5 days, he painted the cervix every fourth day, with a preparation of iodine in glycerine, until the cervix was healed.

In 1878, J. M. Bennett announced his success of treating endocervicitis by the use of interstitial injections coupled with dilatation of the cervix. His formula for the injection is;

R
Potassii Iodidi
Potassii Bromidi aa grains x
Tr. Iodidi drams ss
Aquae q.s. drams ij

The injections were made in 3 to 5 places and large doses of potassium bromide were given by mouth for subinvololution.

The treatment of to-day is merely a modification of the above and the more accepted ones will be discussed in detail under the section on treatment.

III. EMBRYOLOGY AND ANATOMY OF THE UTERUS

The Mullerian ducts which develop in the urogenital folds of the embryo consist of a cranial longitudinal portion or uterine tube, a middle transverse portion or uterine fundus and corpus, and a caudal longitudinal portion or uterine cervix and vagina which is fused to its fellow to form the so-called utero-vaginal primordium. The cranial wall of the middle transverse portion which was concave, bulges upward and becomes convex, thereby adding the unfused transverse portions of the ducts to the uterus to form its fundus and corpus. The shorter uterine cervix and the vagina arise from the original utero-vaginal segment. Uterine glands evaginate by the seventh month but remain small and atypical until puberty. The uterus shortens soon after birth and does not recover this loss until just before puberty. The uterus and vagina are not distinct until the middle of the fourth month, (Arey).

Unlike the rest of the female tract the vagina becomes lined with stratified epithelium (Arey) but not cornified until adult life (Brady).

Concerning the structure of the uterus, I shall limit the discussion to that of the cervix of which we are chiefly interested. The cervix is the lower constricted segment of the uterus. It is somewhat conical in shape, with its truncated apex directed downward and backward, but is slightly wider in the middle than either above or below in the normal individual. Due to its attachments, it is less freely moveable than the body, so that the latter may bend on it. Normally therefore the long axis of

the cervix is not on the same straight line as the long axis of the body. The long axis of the uterus as a whole presents the form of a curved line with its concavity forward, or in extreme cases may present an angular bend at the region of the isthmus. The cervix projects through the anterior wall of the vagina, which divides it into an upper, supravaginal portion, and a lower vaginal portion.

The external orifice of the cervix is bounded by two lips, an anterior and a posterior, of which the anterior is the shorter and thicker. Because of the slope of the cervix the anterior lip projects lower than the posterior, (Gray).

The muscular layer of the cervix uteri consists chiefly of circular bundles which have been called the sphincter of the uterus, (Maximow). The uterus has no distinct layers of muscle but is rather a single muscle presenting many different angles in the course of its component bundles. Its fan shaped muscle sprays wind downward from the Fallopian angles to the external os. The fixed points are elongations in the round and broad ligaments to the pelvic brim, (Brown).

The canal of the cervix is somewhat fusiform, flattened from before backward, and broader at the middle than at either extremity. It communicates above through the internal os with the cavity of the body, and below through the external os with the vaginal cavity. The wall of the canal has an anterior and a posterior longitudinal ridge, from each of which project a number of small oblique columns, the palmate folds, giving the appearance of branches from the stem of a tree, thereby receiving the name of arbor vitae uterina. The folds on the walls are not exactly

opposite so they fit one between the other so as to close the cervical canal.

The mucous membrane in the cervical canal is sharply differentiated from that of the uterine cavity. The upper two-thirds of the canal has a mucous membrane provided with numerous deep glandular follicles, which secrete a clear viscid alkaline mucus. The mucosa of the lower portion has numerous papillae and gradually changes to stratified squamous epithelium close to the external os. The upperportion has a cylindrical and ciliated epithelium, (Gray). The mucous membrane contains numerous racemose glands each of which is lined with cylindric goblet cells secreting a true mucus, (McCrossing, Jr.)

The circulation of the cervical mucosa is sluggish (McCrossing, Jr.), being supplied by branches of the uterine and vaginal arteries originating from the hypogastric arteries, (Gray).

The lymphatics of the cervix uteri take their courses, transversely to the external iliac glands, postero-laterally to the hypogastric glands, and posteriorly to the common iliac glands. The lymphatics communicate with those of the corpus in external iliac and lateral aortic glands, (Gray, Alford).

IV. PHYSIOLOGY

Physiologically, the cervical canal presents nothing more than a passive communicating channel between the vaginal and uterine cavity. The muscular portion contracts rhythmically independent of neurogenic stimuli. The contraction is essential to prevent muscular degeneration. The secretions are drained by passive flow and rhythmic muscular contractions.

There is no true cervical sphincter as the muscle fibers of the corpus uteri are compact successions of oblique circle segments, which when contracting shorten every diameter of the uterus and uncoil in the cervix thereby widening the os like an iris diaphragm. Cervical dilatations become an integral part of uterine contractions, instead of a passive relaxation in a hypothetical sphincter, (Brown, Diasio).

The glands of the cervix secrete a clear viscid tenacious mucus that fills the cervical canal and serves to close it and prevent invasion of the uterine cavity, (Crossen, Cowles).

V. ETIOLOGY

Inflammations of the cervix uteri from the viewpoint of etiology may be grouped under three headings:

1. Gonorrhoeal - more often seen in nulliparae
2. Septic, and
3. Traumatic - most frequently seen in multiparae or cases that have aborted, (Howe, Goodwin).

GONORRHEAL ENDOCERVICITIS

Gonorrhoeal endocervicitis as it occurs in infants and young girls where coitus has not occurred, the cervix is practically never the sight of primary infection. Accidental contamination such as articles of clothing, towels, hands of infected persons, et cetera, usually is the cause in pre-adolescents. Vulvo-vaginitis occurs due to the lack of cornified epithelium in this region (Brady) and a cervicitis results secondarily.

Adult gonorrhoeal endocervicitis is usually the result of direct inoculation during coitus. Here in contra-distinction to the type of infection that occurs in young girls, the vagina is relatively immune to the gonococcus due to the presence of a cornified outer layer of the stratified squamous epithelium, (Brady).

PATHOLOGY — The histological structure of the mucosa of the cervical canal is such that it is susceptible to infection, which once established, remains and progresses, (Henson), unless proper treatment is instigated. The pathological changes in the cervical endometrium bring about round cell infiltration into the subepithelial tissue around the glands, (Howe, Kennedy). In many areas the glands are so filled with leucocytes that their lumina are barely distinguishable. The blood vessels are dilated

and engorged, so that macroscopically one sees a large red cervix from the external os of which there is a profuse purulent discharge, (Martzloff). In the more chronic form these pathological changes stimulate the glands to proliferate and increases their activity, producing a mucous secretion. Some of the glands become distended and covered with a single papillary layer of epithelium, closing the glandular ducts. This produces the nabothian follicles, named after the distinguished Saxon anatomist,



Endocervicitis, subacute and chronic. The deeply penetrating racemose glands are well depicted here with a pronounced periglandular cell infiltration. Some of the glands show their lumina partially filled with cells, (Illustrations from Tice).

Martin Naboth, 1675-1721, (Bath), which can be felt with the examining finger, (Howe). Multiple abscesses may occur due to infection in these blocked glands, (Miller).

SEPTIC OR NON-GONOCOCCAL ENDOCERVICITIS

An endocervicitis of non-gonococcal origin may follow

one of the acute exanthemata such as scarlet fever; with typhoid, syphilis, tuberculosis, diphtheria (Quasser); or it may follow a colon infection with improper care during an attack of diarrhea (Howe). All types of bacteria may be found in the secretion but one usually predominates, (Miller).

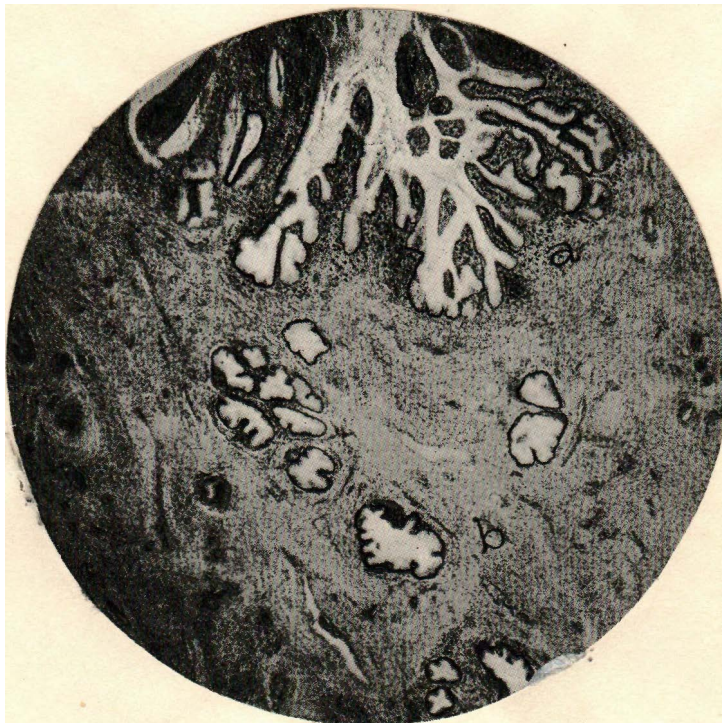
Endocervicitis with cervical hypersecretion is not uncommon in high-strung nervous virgins. The etiology in these cases is still undetermined. Due to the low virulence of some strains of the gonococcus which leave none of the characteristic sequelae of this organism, i.e. salpingitis, Bartholinitis, Skenitis; and the coccus being frequently absent after 2 or 3 weeks from the onset of the infection (Fulkerson), one is dubious as to whether all cases of endocervicitis in a previously normal cervix are not due to the gonococcus.

Howe states that ovarian dysfunction and anemia reduce the general health, thereby lowering the acidity of the vaginal vault to the point where the normal vaginal flora no longer encounter conditions conducive to optimal growth. There follows an invasion of other bacteria and pathogenic organisms which grow and induce an infection of the cervix.

PATHOLOGY — The cervix uteri may be of variable size but usually is hypertrophied. There is a mucopurulent discharge in most cases which flows from the external os and over the cervical lips, (Delafield). The vaginal mucosa may appear pale pink and smooth but more often there is a red, raw, eroded area around the external os, (Howe). This area is known as an eversion and may be limited to either the anterior or posterior lip. The

irritating mucopurulent discharge causes this abrasion of the epithelium of the portio-vaginalis. Rapidly columnar epithelium in the cervical canal extends downward covering the raw surface and with blood vessels shining through this newly formed layer, presents the red raspberry halo seen around the canal, (Goodwin). This eversion in not a few instances bleeds on the slightest trauma with a cotton pledget.

A histological section of a chronic case of endocervicitis reveals in the distal portion of the cervix areas of hyperplasia of the stratified squamous epithelium. Round cell



Endocervicitis, chronic. To show the variation in inflammatory reaction in the same group of glands. At (a) the glands show a most pronounced periglandular round-cell infiltration. At (b) the glands appear essentially normal.

infiltration in the subepithelial tissue produces a well defined zone. The racemose glands which open out on the stratified

squamous epithelial portion of the cervix are markedly distended, their high columnar epithelium gradually becoming cuboidal and flattened as the intra-cystic pressure increases. These are known as Nabothian cysts, (Delafield).

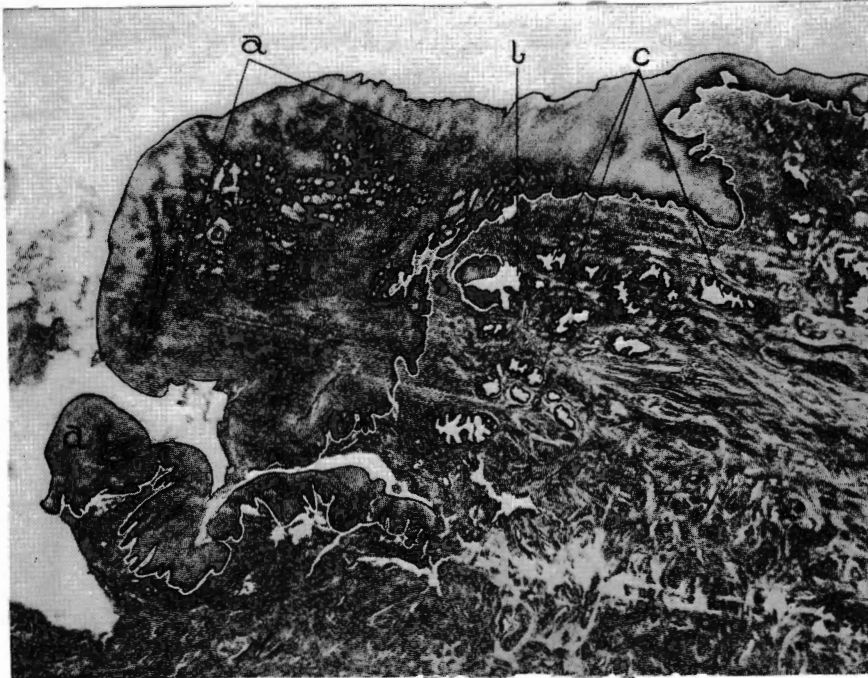
TRAUMATIC ENDOCERVICITIS

As one might have already suspected, childbirth is the most common etiological factor in the production of traumatic endocervicitis. Among other factors that might be included are, excessive coitus, foreign bodies (pessories, etc.), improper use of instruments, and strong chemicals (douches, etc.), (Lancaster). The resulting endocervicitis is always secondary due to the invasion of bacteria into a wound where primary union has not taken place.

PATHOLOGY — Macroscopic examination of a laceration reveals radiating linear depressions which extend on the cervical lips in various directions and extent. If the laceration is transverse, a common type of tear, the lips of the cervix are separated and the distal portion of the cervical canal is in view. This is known as lipping of the cervix.

Microscopic examination of a section of tissue in a lacerated cervix shows an essentially normal endocervix except in the immediate area of the laceration at the external os. Hyperplasia of the stratified squamous epithelium at the site of a healed laceration is usually noticed. Epithelial invaginations occur where the epithelium has attempted to cover some defect as is commonly observed at the edge of chronic ulcers. Signs of inflammation may be lacking but round-cell infiltration in the subepithelial tissue is observed quite fre-

quently. The ducts of the cervical glands, normally lined with columnar epithelium may be seen to have a stratified squamous epithelium which may even extend over the walls of an alveolus.



Low-power photomicrograph of a healed cervical laceration. At (a) is hyperplastic stratified squamous epithelium which has grown into the cervical defect in a manner similar to that seen at the edge of old skin ulcers on other parts of the body. At (b) a cervical gland is lined in part by stratified squamous epithelium. (c) indicates a few of the numerous cervical glands.

The epithelial invagination and irregular surface is sometimes considered precancerous but basis for such an opinion is still questionable at the present time, (Fulkerson).

VI. BACTERIOLOGY

Undoubtedly the gonococcus is the most frequent infecting organism and must always be considered as the etiological factor until sufficient evidence is obtained to exclude it. Repeated examinations must be made although they may be futile, as the organism is frequently only obtained during the first two or three weeks of the disease, (Fulkerson). Brown states that, bacteriologically, endocervicitis is due to the gonococcus, streptococcus, staphylococcus, and colon bacillus in the order named.

The gonococcus is a gram-negative, bean shaped diplococcus both intra- and extra-cellular. Characteristically, few other bacteria are seen in a cervical smear when the gonococcus is present in large numbers, but as it decreases, other bacteria make their appearance. After the infection has become chronic, the gonococcus may be repeatedly absent from the discharge, but the polymorphonuclear leucocytes remain in approximately the same numbers.

When grown on artificial media, the gonococcus requires human protein, usually obtained in the form of ascites fluid, a reduced oxygen tension and a constant temperature of body heat. The organism produces acid but no gas in glucose and does not effect litmus milk, (Topley and Wilson).

Micrococcus catarrhalis, which has similar staining reactions to that of *Neisseria gonorrhoeae* and is not infrequently the cause of vulvo vaginitis in children must be excluded before a positive diagnosis is made. Unlike the gonococcus, this or-

ganism will grow on ordinary media and at a lower temperature.

The streptococcus is present in one-third of all patients having a purulent leucorrhoea (Curtis), and probably is responsible for many of the cases of arthritis where other sites of focal infection cannot be found (Davis). Streptococci isolated from the cervix have produced arthritis in rabbits in numerous experiments here and abroad, (Davis). For that reason the endocervix should be considered the tonsil of the uterus in diseases due to foci of infection, (Quasser). The streptococcus is spherical or ovoid, arranged in short or long chains, or in pairs. It is non-motile and non-spore forming. Most of the species are gram positive. It grows poorly on ordinary media, blood agar being a most favorable medium for characteristic growth. Most species are aerobic and facultatively anaerobic, (Topley and Wilson).

The presence of the staphylococcus and colon bacillus, while common on the vulva, is rare in the upper portion of the vaginal tract, and therefore accounts for the smaller number of cases of endocervicitis of that bacteriological origin.

VII. SYMPTOMATOLOGY

Acute non-traumatic cervicitis, usually gonorrhoeal, in both young and older patients is characterized by a profuse leucorrhoea, generally of mucopurulent character (Davis). Usually no other symptom is present except irritation of the vulva and adjoining skin by the discharge.

In the chronic non-traumatic type of cervicitis, leucorrhoea may or may not be the chief complaint. Jefferys in a survey of 300 cases of cervicitis found that only 29% complained of leucorrhoea. Among other symptoms besides the leucorrhoea which usually becomes more profuse a few days before and after menstruation and seldom has much odor unless infected by the colon bacillus or is attended by sloughing (Cletcher), the patient may present one or more of the following common complaints. Backache is by no means infrequently the cause of much distress to the patient, likewise soreness and tenderness in the pelvis and a feeling of lower abdominal pressure make the disease unpleasant (Howe, Goodwin). Less frequent complaints include menstrual irregularities, dysmenorrhoea, sterility, malaise, loss of energy, lassitude, headache, fatigability, mental depression, nervousness, and numerous symptoms coming under the heading of neurasthenia.

Backache and dyspareunia are present only when the condition is associated with displacements or parametrial involvement, particularly posterior cellulitis, with extension to the uterosacral ligaments.

Constipation, while not usually complained of, is a frequent finding and seems to vary with the severity of the disease (Miller).

Pruritis is a very common symptom but in 11% of 84 cases Burns found it was due to an adherent preputium clitoridis with a collection of inspissated smegma.

Symptoms arising from traumatic endocervicitis are similar to those given above. Intermenstrual bleeding occurs in some cases but is usually due to the rupture of small capillaries in the so-called erosion on the cervical lips.

VIII. COMPLICATIONS

With a rich lymphatic supply and the lymph vessels passing cephalad from the cervix into the muscle body of the uterus, it is of no great wonder that complications sooner or later result from a chronically infected cervix. Infection practically always spreads by lymphatics and seldom by the mucous membrane (Hoenig).

Uterine displacement is the most frequent complication (Fulkerson), especially in women who have had children for the uterus becomes large and heavy because of intramuscular lymphangitis and circulatory stasis. Premenstrual and postmenstrual metrorrhagia may follow this hyperplasia and be an additional source of trouble to the patient (Brown). Venous stasis in the boggy uterus produces uterine fibrosis. The normal soft bed of the uterine mucosa is transformed into a tough fibrous membrane so that when chorionic villi endeavor to implant themselves down into the uterine substructures, they encounter a layer of what might be called hard pan. Thus deprived of normal nutrition, miscarriage or placental adhesions result by reason of malnutrition of the mucosal bed, (Bath).

Not only is retrodisplacement of the uterus due to other causes undesirable because of the backache produced but the uterus is more prone to infection in this position, is less likely to spontaneous cure and much more apt to have a recurrence of the same (Fulkerson).

The endocervical infection spreading by the lymphatics which effects the entire muscle body of the uterus may extend, out around the Fallopian tubes and even envelop the ovary to the extent of interfering with rupture of the Graafian follicle. The infection thus brings about that cystic condition of the ovary so often observed in gynecological patients (Alford). With the spread of the infection through the uterus and to the tubes with the resultant perisalpingitis, endocervicitis stands in the direct relation of cause and effect in the production of tubal gestation and it follows as a logical deduction that the eradication of chronic endocervicitis presents a prophylactic measure in tubal pregnancy (Magid).

Much has been said in the past few years concerning the cervix as a focus of infection in cases of arthritis, and should now always be considered when treating women for chronic arthritis (Cowles). There has been evidence secured which shows the affinity of cervical streptococci for joint tissues. The antigenic properties of cervical streptococci suggest that they possess a low virulence but high specificity for these tissues (Moench). Goodwin cites a case of arthritis which was markedly relieved after two months following the removal of the infection, but further evidence is still needed on this phase of the subject.

Sterility is not an infrequent complaint and should be carefully investigated before the exact etiological factor is to be accepted. When, as the result of an endocervicitis, sterility may be due to a mucous plug in the cervical canal, a

narrowed cervical passage due to fibrosis and hyperplasia of the mucosa, or to the destruction of the spermatozoa by strong secretions of the reproductive tract (Diasio). It is interesting to note that a drop of cervical fluid taken shortly after coitus in cases of chronic endocervicitis, shows actively motile spermatozoa whipping their way along until they come in contact with a group of pus cells. Here they become entangled, struggle for a short time, finally stop all motion and remain fixed. Sterility in these cases may be cured, for removing the seat of the chronic endocervicitis removes one causative factor in the sterility of cervical origin (Sturmdorf).

Stricture of the ureter due to pelvic adhesions is mentioned by several writers but this condition is much less observed than those already described (Henson, Howe, Goodwin).

Carcinoma of the cervix is the most important sequelae of cervical infection according to Ground but on the other hand Fulkerson states that clinically there is no evidence that endocervicitis is a precancerous lesion in all the cases he has treated.

IX. DIAGNOSIS

Cases of acute gonorrhoeal endocervicitis present, along with their symptoms, evidence of a purulent irritating discharge (Goodwin). The cervix usually appears hyperemic and enlarged, although it may be of normal size and color. A thick, tenacious, cloudy discharge can be seen exuding from the external os and a smear made of this secretion will show countless numbers of polymorphonuclear leucocytes and numerous characteristic gram negative intracellular diplococci. In medico-legal cases, the finding of a gram negative diplococcus and a probable history is not conclusive evidence and cultural methods must be resorted to.

In chronic endocervicitis the discharge may vary from a clear mucoid secretion to a grossly purulent one. The portio-vaginalis appears enlarged and inflamed and usually indurated when palpated. Smears made of a clear mucoid secretion may be bacterial and cell free which is not uncommon in virgins and nulliparae who have had no venereal infection and have an excessive discharge. But in cases of endocervicitis, polymorphonuclear leucocytes are always present in variable numbers. The number of cells however bears no relationship to the severity of the disease for they may be almost nil in an acute inflammation and abundant in a chronic low grade infection. Numerous types of bacteria may be seen in a smear made of the secretion but one variety usually predominates (Miller).

With an intact hymen, cervical secretions should be obtained through a cystoscope, after the vulva has been painted

with an antiseptic solution before a thin applicator with very little cotton is inserted into the cervical canal.

Traumatic endocervicitis is diagnosed from the appearance of the cervix described previously and a smear stained by the usual technique. In some cases with erosion a differential diagnosis between early carcinoma and chronic endocervicitis may be impossible without the use of the microscope (Davis). The use of the curette which was quite prevalent a few years ago is dangerous and should not be resorted to unless absolutely necessary (Bath). Infection is often spread in this manner and may be fatal to the patient.

X. TREATMENT

ACUTE ENDOCERVICITIS

Whether of gonococcal origin or not the first principle in the treatment of any acute infection is local and general rest. The patient should be put to bed in all cases where it is possible (Howe), but many cannot remain there for economic and other reasons so that ambulatory treatment must be used. Many physicians prefer to use conservative treatment, which includes rest in bed, fresh air and nourishing food. No medical treatment being given for fear of spreading the infection to the tubes or into the peritoneal cavity. Others believe that medical treatment is essential in order to prevent these undesirable sequelae from becoming an actuality. No one method can be the one of choice for all cases and for that reason numerous procedures have crept into the literature since the time of Hippocrates.

Within the last ten years, a drying treatment has been introduced and holds prospects of excellent results in acute and subacute cases of gonorrhoeal endocervicitis. Blair states that the use of strong antiseptics, daily douches and tampons are of no value. Antiseptics applied to the surface of the infected area do not get at the seat of the trouble, and douches keep up a warm damp environment, in which bacteria can better thrive. A tampon interferes with the daily discharge of infected debris and tends to reinfect the already damaged cervix.

The patient is placed in the knee chest position, and

after careful sterilization of the vulva and proper attention has been placed on contamination from the rectum, the vagina is placed on a stretch with a bivalve speculum. Thus with the folds of the vagina flattened out, the canal is painted with 2% mercurochrome. Cervical smears are made at this time for future examination. The cervix is then carefully dilated and an applicator with a small piece of cotton saturated with 2% mercurochrome is placed in the cervical canal where it is left for about two minutes. The excess mercurochrome in the vagina is removed by a dry cotton pledget. Following removal of the speculum the vagina is filled with air and sprayed with a fine powder composed of two parts of kaolin and one part of sodium bicarbonate. Kaolin is inert hygroscopic aluminum silicate and has for its purpose, the absorption of moisture thereby inhibiting bacterial growth. The powder is applied by means of a Nassauer's siccator, a glass apparatus which balloons up the vagina with air and applies an even coat of powder to all of the mucous membrane.

Treatments are given three times a week, and after a few times the secretion dries up but a cure is not effected when the secretion disappears and treatments must be continued for several weeks to prevent a relapse.

Another method of treatment of acute gonorrhoeal endocervicitis has been devised by Howe in which he makes use of rest, local hyperemia, applications of mild antiseptics followed by medicated tampons. After preparation of the vulva as already described, the vagina is distended with a bivalve speculum and

carefully and thoroughly washed with a 5% sodium bicarbonate solution. After removing the excess solution with dry cotton pledgets, a Bier hyperemic cup connected with a 220 cc Bigelow syringe is placed over the cervix and suction applied from three to five minutes. Upon removal of the cup, the pus and mucus is thoroughly removed and the cervical canal is wiped clean with cotton placed on an applicator. A cotton pledget saturated with 10% silver nitrate is then introduced into the cervical canal and allowed to remain from three to five minutes. Following removal of the pack, a medicated tampon is placed in the vagina next to the cervix and allowed to remain in place for 24 hours.

The treatment should include massage of the glands of Skene and irrigation with a 5% solution of sodium bicarbonate followed by the instillation of 15% argyrol into the urethra. Vaginal diathermy should be started after the acute stage of the disease has subsided.

John states that topical applications are of little value but in the acute cases, 25% argyrol or 10% silver nitrate applied every other day to the cervix after cleansing with saturated bicarbonate of soda is beneficial. The engorgement in marked cases may be relieved by the use of glycerinized tampons or hot vaginal douches.

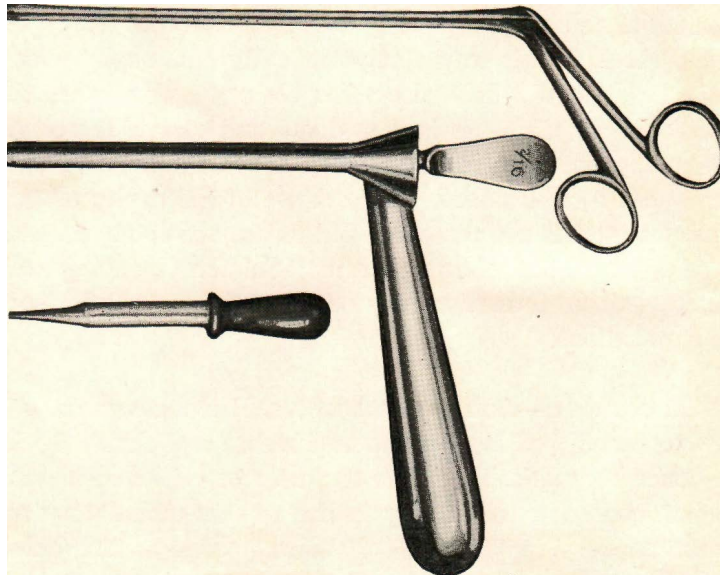
From the wide use of mercurochrome in all branches of medicine one would expect to find it in use in gynecological treatments and a technique has been developed by Brady. As in the preceding techniques, the cervix is well exposed by the use of a bivalve speculum. After the cervical secretion has been

collected for microscopic examination the cervix and vagina are bathed with cotton pledgets saturated with 20% mercurochrome. Any excess mercurochrome is then removed with dry cotton. A small piece of cotton on an applicator is dipped into the mercurochrome and then inserted into the cervical canal where it is allowed to remain a few minutes. After its removal, the fornices are flooded with the 20% mercurochrome and a tampon placed against the cervix, which is removed at the end of 24 hours. The remainder of the vagina is swabbed and as the speculum is withdrawn, the external genitalia are likewise covered with the antiseptic. A perineal pad is placed in position and the patient instructed to return twice a week for treatment. Smears should be made every two weeks and no douche taken during the menstrual period or on the day the smear is to be made.

Conservative treatment with the careful and intelligent use of mild, non-irritant antiseptics will summarize the content of the foregoing in the treatment of gonorrhoea in the acute stage and appears to be the logical and practical method to be used in the gynecological field of medicine. Strong chemicals, as have been advocated by early writers, certainly are not to be recommended, for the destruction of viable cells at the site of an active inflammatory process is obviously contrary to the present conception of the proper treatment of acute infections.

Gonorrhoea in children after a short time usually involves the cervix from extension and treatment of a vulvo-vaginitis in these instances is entirely inadequate. Although the type of treatment is somewhat similar to that in the adult, some variations are necessary and will be discussed presently. The

infection, by the time it is seen by the physician, is usually in the subacute or chronic stage (Catherwood), and medicinal treatment is indicated. The external genitalia are carefully cleaned and painted with an antiseptic. The child now assumes the knee chest position and the vulva are separated to allow



Instruments necessary for endocervical treatment through a Kelly cystoscope. 1. Capillary pipette with small rubber bulb. 2. Spiral-tipped metal applicator. 3. Alligator forceps. 4. Kelly cystoscope. 5. Medicine dropper with which medicament is injected through cystoscope into vagina.

the vagina to become distended with air. A Kelly cystoscope of the largest size that can be comfortably tolerated by the patient is inserted through the hymenal orifice and the vaginal vault is thoroughly examined. Either direct or indirect illumin-

ation can be used, depending upon the model of cystoscope used. The cervix is carefully wiped with a small swab of cotton soaked in 20% mercurochrome. Cervical secretion may next be collected on a clean applicator or by means of a fine capillary pipette with a rubber bulb at one end. The cervical canal is then swabbed or injected with mercurochrome and the vaginal vault is flooded with the antiseptic. A small cotton tampon is placed against the cervix and its thread attachment is fastened to the thigh with adhesive. After local treatment to the vulva, a perineal pad is applied and secured. Treatments should be given daily at the office if possible but where the parent is unable to comply with this routine, she may be instructed to remove the tampon in 24 hours and give the child three sitz baths a day. Following the bath in the morning and at noon, the vagina should be irrigated with a mild douche, such as potassium permanganate 1:4000, or boric acid (Statham), and after the night bath, 20% mercurochrome should be instilled, completely filling the vault. This type of procedure may be repeated until the child can return for office treatment (Brady).

Chronic gonococcal endocervicitis, the stage which is most frequently seen by the physician (Catherwood) is treated in the same manner that will be given directly for any type of chronic non-gonococcal endocervicitis. In the chronic stage, it may be impossible to determine if the infection is of gonococcal origin, for the organisms are usually present only during the first two or three weeks from the onset of the disease (Fulkerson) and as the gonococcus disappears from the secretion other bacteria

tend to increase in numbers.

A thorough diagnosis of the exact pelvic condition must be made before treating the cervix as a latent tubal infection may be lighted up (Ground). Although this type of reaction is not repeatedly mentioned in the literature, it is well to bear in mind, for much damage can be done from improper treatment and legal procedures may be the final outcome.

While considerable attention is applied to clearing up the cervical infection, one must not overlook an infection in the Bartholian or Skene glands. To leave these glands untreated, if they are infected, is to invite a reinfection of the cervix and make a cure practically an impossibility (Fallon). Inspection, palpation, and microscopic examination of any secretion expressed by massage from these glands will readily show if an infection is harboring within.

Patients with either an acute or chronic gonorrhoeal endocervicitis should always be informed that the leucorrhoea associated with the disease is apt to persist for a long time after the actual gonorrhoeal infection has been cured (Statham). As has been previously stated, other bacteria rapidly appear in the secretion as the gonococcus disappears, and due to their presence, the cervical glands are stimulated to produce the excessive mucoid discharge.

CHRONIC ENDOCERVICITIS

Chronic endocervicitis whether of gonococcal origin or not may be treated in one or more of four ways, namely, chemical medication, diathermy, cauterization, and surgical excision

of infected tissue.

CHEMICAL MEDICATION — has been the most widely used form of treatment since endocervicitis began to be treated by physicians until a few years ago when diathermy and the electro-cautery were introduced. Topical applications have been extensively used but statistics show only 12.2% of cases can be cured by this method alone (Fulkerson). The use of iodine was advocated by Cletcher in 1923. His method is more radical than many for he dilates and cures the cervical canal previous to the placing of a 3% iodine pack. The pack is left in place from 24 to 36 hours and then a 1% Dakin's solution douche is used. The cervix is packed every two days for four or five times, then twice a week for three weeks and then once a week for four weeks. If the condition has not been cured at the end of three months, the cervix is then dilated and a curettement done as before. This treatment seems a little strenuous and as good results have been reported from simpler procedures, the latter are more prevalent.

Mercurochrome in a 20% solution when applied to the cervix twice a week has resulted in 29 cures out of 32 cases reported by Brady. The patient is placed either in the lithotomy or knee chest position and the cervix is exposed by a suitable bivalve speculum, a Kelly cystoscope being used in virgins, and the mucus removed by cotton pledgets or a solution of sodium bicarbonate. After wiping the cervix dry, the mercurochrome is applied by means of suitable applicators to the cervix and to the vaginal wall as the speculum is being with-

drawn. In cases of gonorrhoeal endocervicitis, Brady considers the condition as cured, when there has been three negative smears during the treatment, and one negative smear taken one month after treatment has been discontinued.

Pure phenol, immediately treated with alcohol, is of distinct value in mild cases of endocervicitis (Fallon). Great care must be taken that none of the chemical is placed on the adjacent tissues and it should be cautiously used.

Silver nitrate in 10 to 15% solutions applied at seven to ten day intervals has been suggested in the treatment of chronic endocervicitis during pregnancy. This does not cure the disease but produces an apparent cure, thus minimizing the risk of puerperal sepsis (Henson).

Application of kaolin powder by means of a Nessauer's siccator has been previously described under the treatment of acute endocervicitis.

Hypodermic infiltration of the cervical tissue is used at times. A 2 or 4% solution of mercurochrome is instilled with a hypodermic syringe as used in throat work. The needle is passed in the mucosa for its entire length parallel to the cervical canal at a point about 0.5 cm from the external os. There is no pain unless the stroma is pierced. A few drops are injected slowly and more as the needle is withdrawn. Four sites of injection are made corresponding to those of the compass. Approximately 0.5 cc is injected at each site. There results a sense of fullness in the pelvis, but this gradually disappears within three or four hours. Six to ten treatments are usually sufficient (Helvestine, Lancaster).

Injection of 25% ethyl alcohol may be substituted for the mercurochrome and clears up mild cases of endocervicitis in a few weeks (Kennedy).

Bismuth paste injections are also recommended. After removal of the cervical plug by coagulating it with silver nitrate, bismuth paste, composed of bismuth subnitrate ten parts and vaseline ninety parts, is introduced into the uterus gently and slowly with an asbestos packed, urethral tipped, glass syringe. Not more than one dram is injected into the uterus, a little is put around the cervix, and a tampon is placed against the external os for 12 hours. This treatment is given on alternate days in subacute cases and once or twice a week in chronic cases. A hot saline douche should be prescribed to be used after the removal of the tampon. Hollender cites 600 cases with 80% cures. The suppuration ceased on the average after eight injections of the paste. The chief contraindication in this treatment is obviously that of pregnancy. The only complication that might occur and can be avoided is the spreading of the infection to the tubes by the use of too much force or amount of paste during the injection.

The use of effervescent tablets of oxyquinolin tartrate placed in the cervical canal and posterior vault has given good results in numerous cases (Diasio). When it is considered that most of the bacteria which are at the seat of the infection are of the anaerobic variety, it seems logical that the introduction of oxygen in this location should cause an inhibition of their growth for a time.

In considering chemical medication one is brought into the field of electricity in the form of electro chemical treatment of endocervicitis by ionization of copper. The procedure in this type of treatment is as follows; a soft copper electrode known as the positive pole is inserted into the cervix, the bivalve speculum being used as the negative pole, and then eight milliamperes of current is applied and slowly increased to twenty milliamperes. The electrode sticks in the canal after one or two minutes and after 20 minutes, crystals of copper oxychloride can be seen surrounding the electrode and external os. Some of the crystals have been deposited upon and driven into the cervical tissue. The current is slowly turned off, the poles are reversed, and four to ten milliamperes turned on gradually. The reversal of the current quickly loosens the copper electrode, for in one or two minutes the copper crystals become soft and moist. This last step is a distinct improvement over previous methods for the electrode can now easily be withdrawn without tearing the cervical tissue. The patient is instructed to use a nightly douche of copper alum crystals, 12 grains to two quarts of hot water and after 10 days the douche is changed to alum and tannic acid for its astringent properties. The office treatment should not be repeated often-er than once every 10 days. No ill effects, such as pain, atresia, hemorrhage, scar tissue and contraction have been observed (Tovey).

While many observers condemn all chemical medication as practically worthless there are those that advocate this type

of treatment before any radical procedures are resorted to. This form of treatment has the distinct advantage of being more accessible and less dangerous in the hands of the less experienced and to increase the number of cures that are later treated with surgery. Medical treatment with cervical dilatation to promote drainage often gives good results (Titus), and should be done when other methods are not available.

DIATHERMY — in recent years, with the knowledge of the rather low temperature required to destroy the gonococcus, there has developed the process known as medical diathermy. It is known that the cervix can be heated to a temperature of 47° centigrade without tissue damage and that this temperature is 6 or 7 degrees higher than necessary to destroy the gonococcus. The time required to destroy the organism while in the cervix is not definitely known and for that reason the duration is governed by the response to treatment (Walther and Peacock).

As for all other procedures in the treatment of endocervicitis, the patient is properly prepared and the usual technique of asepsis observed. The non-active electrode is placed either under the buttocks or across the abdomen, being sure that there is good contact with the skin. The active electrode should be as large as can be placed in the cervical canal for a more even temperature can be obtained if the electrode is of good size. After the electrodes are in position, the current is applied beginning with 50 milliamperes and increasing the amount at the rate of 50 milliamperes in 30 seconds to the tolerance of the patient. The occurrence of cramps simulating menstrual pains should be the warning sign and the

current reduced until the uterine contractions have stopped. In no case should the current exceed 700 milliamperes (4000 volts). The treatment is continued from 10 to 30 minutes depending on the individual case. After the treatment has been completed, the current should be reduced at the rate of 100 milliamperes in 30 seconds. The average number of treatments is from 6 to 8. The least number required in a series of 38 cases of Walther and Peacock was two and the greatest number was 14. Ground found that three or four treatments were sufficient to clear up the ordinary severe case of chronic gonorrhoeal endocervicitis. Although the cases treated were of a resistant nature, the results have been very encouraging for the amount of scar tissue resulting from diathermy is almost negligible and is soft and elastic (Ground). To restore the vis-a-tergo of the uterus after diathermy, Brown advocates the use of sinusoidal current which empties the veins and stimulates arterial flow.

Failure of the diathermy to give good results in some cases, according to Harriman, is due to the following reasons;

1. Not all cases of endocervicitis are of gonococcal origin.
2. In advanced cases with cystic degeneration, the degree of heat is not sufficient to affect the Nabothian cysts. These cysts must be destroyed if a cure is to be obtained.
3. All old cases of endocervicitis, no matter what was their original etiology, become a mixed infection, and

many bacteria have a higher thermal death point than may be safely obtained by this method.

4. The cervical circulation is speeded up and quickly dissipates the heat formed.

In 1924 Corbus and O'Connor introduced an instrument called a thermophore as an improvement over the original diathermy apparatus. This instrument contains a thermometer in the active electrode which can be observed while the diathermy machine is being used. The temperature is raised to 116 or 117° F. and left in the cervix from 30 to 40 minutes. The treatment is repeated in 7 to 10 days for 4 to 14 treatments. They state that there is no pain during this procedure and that the thick discharge changes rapidly to a watery one and cervical erosions quickly heal.

CAUTERIZATION — Destruction of the cervical glandular tissue by heat is accomplished with the use of a cautery either electrically heated or in a direct flame. Following the cauterization, a violent inflammatory process is set up and in a few days the necrotic tissue sloughs off. Granulation occurs in the cervical canal and some fibrosis results.

Since the time Hunner first described the use of the cautery in the treatment of endocervicitis, there have been numerous modifications brought out by physicians everywhere. At present, the electro-cautery is in general use and consists of a small blade usually not over 8 millimeters wide placed at the end of the long handle of the instrument. Application of an electric current causes this blade to glow a bright red. In practice, the patient is placed in the lithotomy position.

and the cervix exposed by a bivalve speculum. The vaginal wall around the cervix is lined with dry gauze to prevent burning. The anterior lip of the cervix is grasped with a small volsellum forcep and as much of the cervical secretion is removed as is possible. A paste of sodium bicarbonate and hydrogen peroxide is advised by Campbell for this procedure. Due to the poor sensory nerve supply of the cervix, an anesthetic is generally not required but in nervous individuals, local or general anesthesia may be adviseable. Pain is usually the result of steam entering the sensitive uterine cavity (Behney). Howe advocates the use of 10% cocaine or 4% butyn placed in the canal 4 or 5 minutes before cauterization. The cervix is then well dilated if necessary and the cautery at red heat is passed well up into the cervical canal near the internal os. Pressing the blade against the posterior lip, it is withdrawn so that a linear cautery defect is produced down to the external os. The depth of the cautery should not exceed 5 millimeters, especially in virgins and women of the child bearing age. A single line on each lip and laterally is usually sufficient but 2 or 3 striae may be advantageous in the more severe types (Howe). Cysts of the Nabothian glands should be punctured with the cautery at the time of the treatment. Following the cauterization the canal is swabbed with hydrogen peroxide or 10% mercurochrome and the cervix is packed with sterile gauze for 6 to 8 hours if any bleeding is present, (Dickinson).

Following cauterization of the cervix, the patient should be informed that the vaginal discharge will be more profuse for a few days and that she should use an alkaline

douche (potassium permanganate 1:4000) once or twice a day. The necrotic tissue sloughs in about two weeks and the patient should return to her physician within a month of the cauterization for observation of the healing of the cervical canal. The cervix should be dilated if it appears necessary but if the cauterization has not been too extensive, stenosis is a very uncommon sequela (Fulkerson), although it is a possible danger (Tovey). Baker reports 90 cases with 78 cures and no stenosis in any case. In the hands of most physicians, cauterization of the cervix is usually an office procedure (Richardson) and from 3 to 6 treatments are usually required at 6 to 8 week intervals.

In 1931, Ground introduced the use of an apparatus



Parous cervix uteri with a transverse defect, some ectropion with some small Nabothian cysts about the external os. Its appearance immediately after linear cauterization.

made up of articles found in most physicians' offices. He uses an ordinary uterine sound insulated with a urethral catheter. The uninsulated portion is placed in the cervical canal, and using the vaginal speculum as the inactive electrode, the current is applied until a sizzling is heard or felt. The current is then turned off, the tip moved down a short distance and the current reapplied. This procedure is repeated 2 or 3 times so

that the entire cervical canal is touched. He repeats the treatment in 7 to 10 days and states that erosions often disappear by the time the endocervicitis is pretty well cleared up.

The liability of complications following cauterization seems almost nil (Orndoff) but some that have occurred are; vaginal burns producing a painful cellulitis, parametritis or tubal flareups, hemorrhage due to erosion into a large cervical branch of the uterine artery, and stenosis following too radical treatment. Ointments containing a small percentage of phenol may be used in cases of vaginal burns. For the cellulitis, hot sitz baths and compresses are indicated. Packing the cervix will usually control any hemorrhage that might occur. In alarming cases, suturing may be necessary. Dilatation in cases of stenosis should be tried before any operative procedure is attempted.

The types of cases adapted to cauterization according to Dickinson are;

1. Rough and extensive granulation with eversion.
2. Cysts, superficial or deep, (these recur sometimes after repairs).
3. Voluminous, adherent mucous catarrh of the canal.
4. Gonorrhoeal free secretions with thickened cervical lining.
5. Between birth erosion with laceration, (recurring with each labor if sewed in the interim).

6. Patients whose physical condition precludes or whose circumstances postpone operation.

7. Marked endocervicitis in virgins, (because the visits are few).

Syphilis of the cervix is a contraindication for cauterization (Davis).

As to the final result following cauterization, no definite promise can be made. In some cases the results are most gratifying while in others the discharge remains the same as before treatment. Fulkerson reports 65.3% cures and states that cauterization is the ideal form of treatment and should be the standardized procedure in all chronic cases of endocervicitis.

SURGICAL EXCISION OF THE INFECTED TISSUE — As has been previously mentioned, surgical procedures should be the last resort in cases of chronic endocervicitis, and used only after more conservative measures have failed to give satisfactory results. In the case of virgins, it is believed that operative procedures should never be considered, cauterization being the most radical treatment advisable. In patients whose tubes are occluded or excised, of course, conservation of the cervix is not essential (Kendig).

Trachelorrhaphy or low amputation of the cervix cannot be considered a proper surgical procedure for it does not produce a cure as a portion of the diseased endocervicum is unremoved (Brown). Operations which do not completely remove the seat of the trouble should be condemned as it not only

fails to relieve the patient's symptoms but subjects her to a non-beneficial surgical operation.

Curettage of the cervical endometrium is considered practically worthless by most gynecologists. Curettage of the fundus and corpus uteri for the relief of leucorrhoeal discharge is an insane procedure. "To tear the uterine mucosa into shreds in the belief that it will effect a cure when the real cause is afar off, is a most senseless and wicked procedure." — Bath. Acute involvement of the endometrium in cases of chronic endocervicitis is exceedingly rare and when present is usually secondary to some other pathological condition than that present in the cervix.

Probably the most widely used of the surgical procedures for relief of chronic endocervicitis, and giving the most satisfactory results, is conical extirpation of the endocervix, generally known as Sturmdorf's operation. This operation has as its chief aim, the complete removal of all infected tissue without shortening the cervix and inhibiting excessive cicatrization by covering the denuded area with cervical flaps of vaginal mucosa.

Indications for the Sturmdorf operation as described by Coventry are;

1. Cases with marked stellate lacerations with marked hypertrophy and scar formation in the cervix, (cervix may be larger than the uterus).

2. Marked bilateral tears, with eversion of the interior of the cervix and scar formation.

3. Marked retention cysts which fail to respond

to aspiration, puncture, et cetera.

4. Extensive erosions, economic conditions requiring rapid cure.

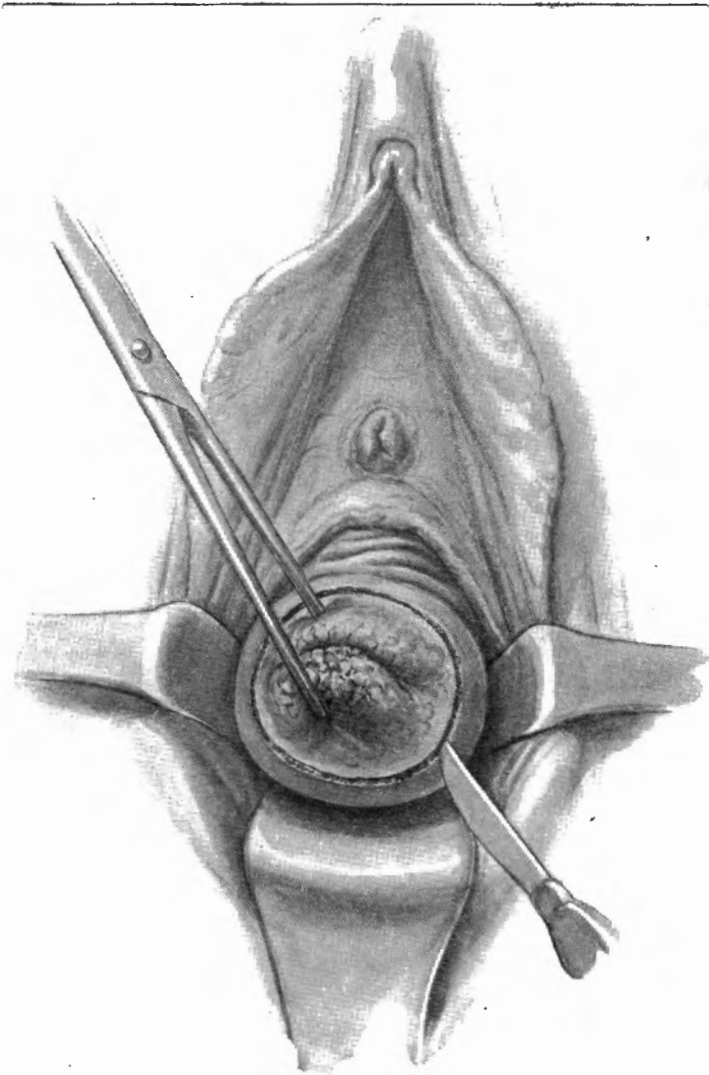
5. Focal infection in cervix of years duration.

With the patient properly prepared, using spinal, sacral or general anesthesia, the cervix is exposed and small volsella clamps are placed in the tissue of the anterior and posterior lips which is to be removed. The vaginal mucosa is then incised circumferentially just proximal to the diseased area surrounding the external os. With traction to expose the posterior lip more readily, the cervical reflexion of the vaginal mucosa is dissected from the cervix with scissors. The dissection is entirely submucous and is carried lateralward and upward along the longitudinal axis of the cervix. When the flap has been made sufficiently large that it can be readily used without producing tension, the anterior lip of the cervix is pulled downward and a similar flap made anteriorly. Before the two flaps are made, an incision can be made on each side of the external os producing a complete bilateral laceration and making definite anterior and posterior lips (Rottenberg and Schwartz).

The endocervix is now excised by inserting a long narrow-bladed knife posteriorly into the cervical tissue beyond any diseased tissue about the external os. The point of the blade is directed toward the internal os but not quite into it and the knife is moved circumferentially to each side and as far proximally as the internal os. The blade is then

placed in a similar position in the anterior lip and the opposite half of the cone formed by the described movements. The cone is then removed by traction and freeing the utero-cervical junction at the internal os with a pair of scissors.

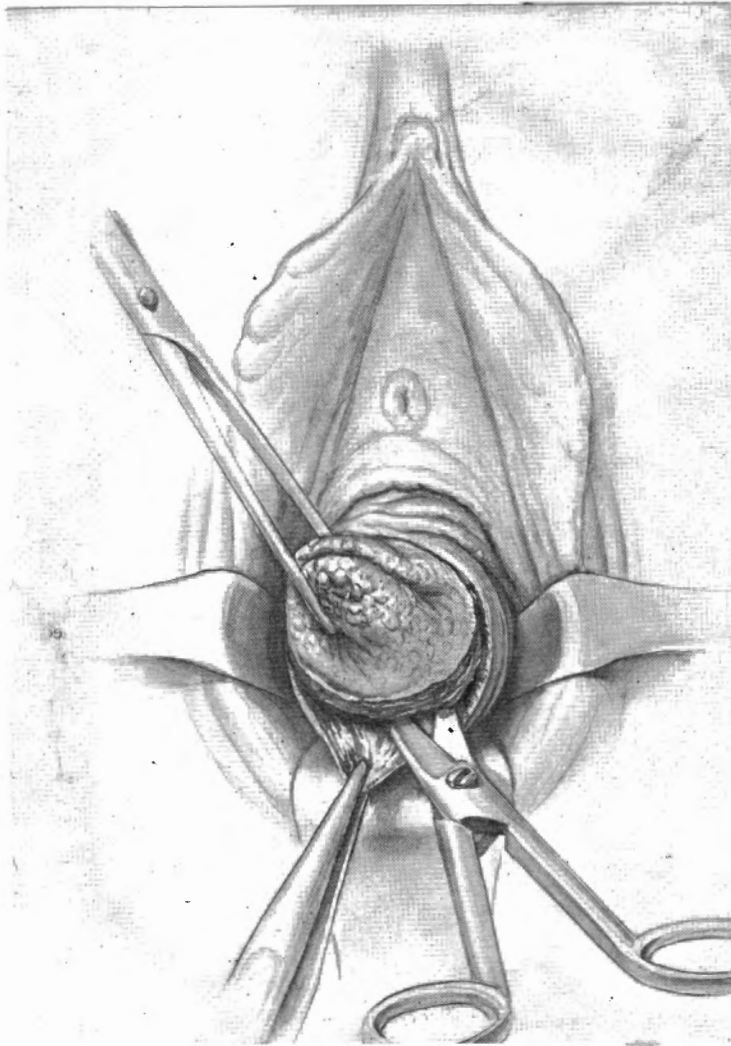
The denuded endocervix is next relined with the pre-



Sturmdorf Operation — Circular incision placed just outside of affected cervical zone passing through mucosa only.

viously made cervical flaps or tube of vaginal mucosa. A piece of No. 1 chromic catgut is passed through the posterior flap

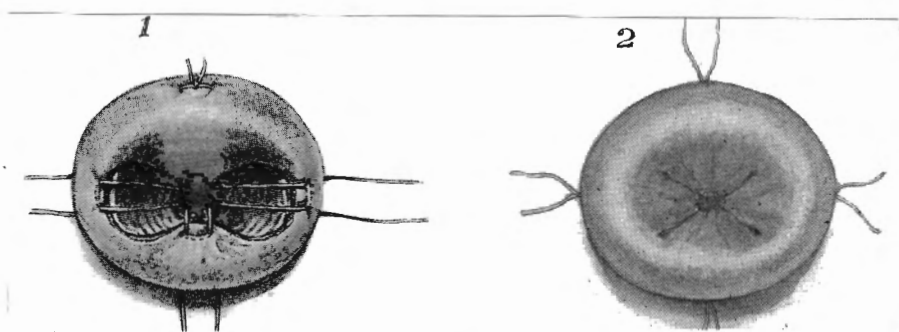
about .5 to 1 cm. from its free border, transversely, from mucosal to mucosal surface forming a wide transfixion suture. The needle is unthreaded and a small hemostat attached to each free end of the suture. A similar stitch is made in the anterior flap. The right free end of the posterior suture is then



Sturmdorf Operation — Beginning posteriorly the cervical reflexion of the vaginal mucosa is freed with blunt-pointed scissors. This dissection is carried entirely around the cervix so that the mucosa is well mobilized.

threaded in a long round needle and the needle is carried into the cervical cavity to a point near the internal os. Here the needle is passed backward, somewhat to the right laterally, through the cervix. The mobilized vaginal mucosa is now drawn downward and then as the needle is pushed farther it pierces the mucosa posteriorly. The free end of the suture is again clamped in a small hemostat. The left free end is similarly treated except it is passed somewhat to the left so that the two sutures emerge through the mucosa about 1 cm. apart.

The suture on the anterior flap is placed similarly

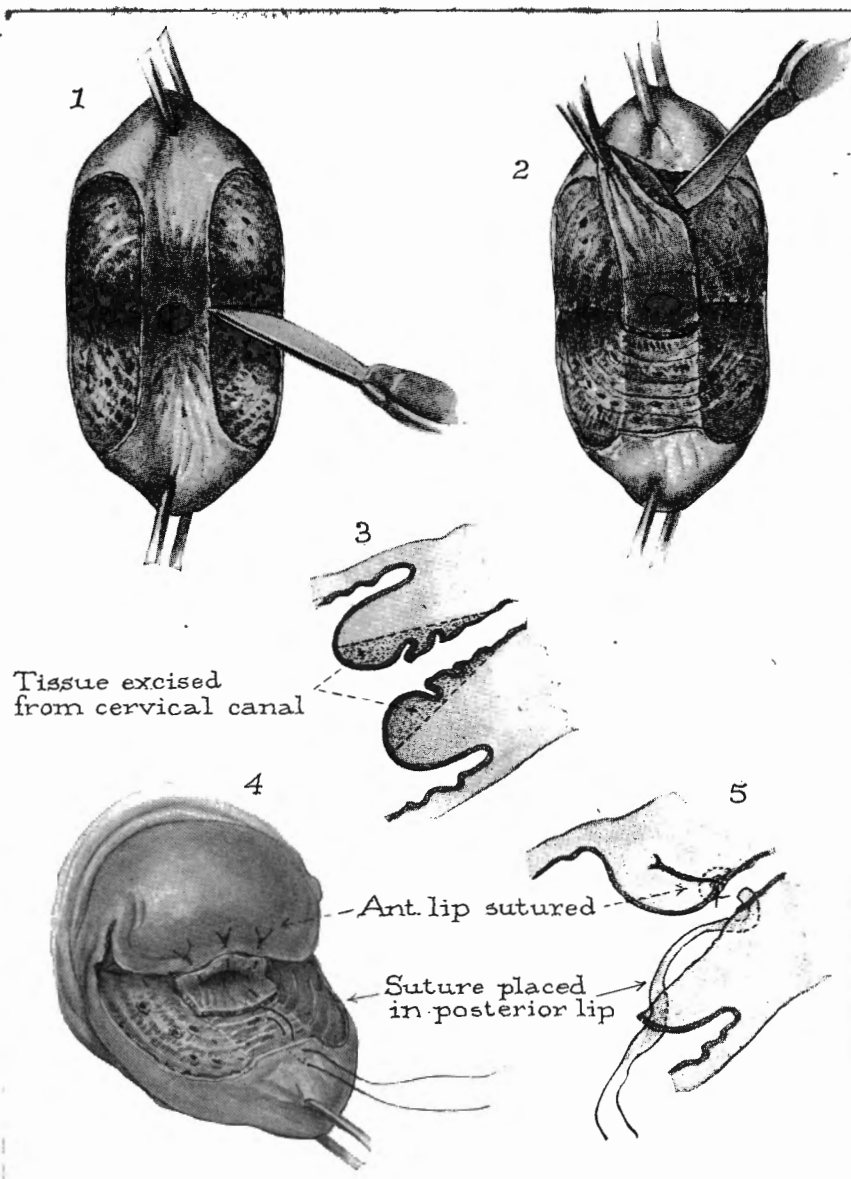


Sturmdorf Operation — 1. Lateral suture which is not always necessary has been placed before anterior suture is tied.

2. The restored cervix after all sutures are tied and the mobilized mucosa covers all denuded surfaces.

but passes, of course, in a forward direction. The edge of the anterior flap is next grasped in a pair of long fine-toothed tissue-forceps and placed as high as possible in the cervical cavity. The anterior suture is then tied without tension. The same is done with the posterior flap and suture, so that there is left an epithelial-lined cervical canal.

In case the mucosa at the lateral aspects of the cervix does not fold in satisfactorily, sutures placed in the same



Schroder Operation.

1. The cervix has been split in its transverse axis up to the level of the internal os. Anterior and posterior lips are pulled apart.

2. The mucosa lining the cervical canal together with the more deeply situated cervical glands are excised in toto. Only a short segment of mucosa is left near the situation of the internal os.

3. Sagittal view of what is accomplished in 2. Shaded area shows tissue excised.

4. Final step of operation. Anterior lip has been sutured to the mucosal stump at the internal os.

5. Diagrammatic sagittal section to show what the procedure in 4 is designed to accomplish.

manner laterally as those anteriorly and posteriorly will easily correct this condition. The cervical canal is then packed with gauze for 48 hours to obliterate any dead space between the mucosa and cervix, (Sturmdorf).

The final results of the Sturmdorf operation have on the whole been quite satisfactory (Burns, Fallon). Although the endocervical tissue has been described as a barrier against invasion of the uterus by microorganisms, its removal has not been followed by complications in general. Also its alkaline secretion has been replaced by an acid secreting vaginal mucosa but Sturmdorf states that the normal cervical lining is not essential to conception or gestation but a diseased lining is inimical to both.

Several writers advocate the use of the electro-cautery in place of the knife when performing the Sturmdorf operation, but this modification seems to be merely a matter of individual choice of the surgeon. Cowles states that all surgery of the cervix is best preceded by a preliminary cautery treatment as it increases the percentage of cures.

Matthews states, in a comparison of cases treated by the electro-cautery versus the Sturmdorf operation, that both are good procedures and each is necessary in its place. He gives the following table of 351 cases treated:

226 cases cauterized without anesthesia. Office procedure. All early cases (3 months to 2 years).

Cured	80%
Improved	20%
Unimproved	0%

55 cases cauterized under anesthesia. Hospital procedure.

Cured	51.0%
Improved	32.7%
Unimproved	16.3%

70 cases of Sturmdorf operation.

Cured	70.0%
Improved	22.8%
Unimproved	7.2%

Strongly opposing the Sturmdorf operation, Ground states that the procedure mutilates the womb, removes the barrier between the infected vagina and sterile endometrium, favors abortion, and interferes with normal delivery. Of course what he states seems to be logical conclusions when the type of operation is considered, but clinical evidence does not bear out his statements as has been shown above.

In passing, a few physicians mention the use of radium in the treatment of chronic endocervicitis but generally it has not been accepted as a wise procedure. Tovey states that he has seen several cases of premature menopause resulting from its use.

XI. CONCLUSION

Endocervicitis is one of the most widely spread diseases of the female population and has been given less attention than the common cold by most physicians.

The endocervix, with its deep racemose glands and sluggish circulation makes an ideal culture bed for organisms and a rather inaccessible area for medical treatment.

The etiological factors of endocervicitis may be classed as gonorrhoeal, septic and traumatic, the first most common in nulliparae and the third most frequent in multiparae.

A profuse leucorrhoea is usually the chief and only early symptom present. Secondary irritation may be present after a short time.

Numerous complications may result from endocervicitis, the most common of which is uterine displacement. Sterility following perisalpingitis is not an infrequent complication and may be of serious consequence.

Treatment of endocervicitis is divided into four classes; medical, diathermy, cauterization, and surgical procedures. Medical treatment appears to be chiefly restricted to acute cases and those that are not in a position to treat or be treated with other means. Surgical measures should be restricted to those cases that fail to respond to more conservative measures.

The seriousness of this ever present disease cannot be overestimated and as physicians are becoming more interested since a greater percentage of cures has been obtained by the newer procedures described in the past few years, probably the in-

vidence will be markedly reduced in the near future.

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