The Journal of the American Medical Association

VOL. XXVII.

CHICAGO, ILL., AUGUST 1, 1896.

No. 5.

ORIGINAL ARTICLES.

PUERPERAL FEVER; ITS PROPHYLAXIS AND TREATMENT.

Read in the Section on Obstetrics and Diseases of Women, at the Forty-seventh Annual Meeting of the American Medical Association, at Atlanta, Ga., May 5-8, 1896.

BY E. E. MONTGOMERY, M.D.

PHILADELPHIA, PA.

The mysterious condition known as puerperal fever has been a prolific theme for discussion. Its insidious character, its multiple lesions and its grave mortality sometimes depopulating lying-in hospitals or causing the death of every parturient woman in a district, have naturally directed interest to its study.

When we review the conflicting theories as to its genesis we find they may be resolved into two views; the one, the more simple and concrete, but less satisfactory, which seeks to associate the disease with the discovered anatomic lesion. With the development of the anatomy the distinction of the lesions has become more delicate and is limited to the tissues, as peritonitis, adenitis and the various abscesses of the pelvis. This is the localization theory. The other theory is that known as the essential doctrine, that the disease is due to some special miasm or infectious poison from which has been evolved the microbic etiology.

The repetition of cases of similar character in the same institution, or the same district naturally led to the recognition that it was an infectious disease and to the supposition that it was due to a special miasm. The specific identity of this poison was ably championed by Fordyce Barker, who claimed that puerperal fever was a distinct disease.

The researches of Pasteur rendered it probable that it was due to the presence of microorganisms which were conveyed to the victim by contact, through the atmosphere, or had developed as ferments in her body. Siredey as early as 1875 determined the absolute similarity between surgical and puerperal infections, and further asserted that puerperal peritonitis was secondary to a uterine lymphangitis. The continuous association of certain forms of bacteria in the uterine discharges of puerperal fever, the ability to develop similar septic conditions in the male by the injection of these organisms or their products, demonstrate the certainty of their baneful influence. Bumm, as a result of his researches into the microorganisms of puerperal sepsis accepts two forms of infection; 1, putrid infection, produced by retained portions of placenta, decidua or blood clots infected by the saprophytes, various bacilli and cocci, developing a condition known as sapremia; 2, the septic form, the result of the presence of the pyogenes, the streptococcus and staphylococcus. Vidal claims to have seen a fatal case of puerperal suppuration which was apparently due to the bacterium coli.

The investigations of Doleris have demonstrated

the identity of the streptococcus of erysipelas with that which results in puerperal fever, or sepsis. Careful investigation no longer leaves a doubt that the puerperal inflammation is induced by a streptococcus identical in its characteristics with the streptococcus of erysipelas and the pyogenes. It can not be denied that inflammation of a less intensity may develop from infection by the staphylococcus. Some cases of peritonitis and puerperal lymphangitis are undoubtedly produced by the bacilli of putrefaction. Rarely the bacillus coli communis may engender a suppurative peritonitis. The process of infection is greatly facilitated by obstetric traumatism, the existence of previous attacks of gonorrhea, and the presence of bacilli in the vagina.

The streptococcus conveyed to the patient by the finger of the physician, or nurse, or by instrumental manipulation during or following labor, makes its habitat in the debris of the mucous membrane, in the lymphatic fluid and blood clots at the situation of the placenta, in the material which forms the lochia, or vaginal discharge following parturition. The canals of mucous glands, tears of the cervix, vagina and vulva afford opportunity for further development; without producing marked effect upon the uterine or tubal surfaces the infection may pass through these organs and produce violent and dangerous infective processes in the ovaries or peritoneal cavity. The writer has seen one case in which there was developed an abscess of the ovary without any uterine or tubal complication. In this case, the uterus and tube afforded access of infection to an ovary which was probably rendered more vulnerable by the existence within it of the corpus luteum of pregnancy. The infection proceeds by continuous extension through the Fallopian tubes to the peritoneal cavity, but in addition it extends through the lymphatics and blood vessels. The multiplication of germs results in the formation of ptomain or toxin products. The increase of the toxin results in irritation, swelling, congestion and the exudation of liquid plasma into the cellular tissue. The presence and multiplication of the germs results in the destruction of the vitality of the infected tissue, the necrosis in mass of large layers of tissue, producing a superficial acute gangrene, or pseudo-diphtheria. The condition is always pus-producing and septic.

Clinically we find the disease varies in different patients. This is due to the varying immunity to the microorganisms. The varying power of resistance in different individuals produces different types. These have been resolved into three: first, inflammation, and local suppuration; second, inflammation and migratory suppuration, and third, hypertoxic infection without suppuration. The point of infection varies in labor and abortion. In the latter, the placental site, and erosions of the cervix will generally be the avenue through which the infection has found

entrance, while in the former entrance may be provided by lesions of the vulva, as lacerations of the fourchette, lateral wall, or anterior commissure, an injury of the duct of Bartholin, adenitis, lacerations of the vagina, laceration or desquamation of the cervix by the fetal head. The previous conditions of the tube may render puerperal infection certain, or displacement of the uterus, presenting an obstruction to drainage, may present a favorable soil for infection. The combat between the invading infection and the powers of resistance in the patient may result in the limitation of the disease to local inflammation or suppuration occurring in abscess in the labium, cellular tissue of the pelvis, wall of the uterus, or in the Fallopian tube. Barriers of limitation are provided, immunity against farther invasion is early secured. Second, the inflammatory processes result in migration of the inflammation; sometimes exclusively by way of the mucous lining of the tube to the peritoneum, which is rare, or it extends from without inward, resting upon the external layer, or it may be mixed, involving the mucous membrane, the blood vessels and the lymphatics. Migration by the mucous membrane exclusively, will produce a puerperal salpingitis, by the external part a phlebitis, while the mixed migration results in a multiplicity of lesions. In some cases, the entrance of infection is so rapid, and the power of resistance so slight, that a toxemia results, which produces a rapidly fatal termination with slight or no indications of the formation of pus.

The fatal termination in puerperal infection may be occasioned by profound organic vices anterior to the confinement, which render the power of resistance faulty. Second, by a regular progression of the lesion, and invasion of its economy by the poison, continually augmented in quantity and toxicity. Here there is a struggle and the forces of nature are finally beaten down. Third, the virulent character of the toxic force results in a paralysis of the nerve forces. Here the multiplicity of the microorganisms is at the maximum, with minimum resistance.

Treatment.—The first and most important consideration in treatment is prophylaxis. With a correct knowledge of the source of danger, we are the better prepared to meet or avoid it. As the contagion in the majority of cases is conveyed by contact, scrupulous aseptic or antiseptic precautions should be preserved. The nearer the measures of the careful surgeon can be imitated and practiced, the less will be the danger to the patient. The physician in general practice who is in attendance upon sepsis or erysipelas can not be too rigid in his measures of preparation; indeed, it is a serious question whether he should go from a virulently infected patient, whether it be with sepsis or erysipelas, to the lying-in chamber. During the writer's term as resident physician in the Philadelphia Hospital in 1875, he went from the surgical ward, where he was in attendance upon cases of erysipelas, to the obstetric department; no special precaution outside of cleanliness of hands and person was practiced. An epidemic of puerperal sepsis developed, in which twenty patients became seriously sick, and four lost their lives.

The measures particularly to be practiced are the removal of the coat, baring of arms to the elbows, careful washing of the hands with soap and hot water, with diligent use of the nail brush, hands should be immersed in 1 to 500 bichlorid and subsequently in

alcohol. The bedding and personal clothing of the patient should be clean, the vulva should be washed with soap and hot water, the bowel emptied by an enema and an antiseptic douche given. Digital vaginal exploration should be infrequent and only after careful disinfection of the hands. Instruments should be sterilized by boiling. Long continued manipulation, instrumental delivery or manual delivery of the placenta, should be followed by antiseptic intrauterine irrigation.

The parts should be carefully cleansed subsequent to delivery, the placenta carefully observed to make sure no portion remains, and the uterus should be left firm and well contracted. Laceration of the vagina and vulva, unless the tissues are bruised or the vitality destroyed by long continued instrumental delivery, should be at once sutured; excoriations may be cauterized by carbolic acid. The vulva should be covered with an antiseptic pad which should be changed as frequently as it becomes soiled. With each changing, the vulva should be cleansed with an antiseptic solution. Aside from the immediate postpartum irrigation mentioned, intrauterine or vaginal douching should not be practiced.

But physicians will reply that they have attended large numbers of confinement cases without such precautions and no bad results have followed. This may be true. With ordinary precautions the chances are favorable, and much depends upon the condition of the patient. Not every patient, fortunately, to whom contagion is conveyed, yields to its influence. The normal secretions of the vagina are unfavorable for germ culture. The tract is irrigated by discharge of the liquor amnii and swept clear by the passage of the fetus. Many eminent obstetricians, among whom may be named Lusk, are content to depend upon these conditions in ordinary cases; still, the preliminary douching does not seem useless.

Treatment of *infection* may be considered as, first, maintenance of the powers of resistance; second, production of immunity; and third, the resort to surgical procedures for relief of local manifestations. This classification of treatment has reference to septic conditions. Sæpæmia or putrid intoxication is relieved by removal of the decomposing placenta, portion of membrane or blood-clot, and subsequent irrigation and drainage. The diagnosis is determined by the character of the lochia and the digital exploration of the uterine cavity. Decreased or absent lochia, elevation of temperature, rapid pulse, depressed, anxious countenance, should betoken the suspicion of beginning sepsis. It may or may not be accompanied by local tenderness. Exploration of the uterine cavity reveals a smooth surface, which should confirm the diagnosis. The rapidity with which the vital forces are depressed contraindicates the use of depleting agents, unless it be the moderate use of purgatives to aid in elimination. Early resort should be made to the use of tonics, stimulants and easily assimilated and nourishing food. The most efficient stimulant will be found in strychnin, which should be given for effect, and may be administered hypodermically in doses of gr. 1-15 every two or three hours, where there is much depression. Opium, morphin and antipyretics should be given with great circumspection. For the control of temperature, cold sponging or the cold pack should be practiced. Pain, whenever possible, should be relieved by the ice bag. The natural tendency of disease germs is to develop toxins which

are toxic to themselves, and render the individual immune to further ravages. The better the nutrition, the more the strength is sustained, the earlier immunity will be secured. In many cases, however, the progress of infection is so rapid, the intoxication so profound, that the patient can not survive until immunity has become established. As we can not foretell in any individual the virulence of the infection, nor the possible powers of resistance, the use of an antitoxin should be considered as indicated wherever infection is recognized. This is best given by hypodermic injection. These injections of streptococcus antitoxin should be given in doses of 25 c.c. once daily for four days. They may be made into the cellular tissue of the abdominal wall, or into the buttocks or thighs. Of course, every precaution must be practiced to render their use aseptic.

Bacteriologic study should be made of the secretions, but as the large majority of septic troubles arise from the presence of the streptococcus, valuable time may be saved by immediate use of the antitoxin.

The following history is of interest: A young woman gave birth to a child February 18, at 6:30 P.M. Twenty-four hours later her temperature was 103.8 degrees, pulse 130, the next evening 104.2 degrees. Her husband at the time was suffering from numerous boils, and her physician, the day following her confinement, developed an onychia of the right index finger. The writer saw her upon the sixth day, when her temperature was nearly 102 degrees; the uterus was large, situated to the left side, quite tender, and vaginal examination disclosed some induration in the left broad ligament. The vagina was inflamed and filled with thick muco-purulent material with no especial odor. The vagina was carefully irrigated and scrubbed, the uterine cavity cleansed and packed with iodoform gauze, an opening made into Douglas' pouch, some flakes of lymph removed by irrigation and a gauze drain inserted. Her symptoms improved for two days, and then became aggravated. An erysipelatous blush was noticed extending from the vagina to the buttocks, and the vulva much swollen. This extended in a wave-like course until the entire body became involved. March 11, over three weeks from her confinement, the temperature had been but twice below 100 degrees and now was nearly 104 degrees, with a renewal of the erysipelas at the vulva. The antitoxin was now begun and given daily for five days after the first dose, and the temperature subsided and convalescence was subsequently uninterrupted.

Surgical Measures.—Curettement is advised early. If the condition is due to putrid intoxication this procedure, followed by irrigation and drainage, will give prompt relief. In streptococcus infection the germs are imbedded in the mucous membrane, sinuses and wall of the uterus, so that a curettement would not accomplish their complete removal, and affords more surface for ptomain absorption. Hysterectomy has been advocated, but it is a question whether in this form of infection the tissues have not been invaded to such a degree that the removal of the uterus would be ineffectual. The first aim should be the establishment of immunity, then local manifestations should be treated as they make their appearance with the assurance that farther spread will be avoided.

Let us have a Department of Public Health!