

I determined to try it. In about fifty consecutive cases I followed his technic, i. e., removal of one-half in five days, one-half of the remainder on the seventh day and the balance on the ninth day. In that series of cases about 90 per cent. developed infection of the abdominal wound, and I abandoned the method.

In my judgment, the infection is caused by a collection of the exudate above the gauze. As the gauze became saturated with exudate, drainage was impeded or entirely stopped, and before the gauze was entirely removed, sufficient backing up of the drainage content caused infection of the abdominal incision. By complete removal at the end of five days this danger is averted. It was further noted that the cases drained much longer when treated by the three-step method, than when the drain was entirely removed on the fifth day.

Since returning to my usual method of removing the gauze on the fifth day, I have had but a single case of abdominal wound infection in about fifty cases. The cavity was much more rapidly obliterated and the infection more quickly subdued.

The administration of a little nitrous oxid gas during the removal of the gauze drain is very advantageous. While I have removed the gauze without an anesthetic, patients have complained so bitterly that it has become my routine practice to induce partial anesthesia.

CONCLUSIONS

Where early positive diagnosis is possible in acute pelvic infections, especially with history of recurrent attacks, early operative interference is good practice.

Evidence of beginning general peritonitis is a positive contra-indication to surgical intervention.

Pelvic cellulitis after localization is best treated by vaginal puncture and drainage.

Palliative treatment of gonorrheal infection during the acute stage, and radical operation when gross pathologic conditions present themselves, is the routine treatment.

Interval operations are advised in the chronic form with acute exacerbations.

In all chronic cases an operation should be done when there is evidence of destruction of the tubes. The sooner done the more likely it is to avert neuroses and psychoses.

The lowest level of a cavity should be the highest point for the insertion of the drainage.

A double rubber tube is the best material in a pus cavity.

Iodoform gauze drain is best where drainage is indicated following a radical operation for pyosalpinx.

Gauze drain should be removed after five days. Three-step removal of gauze causes unnecessary torture and results in infection of the abdominal wound.

ABSTRACT OF DISCUSSION

DR. FRANK T. ANDREWS, Chicago: I think that perhaps ninety-eight or ninety-nine out of every 100 abdominal wounds that one makes should not be drained at all. Drainage is almost never necessary in the drainage of the abdominal cavity for pus tubes. You put the hand in the cul-de-sac of Douglas, rupture the tube and the pus pours out and soils the field of operation. If you wipe that pus out you do not have to make a toilet of the peritoneum, as we used to speak of it, but you get most of it out, close the incision and the patient gets well. If you drain you go to more or less extra trouble and there is no use in it. Almost all of these pus cases have gonorrhea for their inception; not all. That gonorrhea runs a course in the vulva, shows in the uterus and causes the pus

tubes. In time that pus becomes sterile, if it is purely gonococci pus; or, what is more apt to happen, it becomes a mixed infection, not because the infection is thrown in as a mixed infection, but there are microbes present—the streptococcus, staphylococcus, colon bacillus, the gonococcus—all in that tube, and the gonococcus is the thing that gets out first. If you wait long enough you get sterile pus. I do not like to operate within a very short time—two or three weeks. I prefer to wait. What Dr. Bowers calls an “acute attack” simply means a rupture of the tube and a little extension in the peritoneum. Every pus tube patient gets these ruptures of the sac; that is the soiling of the peritoneum. You never have a patient with a pus tube die of acute peritonitis. Nature throws pus out into the peritoneal cavity, and every time the patient gets well. The only excuse for drainage is the fear that you may have soiled the patient with your own hands.

DR. BOWERS, Dayton, O.: It has been my experience—it may have been the fault of my technic—to see cases in which the pus infection has caused repeated attacks. If you let it absorb you are much more likely to have acute infection than if you put in a drain. There is no use in saying that the pus does not cause infection and that the patients do not die, because I have had this happen and have observed it in other operative cases. Probably in one case in fifty I use the drain. I do not use it promiscuously. No one is more afraid of drainage than I am, but I would rather leave in a drain than let the patient die. The drain does not complicate the case in the least. Those cases will cease draining in four or five days after the withdrawal of the drain. Before the patient gets up the cul-de-sac is closed. Another benefit is that in the cases of excessive adhesion you keep the clean gut out of the soiled field, which lessens new adhesions. I have had less infection of the abdominal wall in cases which are infected and a drain used.

TWO YEARS' EXPERIENCE WITH VACCINES IN PELVIC INFECTIONS *

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In this brief summary on the value of vaccines as an adjunct in the treatment of puerperal and non-puerperal pelvic infections, I shall attempt to describe the class of cases in which the staff of Long Island College Hospital have found vaccines to be of therapeutic use. During our three years' experience, vaccines have been used in almost every case of septic pelvic infection, which has occurred in my several obstetric and gynecologic services.

We have been able, through the courtesy and cooperation of our pathologic department, to make the necessary blood-examinations throughout the entire course of the vaccine treatment, and to study the blood-picture as it appeared before and after each vaccination; so I feel that, while this contribution is but preliminary to a more extended trial, it is our duty to give to the profession at large such data as we have gathered. So many prominent gynecologists speak of vaccine therapy, only to condemn it as useless and unnecessary, that many of the profession, instead of giving it its full clinical value, have come to look on it as a fad of the laboratory experimenter.

It is only by the reports of those of us who have had considerable experience in the use of bacterial vaccines checked by the proper blood-examination before and after each vaccination, that reliable data can be amassed. In my clinics we have applied the injection of bacterial vaccine in every septic case, irrespective of the time at

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which it was seen, just as we take advantage of the Fowler position in every case of pelvic sepsis.

Our experience convinces us that, while it is a mistake to imagine that we have in bacterial vaccines a panacea for all infections to the exclusion of surgical drainage and general supportive measures, vaccine therapy has a place and serves a distinct purpose as an adjunct to the established forms of treatment. Our experience includes thirty-one patients suffering from streptococcic metritis, twelve of staphylococcic bacteremia, twenty-eight of streptococcemia, thirty-seven of thrombophlebitis of the pelvic or femoral veins, thirteen of infected pelvic hematocele, sixteen of acute streptococcic salpingitis with peritonitis, fifteen of acute gangrenous appendicitis with peritonitis, forty-eight of colon bacillae and mixed pyelitis, simple and complicated with pregnancy, eleven of pelvic cellulitis due to mild staphylococcic and streptococcic infections, fifteen of pelvic abscess and two of mastitis, besides several others due to pulmonic conditions following from infected foci in the pelvis.

When the human organism attempts to overcome an infection, whether it be puerperal or non-puerperal in its origin, the battle against the bacteria and their toxins is waged by Nature, by the production of certain substances in the serum of the normal blood, known as bactericidal substances, that kill the products of these bacteria. There are also present in the blood, opsonins, which combine with the bacteria themselves and so alter them that the phagocyte can destroy them, and finally, the human organism further protects itself by the elaboration in the blood-stream of certain antitoxins, specific antibodies, which combine with and neutralize the toxins. The streptococcus, staphylococcus and gonococcus are little, if at all, affected in their activity by the bactericidal substances, but are readily opsonized and ingested by the phagocytes; consequently, if we are to carry out the processes of Nature in combating local or general infections, it is necessary to increase the phagocytes, for phagocytosis is one of the cardinal factors in producing an artificial immunity. This can be done by bacterial vaccines, if these vaccines are but used early enough in the septic process. It is when the process is local that most can be expected from vaccine therapy.

In the few cases in which we have failed to produce any degree of artificial phagocytosis by the injection of vaccines, a bacteremia of virulent type has existed for some time prior to instituting treatment. We have further found that in a large proportion of infections, even when the clinical symptoms have shown severe manifestations, the blood-culture was sterile or that it necessitated repeated blood-cultures to isolate the organism in the blood. While theoretically it is never wise to begin treatment by vaccine injection until the organism producing the infection has been isolated, we have found that were we to depend wholly on the demonstration of the infection in the blood, much time would be lost before the administration of the vaccine. We have therefore depended largely on the culture taken from the cervix, from the interior of the uterus, from the pus or serum evacuated at the time of operation, to determine the nature of the infection.

Autogenous vaccines of a single strain have given us unreliable reactions. This, I think, can be explained by the fact that the coccus is attenuated in its strength and, after it has produced its first reaction, the leukocytes become more or less accustomed to the particular variety

of coccus, and are less liable to effect a defense than when a vaccine of polyvalent strain is introduced.

The mixed vaccines of reliable laboratories have given better results than when a single variety was used. This has been shown repeatedly in the blood-picture, when an autogenous vaccine of single strain used in large doses, even up to 500,000,000, has failed to increase the leukocyte-count or diminish the polynuclear percentage, the mixed vaccines of several strains have promptly produced a marked leukocytosis. Even colon bacillus infections, such as the infection of a pelvic hematocele by the colon bacillus, have yielded more promptly to mixed vaccines of polyvalent strains than when a single autogenous germ has been used.

One characteristic which has been noted throughout all of our experience is that, even before any definite effect has been noted on the temperature, the well-being of the patient has seemed to be improved by vaccine injection. The dosage has been a matter of considerable experimentation.

It is almost impossible for the ordinary physician to figure out the opsonic index of the individual patient under his care, but it is very simple for him to determine the necessary dosage by making blood-counts and estimating the polynuclear percentage before and after the injection. It is our custom to examine the blood from four to six hours before vaccination is made; we then begin with comparatively small doses, 25,000,000 to 100,000,000, and eight hours later reexamine the blood. This shows us whether or not the dose given has been sufficient to change the leukocyte-count; if it has not made any change, the injection is repeated on the next day in larger dosage; if, on the other hand, there has been a marked rise in the number of leukocytes, or there has been any change in the polynuclear percentage, we wait for the beginning of the negative phase before repeating the injection, and when it is repeated the dose is doubled or trebled.

The foregoing suggestion has been demonstrated to be of greatest value when infection is due to the streptococcus. In mixed infections or in colon bacillus infections, we have been in the habit of giving an initial dose of from 200,000,000 to 250,000,000, as a hyperbacteremia, resulting from the patient's incompetence to produce his own antibodies, is less liable to occur when the infecting organisms are of low or of mixed variety.

After these general considerations, it may be of interest to note the special effect of vaccine therapy in each of the several classes of cases that have come under our observation. Thirty-one patients with streptococcic metritis of septic origin, following abortion, labor or intrauterine instrumentation, were treated by injection of bacterial vaccines. In all a marked increase in the leukocytic resistance of the patient was noted immediately after the injection. Three patients died of general peritonitis, ten developed a streptococcemia, which cleared up under the continued use of polyvalent strains of streptococci.

Of the twelve patients with staphylococcic bacteremia, eleven recovered under the vaccine treatment alone. The one fatal instance is of special interest as it occurred after a normal labor in my hospital service, in which the house surgeon, after waiting an hour and a half for the third stage to terminate, removed the placenta from the interior of the uterus. This removal was done with the gloved hand.

The patient at the time of delivery had a hemoglobin of 39 per cent., a white-cell count of 6,000 and a red-cell count of 2,100,000. Within forty-eight hours her

temperature rose to 105 F. and continued to range between 100 and 106 F. for thirty-two days, making marked and sudden remissions two and three times daily. No local focus was ever demonstrated before death or at the autopsy. Staphylococci in large numbers were isolated from the blood. Autogenous, stock and mixed vaccines and serums were used repeatedly and continuously, without any effect on the leukocytosis. The blood-count steadily decreased and the patient died of a complicating pneumonia.

Of the twenty-eight cases of streptococcemia, six ended fatally. The patients were all very sick and the infection well developed before their admission to the hospital. It was noted in these cases, in which the streptococcic vaccine of an autogenous strain was used, that the leukocytic resistance which was produced was much less positive than when polyvalent stock or mixed vaccines were used.

In the thirty-seven cases of thrombophlebitis of the pelvic and femoral veins in which bacterial vaccines were used, we believe that we have demonstrated that the thrombophlebitic extension is arrested and that the recovery is hastened by the use of vaccine therapy. In all of these cases we have used the mixed vaccines of polyvalent strain, such as suggested by my colleague, Prof. J. M. Van Cott of the Long Island College Hospital. The effect after injection in this class of cases has been almost miraculous. The temperature has promptly dropped after injection, the well-being of the patient improved and the pulse correspondingly strengthened.

Mixed vaccines were again used with noticeable effect in thirteen cases of infected pelvic hematocele following undiagnosed or neglected ectopics. Here again the effect of vaccination on the character of the drainage was promptly noticed. How much vaccination has accomplished in the management of the sixteen cases of acute streptococcic salpingitis in which vaccines were used is not definitely determined, for the patients were treated, not only with vaccines, but with the Fowler posture, starvation, the Murphy drip, etc. We have noted, however, that injection of the mixed vaccines in this series seemed to produce a more prompt and a higher leukocytic resistance than was noted in a corresponding series in which no vaccines were used.

Again, in acute gangrenous appendicitis with peritonitis, fifteen cases of which are included in this report, the vaccines have been useful as an adjunct in the individual defense, but we feel that it was the surgical methods rather than the vaccines that resulted in these recoveries.

Of the forty-eight cases of pyelitis included in this series, fifteen were complicated with pregnancy, two patients aborted spontaneously, one abortion was induced and the remaining patients were treated by posture, the copious ingestion of water, the free use of hexamethyl-eramin and vaccination with the mixed vaccines of the colon bacillus, the streptococcus and the staphylococcus. All the patients recovered.

The effect of mixed vaccination was very impressive and stands in marked contrast to vaccination in pyelitis, when said vaccination was made with the colon bacillus alone. In all, the temperature improved within twenty-four hours after the first injection and in but six cases was there any rise after the second injection. It is a fact that colon bacillus could be demonstrated in the urine for a considerable period after all general symptoms and local tenderness had subsided.

The eleven patients with pelvic cellulitis who were treated by vaccination in conjunction with the Fowler position, ice and an enema, all recovered, but showed no special changes for good or bad, either in the blood-

picture or in the clinical evidence which could be attributed to vaccination. This also holds good in the fifteen cases of pelvic abscess, in all of which the treatment was incision and drainage, in conjunction with vaccine therapy.

In contrast with these last two classes of cases, I want to mention two cases of parenchymatous mastitis. In each, stab-wound discharge had been repeatedly made by the attending physician without avail. In both of these cases injections of mixed streptococcic, staphylococcic and colon bacillic vaccines, were used, which had a most marked effect on the local condition in changing the character of the discharge, diminishing the glandular infiltration as well as reducing the temperature and improving the pulse.

In this summary of our experience we must admit, biased as we were against vaccines, that in thrombophlebitis, in colon bacillic and mixed pyelitis, and as an adjunct to incision in mastitis, vaccines have proved their value beyond question.

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ABSTRACT OF DISCUSSION

DR. F. T. ANDREWS, Chicago: I would like to ask a few questions; for instance, the laboratory work and the work of Dr. Polak's predecessors, on which he founds his own work, have gone to show that it is a dangerous proposition to use vaccine in cases of acute infection. Acute infections are not the kind of cases that Wright indicates, yet Dr. Polak seems not to hesitate to include the acute with the chronic. Another question: How great is the local reaction at the seat of the lesion, not the seat of injection? We have always been taught that the immediate effect is to increase the local inflammation very much. It seems on that account also a reason that we do not dare to do this thing, and if we dare, we all want to do it. He speaks of three deaths from streptococcic infection; were those acute cases or chronic?

DR. JOHN O. POLAK, Brooklyn: The acute cases in the very early stage are favorably affected by vaccine. Where there is a distinct bacteremia with very little leukocyte defense in the acute stages, I think that vaccines will decrease rather than increase the resistance of the patient. There are very few bacteria to each cubic centimeter of blood withdrawn and sometimes even these are lost. Six examinations were made on one patient with a virulent infection and I did not succeed in getting the bacterium until the last culture. Take the septic abortions, of which we have a large number, and treat them with the usual local procedure and there is immediately the exacerbation of temperature from manipulation. Now if we give a dose of mixed vaccines we do away with the exacerbation and the temperature continues along with the elevation we formerly got from manipulation. I have no fear in using it in acute stages when it is used early enough. Unless we do that, it should be used in small doses. In a case of septic endocarditis with puerperal sepsis with streptococcic infection, the patient came in with a leukocytosis of 4,000; polymorphonuclears, 91 per cent. She was turned over to my service by the medical men and watched throughout her treatment. I began with injections of 10,000, increasing to 25,000 in six-hour injections instead of the heroic dose advocated by so many. I could see after the second injection a marked increase in leukocytic count. I continued the injections until the leukocytic count was very high and the patient showed a corresponding clinical improvement. This was the only case of extreme virulence which showed such marked reactions as to be definitely apparent in the blood-picture. The local reaction has been absolutely negative. I think vaccine adds to the defense after local reaction has been established by Nature. In exudate cases, after everything has quieted down, if we continue the vaccine we get exacerbations. The three streptococcic deaths were in puerperal and miscarriage cases. I get these patients, as a rule, about four or five days after the confinement or miscarriage. These cases are usually injected within the first week.