

AN ANALYSIS OF OPERATIVE RESULTS IN 1066 CASES OF
SALPINGITIS*

(From the Service of the Woman's Hospital, New York City)

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IT HAS been estimated by a well-known writer on the subject of salpingitis that 75 per cent of invalidism in women arises from pelvic inflammation. From a study of the records of the Woman's Hospital, I have found that, as a result of tissue destruction from inflammation, one or both fallopian tubes are removed in approximately 25 per cent of the patients who have laparotomies for gynecologic conditions.

If we review the great mass of literature which has been written on this subject, we will find that it is eventually focused on two points:

First: The nonoperative treatment of the patient who has a pelvic infection.

Second: The choice of a safe time for operation on those patients in whom the infection has not been arrested nor the symptoms relieved by palliative treatment.

It is on this second point, the choice of a safe time for operation, that we find a wide variation of opinion. On the one hand we have the well-known conservative teaching of Simpson. He recommends that the patient must be allowed to recover from her acute illness, that she must not have temperature above normal a single time for at least three weeks, even after bimanual examination, and that the inflammatory exudate about the focus of infection must have been completely absorbed.

We also find the very conservative opinion of Curtis, who believes that we should delay operation as long as possible and that by so doing it will be necessary to operate on only about 15 per cent of patients who have had salpingitis. He recommends operation only, as he puts it, for the "sequelae of infection," and not for the infection itself. In other words, he believes that operations should be directed at reconstruction of tissue laid waste by disease and not at stamping out the disease itself.

On the other hand, we find in fairly recent articles the most radical views by men who have had much experience in the surgical treatment of this condition.

For instance, in an article by a well-known American surgeon we find the following statement, "Personally I have never seen the bad

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results reported in not delaying operation for the acute pus tube any more than I have for the acute appendix cases or ruptured tubal pregnancies, and heartily condemn delay and applaud early action of the surgical variety."

An eminent English surgeon states that for a great many years he has been an advocate of operating upon all cases of salpingitis at the earliest possible moment and that during the last twenty years has had only one death in a large number of operations for this condition.

In general, I believe that there has been a tendency to become more and more conservative in the treatment of pelvic infections and to avoid laparotomy whenever possible. Various factors have influenced gynecologists in adopting this conservative policy.

As the result of comparatively recent studies, the bacteriology of pelvic infections is better understood. Curtis, in reporting his studies of the bacteriology of salpingitis, concludes that tubes infected with the gonococcus become sterile about fifteen days after the fever and leucocytosis have subsided, and if symptoms reappear at a later time, they are due to reinfection and not to an exacerbation of the original infection. Streptococcal salpingitis presents an entirely different problem. A history of abortion, of puerperal infection, or of instrumentation with infection, gives the clue as to this type of infection. In these cases he has found that the bacteria are usually viable in the tissues for at least six months and not infrequently two years.

From his work he further concludes that secondary infection of the tubes after a gonococcus infection is infrequent, and that for reasons noted above gonorrheal salpingitis is a self-limited disease. If reinfection can be avoided in the patients who have gonorrheal salpingitis, a clinical cure without operation can be expected even in the cases with more than one attack, in all but about 15 per cent. In other words, if patients who have gonorrheal salpingitis have proper conservative treatment, only 15 per cent will ultimately need operation. In order to avoid operation on patients with active streptococcal infection in the tubes, he waits for two years from the time of the infection.

A high incidence of mortality and morbidity has been found to accompany operations in the presence of active infection. Furthermore, operation in the presence of active infection has been found to be radical in too high a percentage of cases. Protein therapy and physical therapeutic measures, especially diathermy, have been added to our previous methods of palliative treatment. We have had no experience with the latter method at the Woman's Hospital but good results from its use are claimed by some.

In case operation seems necessary a recent laboratory method, sedimentation time, has been found of value in detecting the existence of active infection which may make the proposed operation a dangerous

one. The surgeon is thereby warned to delay until a safe time presents itself.

This analysis of the records of 1,066 patients operated upon in the wards of the Woman's Hospital is submitted with the hope that it may add something to our knowledge of the dangers of operation in salpingitis, one of the most frequent and important gynecologic conditions.

The series which I have studied includes only patients operated upon in the wards of the Woman's Hospital from 1920 to 1927, a period of seven years. All of these patients had laparotomies for gynecologic conditions. All had either an acute or a chronic salpingitis alone, or associated with other pelvic pathology. Furthermore, the series includes only patients in whom a diagnosis of salpingitis was made by microscopic study of tissue removed at operation. It is of interest to note that these patients were operated upon by 29 surgeons who are specializing in the practice of gynecology and obstetrics.

CLASSIFICATION OF CASES

From the microscopic study of tissue removed at operation, the cases were divided into two groups according to whether or not the tissue removed showed evidence of existing active inflammation at the time of operation. In other words, the cases were classified as active or inactive.

Tables I and II show the types of cases which fell into each group.

TABLE I. CLASSIFICATION OF ACTIVE CASES

TYPE OF PATHOLOGY	NO. OF CASES
Pyosalpinx	71
Tuboovarian abscess	55
Subacute salpingitis	31
Acute salpingitis	28
Tuberculous salpingitis	3
Total	188

TABLE II. CLASSIFICATION OF INACTIVE CASES

TYPE OF PATHOLOGY	NO. OF CASES
Chronic salpingitis	376
Hydrosalpinx	76
Pseudocystic salpingitis	14
Haematosalpinx	10
Perisalpingitis	10
Tuberculous salpingitis	8
Chronic salpingitis and myomas	384
Total	878

I have implied that a conservative policy is followed at the Woman's Hospital. You may wonder, therefore, that in the series that I am reporting, 188 cases, more than one-fifth, showed active inflammation

in the tissue removed at operation. In order to obtain a sufficient series of active cases the study was purposely carried back to the days when the policy, although conservative, was not as decidedly so as at present.

It is of interest to note that in this series of 188 cases which were operated upon in the presence of active inflammation, only 20 per cent were diagnosed and intentionally operated upon for acute conditions. Only 5 per cent of the entire series had fever at the time of operation. A further examination of the records of these patients shows that 45 per cent were mistaken for chronic adnexal disease; 20 per cent were mistaken for acute pelvic conditions such as ectopic pregnancies or ovarian cysts with twisted pedicles, and the remaining 15 per cent had acute inflammation at the time of operation although it had not been discovered in the preoperative study of these cases.

The records of all the microscopically active cases in the series were carefully examined to determine whether they also had any clinical evidence of existing active inflammation during the period of preoperative observation in the hospital. Cases were considered active or inactive according to the standards noted in Table III.

TABLE III. STANDARDS FOR CLASSIFICATION OF INACTIVE CASES FROM THE CLINICAL STANDPOINT DURING PREOPERATIVE PERIOD OF OBSERVATION IN HOSPITAL

White blood count never reached	12,000
Temperature readings were never above	99.6°
Sedimentation time was never below	60 minutes

Of the 188 microscopically active cases, only 99 showed evidence of existing active inflammation when studied clinically. The microscopically active cases were therefore divided into two groups:

1. Clinically and microscopically active cases.
2. Microscopically active but clinically inactive cases.

The sedimentation time test was not generally used at the Woman's Hospital at the time that this series was under treatment, that is, up to 1927. Undoubtedly the presence of active inflammation might have been detected by its use in cases which failed to show it by other clinical diagnostic methods.

CHARACTER OF OPERATION

Operations were classified as conservative or radical, according to how much tissue was removed at operation. If enough tissue was left so that the patient had a chance for a future pregnancy, the operation was classified as a conservative one.

In studying this particular phase of the subject, cases operated upon for salpingitis associated with fibroids were omitted. These were ex-

cluded for the obvious reason that the surgical treatment of fibroids alone must be radical in a high percentage of cases.

Table IV shows a summary of the character of operations adopted in cases in which the infection was still active at the time of operation as compared to those in which the inflammatory process had become chronic or had healed.

TABLE IV. COMPARATIVE STUDY OF THE CONSERVATION OF TISSUE IN THE VARIOUS TYPES OF CASES

TYPE OF CASE	NO. OF CASES OPERATED ON (MYOMA CASES EXCLUDED)	NUMBER OF CONSERVATIVE OPERATIONS	PER CENT
Microscopically and clinically active	70	30	39.4
Microscopically active but clinically inactive	63	26	41.2
Chronic inactive	486	246	50.6

MORBIDITY

Table V shows the incidence of morbidity in the various types of cases which were operated upon for salpingitis. Faulty wound union was the most common cause of postoperative morbidity.

TABLE V. POSTOPERATIVE MORBIDITY

TYPE OF CASE	NO. OF CASES	COMPLICATIONS		COMPLICATIONS INCLUDING WOUND INFECTIONS	
		NUMBER	PER CENT	NUMBER	PER CENT
Microscopically and clinically active	99	33	33.3	52	52.5
Microscopically active but clinically inactive	89	13	14.6	27	30.3
Chronic inactive	878	101	11.5	159	18.1

Tables VI and VII give detailed lists of the postoperative complications which in addition to wound infections were responsible for the incidence of morbidity in the two classes of cases, active and inactive.

TABLE VI. ACTIVE CASES—POSTOPERATIVE COMPLICATIONS

	NO. OF CASES
Peritonitis	10
Urinary infection	8
Wound sinuses	8
Shock	6
Pulmonary infection	4
Septicemia	3
Pelvic cellulitis	2
Wound opened (resutured)	1
Abscess of abdominal wall	1
Tonsillitis	1
Fecal fistula through wound	1
Myocarditis (death)	1
Total	46

TABLE VII. INACTIVE CASES—POSTOPERATIVE COMPLICATIONS

	NO. OF CASES
Infections of urinary tract	27
Pelvic inflammation	14
Peritonitis	13
Respiratory infections (pneumonia 3 cases)	11
Thrombophlebitis	8
Shock	6
Pulmonary embolism (3 deaths)	4
Tonsillitis	3
Prolonged fever (cause ?)	3
Postoperative ileus	2
Parotitis	2
Hemorrhage from cervix	2
Malaria	1
Psychosis	1
Acute dilatation of stomach	1
Hematoma of wound	1
Diabetes (coma, death)	1
Intestinal obstruction	1
Total	101

DRAINAGE OF THE PERITONEAL CAVITY

It is recognized that opinions as to the necessity for drainage of the peritoneal cavity following operation for pelvic infection vary considerably with different surgeons and consequently the percentage of cases drained also varies.

The best method of drainage, that is, whether it should be through the abdominal incision or through the vagina, is also a matter of choice by the individual surgeon. As I pointed out above, this series represents a group of 1,066 cases operated upon by 29 surgeons. Therefore, the incidence of drainage as shown in Table VIII should represent an average opinion on this point in technic.

TABLE VIII. INCIDENCE OF DRAINAGE OF PERITONEAL CAVITY BY THE VARIOUS ROUTES

TYPE OF CASE	CASES NO. OF	VAGINAL		ABDOMINAL		VAGINAL AND ABDOMINAL	
		NUMBER DRAINED	PER CENT	NUMBER DRAINED	PER CENT	NUMBER DRAINED	PER CENT
Microscopically and clinically active	99	29	29.2	30	30.3	6	6.0
Microscopically active but clinically inactive	89	17	18.9	9	11.1	3	3.3
Chronic inactive	878	43	4.8	52	5.9	9	1.0

WOUND INFECTION

Wound infection is the most important factor which contributes to the high incidence of morbidity in operations for pelvic infection. Defective wound healing results in prolonged hospitalization for the patient and finally in a considerable percentage of incisional hernias.

Table IX shows the incidence of wound infections in the various

types of cases. The incidence of infections following operations for salpingitis in the acute stage is about three times that in operations for chronic inactive salpingitis.

TABLE IX. INCIDENCE OF WOUND INFECTIONS

TYPE OF CASE	NO. OF CASES	NUMBER OF INFECTED WOUNDS	PER CENT
Microscopically and clinically active	99	19	19.1
Microscopically active but clinically inactive	89	14	15.7
Chronic inactive	878	58	6.6

PROBLEMS IN WOUND HEALING

As I stated before delayed and defective wound healing is the most important factor which contributes to a prolonged postoperative stay in the hospital. Delayed wound healing results from both infection and drainage. Table X shows the combined incidence of drained or

TABLE X. PROBLEM IN WOUND HEALING SHOWING PERCENTAGE OF COMBINED DRAINED OR INFECTED ABDOMINAL WOUNDS IN THE VARIOUS TYPES OF CASES

TYPE OF CASE	NO. OF CASES	TOTAL NUMBER OF DRAINED OR INFECTED WOUNDS	PER CENT
Clinically and microscopically active	99	43	43.4
Clinically inactive but microscopically active	89	19	21.3
Chronic inactive	878	116	13.2

infected wounds. In other words it represents the percentage of cases in which we had a problem in wound healing. It indicates that the percentage of problems in wound healing is increased more than three-fold if patients are operated upon in the presence of active infection.

TABLE XI. COMPARATIVE SUMMARY OF THE AVERAGE NUMBER OF POSTOPERATIVE HOSPITAL DAYS IN CASES DRAINED BY THE VARIOUS ROUTES

ROUTE OF DRAINAGE	MICROSCOPICALLY AND CLINICALLY ACTIVE		MICROSCOPICALLY ACTIVE BUT CLINICALLY INACTIVE		CHRONIC INACTIVE	
	AVERAGE NO. OF DAYS OF DRAINAGE	AVERAGE NO. OF HOSPITAL DAYS	AVERAGE NO. OF DAYS OF DRAINAGE	AVERAGE NO. OF HOSPITAL DAYS	AVERAGE NO. OF DAYS OF DRAINAGE	AVERAGE NO. OF HOSPITAL DAYS
Normal convales- cence. No drainage		17.8		17.2		17.5
Vaginal	8.6	23.1	8.0	18.7	8.4	20.1
Abdominal	9.8	29.7	7.8	19.8	10.5	25.5
Abdominal and vaginal	9.0	29.7	7.6	22.0	9.5	28.0

Table XI shows a comparative study of the average number of post-operative hospital days of cases drained by the various methods and

indicates that drainage by the vaginal route is preferable. The shorter period of hospitalization in this class of cases is due, I believe, to the fact that delayed wound union is avoided. To shorten the postoperative stay in the hospital is important economically both to the patient and to the hospital.

MORTALITY

Table XII shows the incidence of mortality in the various types of cases.

TABLE XII. MORTALITY

TYPE OF CASE	NO. OF CASES	GROSS MORTALITY		MORTALITY FROM SEPSIS	
		NO. OF DEATHS	PER CENT	NO. OF DEATHS	PER CENT
Microscopically and clinically active	99	13	13.1	11	11.1
Microscopically active but clinically inactive	89	3	3.3	2	2.2
Chronic inactive	878	25	2.8	13	1.4

Those who have studied the results of operations for salpingitis in other clinics have reported similar percentages of mortality.

Table XIII shows detailed lists of the causes of death in active and inactive cases. A high percentage of the deaths is caused by shock and sepsis.

TABLE XIII. CAUSES OF DEATH

<i>Active Cases:</i>	
Peritonitis and septicemia	12
Shock and sepsis	1
Shock and cardiac disease	1
Shock	1
Respiratory failure (death on table)	1
Total	16
<i>Inactive Cases:</i>	
Peritonitis	13
Cardiac disease	4
Pneumonia	3
Pulmonary embolism	3
Diabetes	1
Intestinal obstruction, ilectomy on 11th day, shock	1
Total	25

Table XIV shows an analysis of the end-results in the various types of cases. It proves quite definitely that the end-results were better when patients were operated upon after the infection had become inactive. The increased number of deaths in the two active groups accounts for the smaller percentage of these patients seen for follow-up examinations.

Tables XV and XVI give detailed lists of the conditions for which active and inactive cases were considered unsatisfactory when exam-

ined in the follow-up clinics. These tables also give lists of secondary operations which were done and the number of pregnancies which had been reported in each of the groups of cases.

TABLE XIV. FOLLOW-UP ANALYSIS

DATA	CHRONIC INACTIVE		MICROSCOPICALLY ACTIVE BUT CLINICALLY INACTIVE		MICROSCOPICALLY AND CLINICALLY ACTIVE	
	NO. OF CASES	PER CENT	NO. OF CASES	PER CENT	CASES NO. OF	PER CENT
No. of cases operated upon	878	--	89	--	99	--
No. of cases in follow-up	802	91.3	81	91.0	79	79.7
No. of cases never seen in follow-up including deaths	76	8.6	10	11.2	28	28.2
End-result was known including deaths	826	94.0	84	94.3	92	92.9
Satisfactory cases	649	80.9	57	70.3	49	62.0
Unsatisfactory cases	153	19.0	24	29.6	30	37.9
End-result unsatisfactory including deaths	177	21.4	27	32.1	43	46.6

TABLE XV. FOLLOW-UP ANALYSIS. UNSATISFACTORY ACTIVE CASES

	NO. OF CASES
Cystic ovaries	15
Inflamed adnexa	10
Urological	8
Incisional hernias	6
Pelvic pain	5
Retroversion	5
Wound sinuses	2
Menstrual irregularities	2
Leucorrhea	1
Total	54
<i>Secondary Operations:</i>	
Abdominal for adnexal conditions	3
Vaginal: Dilatation and curettage	2
Plastic on cervix	1
Incisional hernias, all were tuboovarian abscess or pyosalpinx cases	6
Pregnancies	2

Table XVII shows a summary of data, and I believe that it is the most convincing evidence that I can offer in recommending that laparotomy for the cure of salpingitis while the infection is still active should be absolutely avoided.

Unfortunately surgeons who have so enthusiastically recommended operation for salpingitis while the infection is still active have not always given us statistics showing their operative results.

In the hands of very expert men results are sometimes achieved and surgical procedures are advised which would be dangerous if generally adopted.

TABLE XVI. FOLLOW-UP ANALYSIS. UNSATISFACTORY INACTIVE CHRONIC CASES

	NO. OF CASES
Ovarian cysts or cystic ovaries	38
Pelvic pain	31
Retrodisplacements of the uterus	22
Menstrual disorders	14
Leucorrhea	10
Adnexal inflammation	8
Dysmenorrhea	7
Backache	7
Sterility	7
Incisional hernias	5
Persistent wound sinuses	3
Urinary conditions	1
Total	153
<i>Secondary Operations:</i>	
Dilatation and curettage	3
Dilatation and curettage and stem pessary	1
Curettage and radium	2
Curettage for incomplete abortion	1
Abdominal operations for adnexal disease	16
Total	23
<i>Pregnancies:</i>	
21 patients had a total of 23 pregnancies	

TABLE XVII. SUMMARY OF DATA. COMPARATIVE OPERATIVE RESULTS IN PERCENTAGE IN THE VARIOUS TYPES OF CASES

DATA	MICROSCOPICALLY AND CLINICALLY ACTIVE	MICROSCOPICALLY ACTIVE BUT CLINICALLY INACTIVE	CHRONIC INACTIVE
Mortality: a. Gross	13.1	3.3	2.8
b. Sepsis	11.1	2.2	1.4
Conservative operations	39.4	41.2	50.6
Drained wounds—Abdominal	30.3	11.1	5.9
Vaginal	29.2	18.1	4.8
Vaginal and abdominal	6.0	3.3	1.0
Wound infections	19.1	15.7	6.6
Problem in wound healing—			
Drained or infected wounds	43.4	21.3	13.2
1. Morbidity	33.3	14.6	11.5
2. Morbidity including infected wounds	52.5	30.3	18.1
Follow-up results:			
1. Unsatisfactory	34.1	30.3	19.0
2. Unsatisfactory, including deaths	40.2	34.1	21.4

Quoting from Dr. Jeff Miller, who recently wrote an article on this same subject we find this matter very well stated. He says:

In the hands of expert men good results sometimes follow even the violation of all the principles of sound surgery, but we would point out that unfortunately most operations are done not by expert gynecologists but by men who are frequently neither experienced nor expert, and it is well, therefore, to inquire how the practice works out when it is generally applied.

From the statistics which I have presented I must conclude that:

1. Laparotomies for the cure of salpingitis while the infection is still active should be absolutely avoided.

2. Dangerous smouldering infections may be present in the pelvis which, even after bimanual examination, may not be accompanied by leucocytosis or fever. Sedimentation time should be used routinely to aid in detecting the existence of active infection in such cases.

3. Abdominal operations for salpingitis while the infection is still active are accompanied by an unjustifiable mortality, excessive morbidity, especially from shock, sepsis and defective wound healing, a high percentage of radical surgery and disappointing end-results.

4. Patients who have pelvic infections should be allowed long periods of convalescence and palliative treatment. If after such treatment spontaneous cures do not occur and operations eventually become necessary, the results will show a minimum percentage of mortality and morbidity, and a maximum percentage of conservative surgery and satisfactory end-results.

5. If operation seems unavoidable after a prolonged period of convalescence and palliative treatment, a cure by laparotomy should not be attempted until the inflammatory exudate about the focus of infection has been absorbed and the leucocyte count, temperature, and sedimentation time are normal.

6. Drainage of the peritoneal cavity by the vaginal route is superior to other methods. By this method the period of postoperative morbidity from delayed wound union and the incidence of postoperative incisional hernias are materially decreased.

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