

TOTAL ABDOMINAL HYSTERECTOMY IN A SERIES OF 1,925 PATIENTS

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TWO thousand eight hundred and twenty women underwent some form of hysterectomy at the University of Iowa between January 1, 1926, and December 31, 1943. In the early years of the present administration of the Department of Obstetrics and Gynecology subtotal hysterectomy was performed routinely with the total operation reserved for necessity. During 1932, the clinic policy changed; more and more total hysterectomies were elected so that during the next two years, 1933 and 1934, not a single subtotal operation was done. This rigorous policy was relaxed for the next few years, but since 1938 more than 90 per cent, and since 1940 more than 95 per cent of all abdominal hysterectomies have included the cervix.

The 2,820 operations included 1,925 total, 393 subtotal, 475 vaginal and twenty-seven radical (Wertheim) hysterectomies; the year-by-year distribution is shown in Figure 1.* The purpose of this paper is to detail the experience obtained in performing the 1,925 total abdominal hysterectomies.

THE PATIENT

The women of the series were preponderantly white (94.9 per cent) mostly indigent, and ranged in age from twenty to more than seventy years, with an average of fifty. Their weights ranged from less than 100 to more than 250 pounds with an average of 130. Forty per cent had never undergone an abdominal or vaginal operation. Only 326, or 16.9 per cent, were nulliparous, the remainder having had an average of four pregnancies.

PRE-OPERATIVE COURSE

Fifty-nine per cent of the patients remained in the hospital from two to five days prior to operation and 27 per cent remained more than six days. Operation within twenty-four hours following admission took place in only 12 per cent. The most common pre-operative complications were hypertension and anemia, occurring in 493 and 407

*The drawings and the two charts were prepared by the Department of Medical Art, Southwestern Medical College.

en, respectively, and in association with each other eighty-four. Fourteen patients suffered from diabetes mellitus and twelve febrile.

has always been customary to examine all patients at a group on and only rarely did a patient escape examination by the chief of his associates. The accuracy of these pre-operative diag-

TYPES OF HYSTERECTOMY

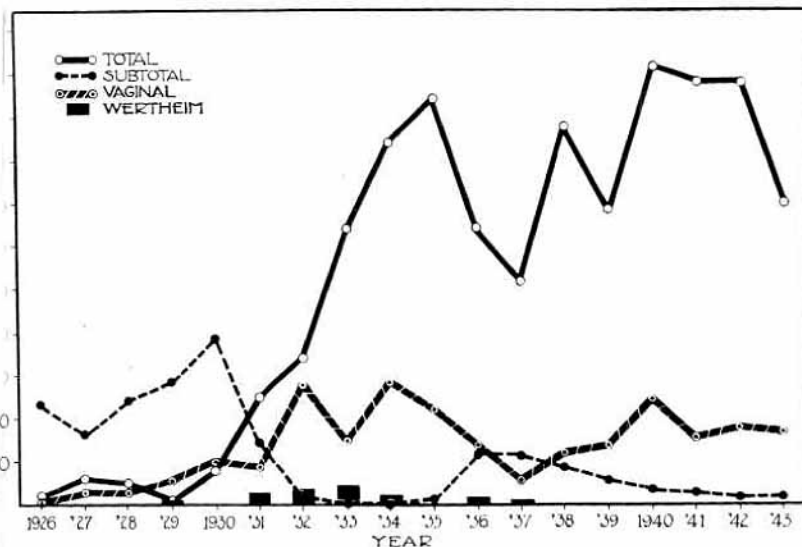


Fig. 1. Annual incidence of types of hysterectomy.

es was 71.9 per cent. For the sake of greater accuracy, postoperative rather than pre-operative diagnoses are tabulated in Table I. Malignant tumors of the uterus (167) or of the ovary (67) were present 14 times. Since no one would question the necessity of performing total hysterectomy in these conditions, it is obvious that removal of the ovary was demanded in 12.1 per cent, or in one patient in eight.

THE OPERATOR

Fifteen senior staff members performed 36 per cent, eighteen senior residents, with assistants usually of lower rank, 39 per cent, and resident or associate residents, generally assisted by more experienced operators, 475 operations, or 25 per cent. The mortality rates for these three groups, senior staff, senior residents and others, were 2.0, and 0.6 per cent, respectively. This difference is to be expected,

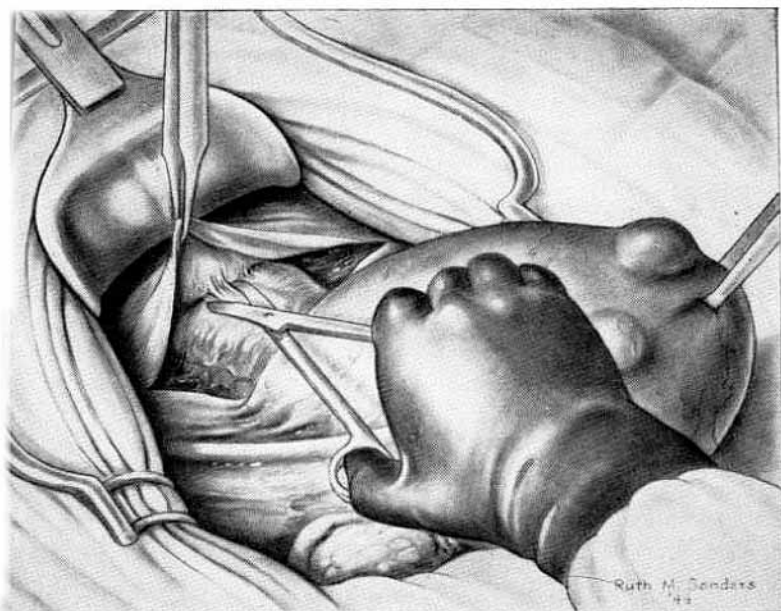


Fig. 2. Technique of total abdominal hysterectomy—downward dissection of the bladder. The bladder is lifted up with forceps and the cleavage line developed with scissors by a cutting and pushing motion.

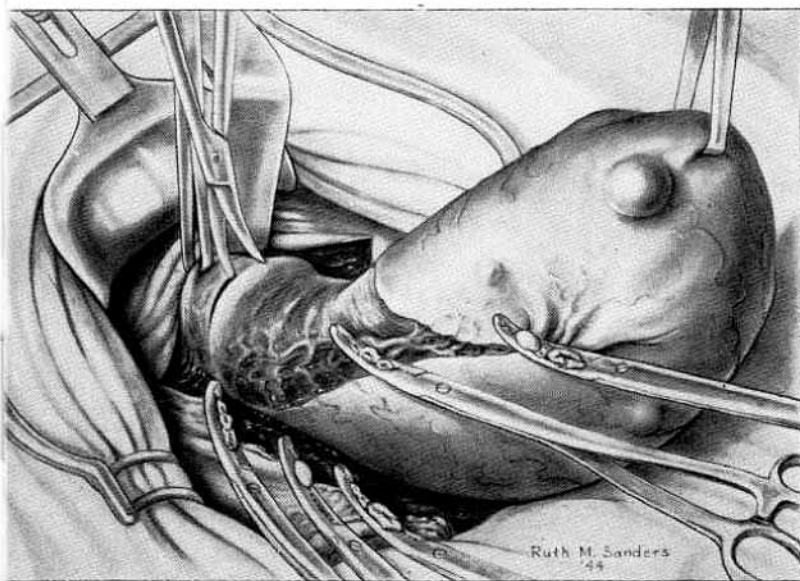


Fig. 3. Technique of total abdominal hysterectomy—opening the vagina anteriorly just below the cervix. After opening, a fluffed sponge is tucked into the vagina to absorb fluid left from pre-operative vaginal preparation.

the other hand, ureteral injury, while not peculiar to, is more uently associated with, total hysterectomy. Such injury may be ded with accurate anatomic knowledge and careful dissection. quate downward displacement of the bladder tends to increase the ince between cervix and ureters. Group experience developing in clinic with a closely associated staff tends to minimize the fre-

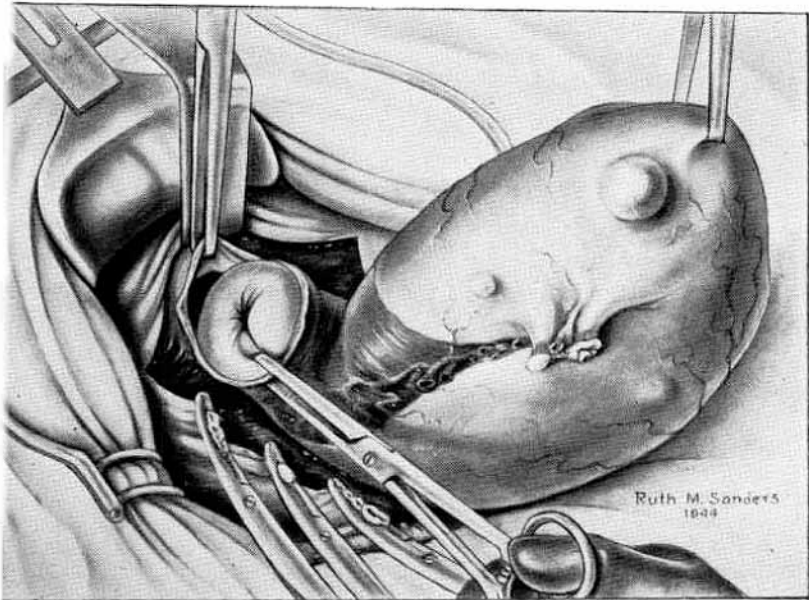


Fig. 4. Technique of total abdominal hysterectomy. The cervix is retracted with a volsellum forceps, and the vagina circumcised under direct vision and close to the cervix as possible. No special attention is paid to the sacro-erine ligaments, although they may be clamped if desired.

TABLE IV. COMPLICATIONS DURING OPERATION

	Times Noted
Troublesome adhesions	833
Troublesome bleeding	115
Shock	54
Large bowel injury	12
Ureteral ligation or division	10
Bladder injury	12

uency of ureteral injury. This point is illustrated by the fact that even of the ureteral injuries occurred in the first half and three in the second half of the series, incidences of 0.7 and 0.3 per cent, respectively. Some operators at first employed indwelling ureteral catheters in pre-operative preparation, but tended to discard this technique as they gained experience. The cut ureter was generally re-implanted in the bladder and contributed to death in only one instance.

Secondary operation to re-implant the ureter was necessary only o
 In general, bladder or ureteral injuries, in gynecologic surgery, amenable to correction and heal well if recognized and repaired

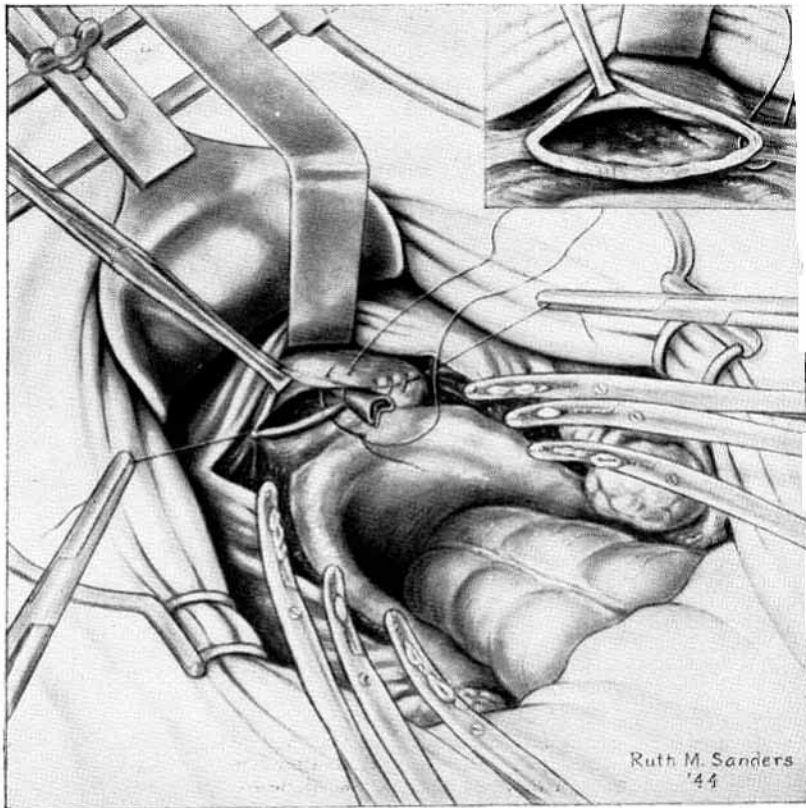


Fig. 5. Technique of abdominal hysterectomy. The vagina is closed with continuous whipover stitch of chromic I catgut, which includes the whole thickness of vaginal mucosa and the fascia propria of both the anterior and posterior walls. Since the sacro-uterine ligaments are part of the posterior fascia propria they are included in this suture. A soft rubber drain, removed the next morning, is left *in situ* to provide vaginal drainage for any bleeding. Optionally, the vagina may be left wide open. In this event, the edges must be whipped over with interrupted or continuous suture in order to effect hemostasis of the vagina cuff. Note that the round and ovarian ligaments are *not* sutured to the vagina cuff.

Insert: Since vaginal branches of the uterine artery sometimes produce troublesome postoperative bleeding, mattress sutures are placed bilaterally.

mediately. The unforgivable sin is failure to recognize the injury before closure of the abdomen. A detailed report of all types of injury during the course of gynecologic operations is in preparation.

POSTOPERATIVE COURSE

torbidity.—A temperature of 100.4° F. was selected as representing division between normal and febrile postoperative courses. On this basis, 11 per cent (281) of the patients were afebrile and 16 per cent (306) had fever for only one day. Fever persisted no more than three days in 55 per cent, no more than four days in 66

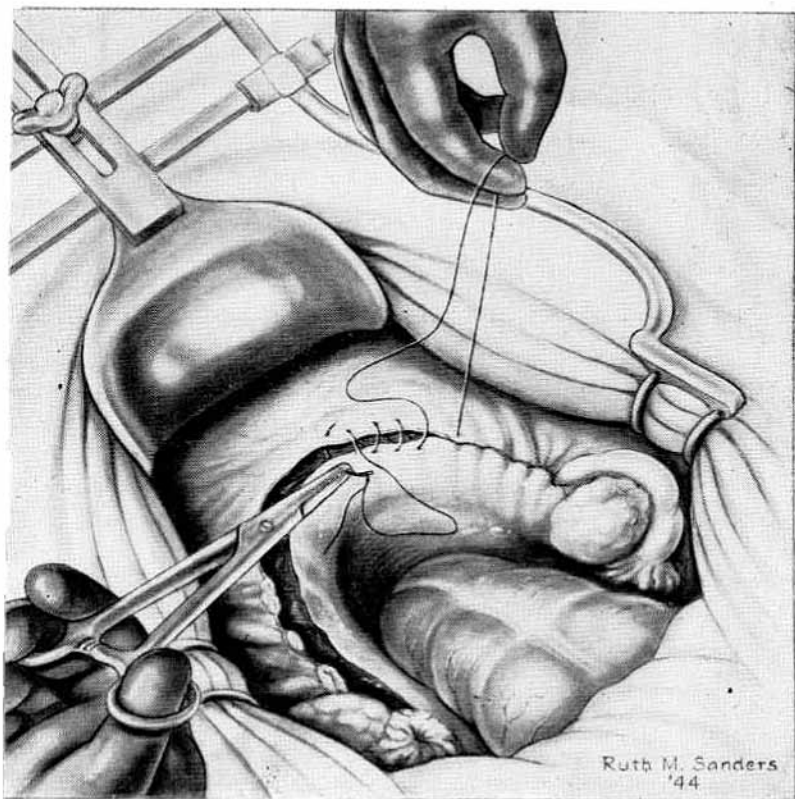


Fig. 6. Technique of abdominal hysterectomy—peritonization with continuous chronic 00, care being taken to extraperitonize the ovarian and round ligament and the tubal stumps.

er cent, and no more than five days in 73 per cent. The greatest number suffered the highest fever on the second postoperative day. The highest fever, irrespective of the day of occurrence, averaged 101.3° F. The average duration of the postoperative hospital stay was 2.7 days, although the limits ranged from seven to more than twenty days.

Nature of Postoperative Complications.—The principal postoperative complications are shown in Table V. Secondary operation was necessitated by the hysterectomy in fifty patients (2.5 per cent) and required procedures are detailed in Table VI.

Fatalities.—Thirty-eight of the 1,925 patients died, a mortality rate of 1.97 per cent. The trend of the mortality rate is downward as shown in Figure 7. During 1942, the rate was 0.51 per cent and during 1943 there was no death. In other words, there was only one

TABLE V. NATURE OF POSTOPERATIVE COMPLICATIONS

	Number Patients
Abdominal wound infection	73
Urinary tract infection	59
Shock, necessitating treatment	51
Operative bed infection	44
Thrombophlebitis	27
Peritonitis	23
Superficial separation—abdominal wound	23
Hemorrhage, early	17
Dehiscence	11
Pneumonia	11
Miscellaneous*	76

*Includes: Septicemia, pulmonary embolus, atelectasis, cardiac failure, late hemorrhage, foreign body, urinary and bowel fistula.

death among the last 335 total hysterectomies. To illustrate the decreased mortality rate in another way, the series was arranged chronologically and divided equally. There were twenty-nine deaths in the first half and nine in the second half of the series, rates of 3.1 and 0.94 per cent, respectively.

Postmortem examination was conducted on twenty-seven of the thirty-eight women.

The causes of death are grouped in Table VII. A more detail

TABLE VI. NATURE OF SECONDARY OPERATION NECESSITATED BY THE HYSTERECTOMY

	Number Patients
Wound closure (16 superficial, 11 dehiscence).....	27
Drainage of abscess	9
Control of hemorrhage	5
Relief of bowel obstruction	3
Removal of foreign body	1
Repair of vesicovaginal fistula	1
Implantation of ureter into bladder	1
Miscellaneous	6

In three instances two procedures were done on the same patient.

The study reveals that peritonitis was present in sixteen, pneumonia in six, and septicemia in four patients. Embolism accounted for six of the deaths, a fatality incidence of 0.3 per cent, or one in 321. Of the fatalities occurred following fifty secondary operations, a mortality rate of 8.0 per cent.

COMPARISON OF SUBTOTAL AND TOTAL HYSTERECTOMY

etailed comparison between the 393 subtotal and the 1,925 total hysterectomies reveals few essential differences. The subtotal mortality rate was 4.1 per cent, but since almost three-fourths of these operations were performed before 1932, the comparison is not valid.

INCIDENCE OF TOTAL VERSUS SUBTOTAL HYSTERECTOMY
CONTRASTED WITH
TOTAL HYSTERECTOMY MORTALITY RATE

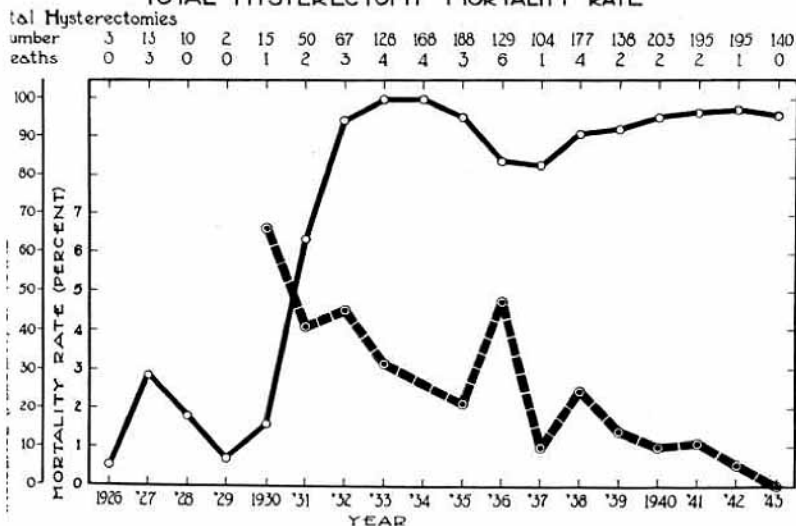


Fig. 7. Annual incidence and mortality rates of total abdominal hysterectomy. Because of insufficient numbers, the mortality rates for the years 1926 to 1929 were not calculated. The gross mortality rate was 1.97 per cent, but twenty-nine deaths occurred during the first 877 hysterectomies 1926-1937, inclusive) and only nine in the last 1,048, rates of 3.08 and 1.05 per cent, respectively. Note that during 1942 and 1943 there was only one death from 335 hysterectomies, a rate of 0.3 per cent.

orbidity, postoperative complications and causes of death were very similar in the two series.

The only significant difference lay in injuries to the urinary tract. The bladder was inadvertently opened eight times (2.0 per cent) in subtotal hysterectomies as against twelve times (0.6 per cent) in total removal of the uterus. Bladder injury, therefore, is no more frequent in total hysterectomy and may be less, because of the necessity for more adequate dissection.

Ureteral injury did not occur with subtotal but was incurred ten times with total hysterectomy, an incidence of one in 193 patients, obviously a similar incidence with subtotal hysterectomy should have resulted in two such injuries.

We are indebted to Doctor Mengert for presenting a report on his experiences. It should stimulate each of us to review our results, that we might profit from similar analysis.

DR. F. S. WETHERELL, Syracuse, N. Y.—I should like to discuss two phases of this paper, namely, deaths from infection and embolic deaths. Doctor Mengert perhaps was not able to give complete details of pre-operative preparation, but I should like to ask how he prepares the vagina pre-operatively? In some large clinics I have watched total abdominal hysterectomies performed with no gauze used in the pre-operative preparation of the vagina. With a patient in the Trendelenburg position, under spinal anesthesia, it is well to pack the vagina with gauze to prevent possible seepage of rectal contents into the vagina incident to relaxation of the anal sphincter.

Pulmonary embolism or pulmonary infarct, which usually occur within seven to ten days postoperatively, are often not recognized by the gynecologist when the first symptoms begin to manifest themselves. He fails to realize the complete significance of a normal temperature or low grade fever suddenly changing and going up a degree or more. At that time the patient herself will often complain of feeling uneasy and apprehensive. Those two little preliminary symptoms are important. He now fails to feel the calf muscles, to make pressure on the soles of the feet and to do the Homan test of extending the feet on the legs. There is a time when it is perfectly proper to feel a woman's legs, namely, on the first day postoperatively. Thus the patient becomes accustomed to the amount of pressure made daily thereafter on the calf of the leg, and on the sole of the foot; if there is a change toward tenderness she will tell you. An embolic death is a terrible thing and it can be avoided by careful routine examination. If tenderness and the other signs are present there should be an immediate ligation of the femoral vein; not the institution of heparin or dicoumarin therapy. The thrombus as a rule starts in the veins of the soles of the feet and travels upward in the external saphenous which becomes the popliteal and then the femoral vein. The way to stop an embolus from getting into the lung or pulmonary artery is to tie off the vein. Even the common iliac vein can be tied with impunity. For that matter, the inferior vena cava has been tied. I would make a plea now that pelvic surgeons drop about an inch below the pelvis and learn how to do a ligation of the femoral vein because they may not have a general surgeon handy to do it.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—In connection with this splendid report of hundreds of cases, I am wondering if it would not have been of advantage to have made a thorough examination of the blood previous to operation? We examine for syphilis and some, like myself, also have the sugar content tested when the operation is not an emergency, as it is estimated that from 20 to 25 per cent of the human race is hyperglycemic while, on the other hand, a fair percentage is hypoglycemic. As we frequently employ glucose after operation, either intravenously or by rectum, I believe that pre-operative examination of the blood as to sugar content would be a move toward making the patient safer for the surgery. I noted that among the cases reported there were a good many of excessive bleeding. I believe that a routine test for coagulation time, followed by proper medication if necessary, might have been of advantage.