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Complications of First-Trimester Abortion: A Report of 170,000 Cases

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One hundred seventy thousand first-trimester abortions were performed in three free-standing clinics of Planned Parenthood of New York City from 1971–1987. Seventy percent of the procedures were done under local anesthesia; the remainder under intravenous methohexital. No preoperative medications or routine postoperative antibiotics were given. High-risk patients were referred to a hospital. The clinics operated under uniform written guidelines. Experienced physicians performed the procedures. There were no deaths in this series of patients. One hundred twenty-one patients were hospitalized (0.71 per 1000) for suspected perforation, ectopic pregnancy, hemorrhage, sepsis, or recognized incomplete abortion. There was no major extirpative surgery performed. There were an additional 1438 minor complications (8.46 per 1000). Overall, there were 9.05 complications per 1000 abortions. The complication rates for procedures done under general anesthesia and local anesthesia were similar. We conclude that outpatient abortion on selected patients to the 14th week from the last menstrual period is a safe procedure. ***(Obstet Gynecol 76:129, 1990)***

After liberalization of abortion laws in New York State, Planned Parenthood organized three abortion sites in 1971–1972 in metropolitan New York City. The two clinics in Brooklyn and the Bronx added abortion services, and a new clinic was opened in Manhattan in late 1971 to provide first-trimester abortion services as well as contraceptive and other services. At the time these Planned Parenthood Clinics began operation, most abortions in New York City were performed in hospitals under general anesthesia. Planned Parenthood of New York City decided to provide low-cost first-trimester abortion services to meet the perceived community need. This paper evaluates the results of the 170,000 pregnancy terminations that were performed in these three clinics from 1971–1987.

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Materials and Methods

From the onset of the clinic services in 1971, detailed records were kept on all patients who had pregnancy terminations. Monthly reports concerning the number of procedures performed at each center were filed regularly. In addition, a separate and complete report on any known termination with complications was filed with the medical director of Planned Parenthood of New York City. Thus, it was possible to analyze complications per thousand abortions. However, because the bulk of the patient record forms was not computerized, it was not possible to analyze the data with respect to years of education, parity, weeks of gestation, patient age, etc.

All patients who were seen at the clinic were counseled intensively both pre- and postoperatively by trained nurses and social workers at the clinics. Informed written consent was obtained, and a detailed description of the procedure was given to all patients. Alternate choices were also discussed. In addition, contraceptive counseling was provided to all patients. After the counseling, the procedure was performed that day or the patients were referred to a hospital if there was any medical condition noted as a possible risk to the performance of the procedure in an outpatient facility. The contraindications to a procedure were as follows: hematocrit below 30, blood pressure of 160/110 mmHg or more, insulin-dependent diabetes, grand mal epilepsy, history of a bleeding diathesis, acute cardiopulmonary disease, and failure to fast before the procedure. In 1979, the Margaret Sanger Center opened a fully equipped anesthesia service that could provide general anesthesia for first-trimester abortions. In addition to the contraindications to abortion listed at Planned Parenthood of New York City

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clinics, there were some additional contraindications to the use of methohexital anesthesia, including history of sensitivity to barbiturates, the presence of porphyria, and morbid obesity. All procedures were done by gynecologists who, after the first few months of the service's opening, were experienced in this surgery.

Each patient had a minimal amount of laboratory work performed before the procedure. The following laboratory tests were performed: pregnancy test, hematocrit, Rh (if negative, a Coombs test was performed), gonorrhea culture, chlamydia screen (if indicated), Papanicolaou smear (if not performed within 6 months), and a blood test for syphilis. Because the majority of our patients had the procedure performed on the same day of their counseling and laboratory work, it was not possible to have in hand the results of the gonorrhea culture, chlamydia screen, and Papanicolaou smear. If a sexually transmitted disease was suspected clinically, the patient's procedure was postponed until the results of the cultures were available. When a positive culture for sexually transmitted disease was returned after the procedure, the patient was contacted and treated according to the guidelines of the Centers for Disease Control (CDC) appropriate at that time.

All personnel in the operating rooms wore scrub suits and observed a modified protocol for prepping and draping the patient. The wearing of caps, masks, and gowns was not required. Physicians scrubbed for 5 minutes before the first case and for 2 minutes between each succeeding case. Although the surgeons did not use sterile drapes, they did use a modified no-touch technique, and great care was taken that no part of any sterile instrument touched any part of the patient except for the uterine cervix and endometrial cavity.

The procedure followed was similar to the ones outlined in the papers by Burnhill[1,2] and Stubblefield.[3] The cervix was grasped with a single-tooth tenaculum; gradual cervical dilatation was performed as necessary using Pratt dilators. The uterine contents were evacuated with suction curettage followed by sharp curettage and finally reaspiration of the uterine contents. No laminaria were used for cervical dilatation.

Ergotrate maleate was administered either intramuscularly or intracervically after the procedure if the operator noted an increase in bleeding during the procedure or if the patient had a history of previous uterine atony or postabortal hemorrhage. No intravenous infusion was started on patients who had local anesthesia. The tissue was examined grossly using a technique outlined by Burnhill et al.[4,5] For all patients who were less than 8 weeks pregnant or in whom gross tissue examination revealed no fetal parts, the specimen was floated in saline and examined with a magnifying lens. However, all tissue was submitted to an outside laboratory for examination by a board-certified pathologist. When neither fetal parts nor placental tissue were obtained, patients were referred to back-up hospitals to rule out ectopic pregnancy.

Ultrasound was not used routinely; however, it was mandated for patients in whom preoperative diagnosis as to the length of gestation was uncertain or there were other difficulties in estimating gestational age. Immediate postabortal insertion of intrauterine devices (IUDs), such as either the Lippes Loop (Ortho Pharmaceutical Corp., Raritan, NJ) or Copper 7 (Searle Corp., Skokie, IL), was provided for patients who requested this method of contraception. The postabortal use of IUDs was discontinued in 1985 when the supply of IUDs was exhausted. Patients who selected oral contraceptives were started on the oral contraceptives on the day of abortion.

Vital signs of the patients were monitored by the nursing staff in the recovery room. Most of the patients were discharged within 1–2 hours after arriving in the recovery room. General-anesthesia patients were kept under closer observation to be sure that they had fully recovered from the anesthesia before discharge. All patients were given written postoperative instructions and were required to be accompanied by a spouse, friend, or relative. Contraception was again discussed in the recovery room, and a postoperative appointment was made for 2–3 weeks after the procedure. Patients who elected to have their examination at some other center were given a form to be filled out by the examining physician and returned to Planned Parenthood of New York City. When the clinics were closed, two physicians were assigned to receive telephone calls from postabortal patients with complaints. Anti-Rho(D) immunoglobulin (Ig) was routinely administered to all Rh-negative, Du-negative patients in the recovery room. Those whose pregnancies were less than 12 weeks from the last menstrual period (LMP) received a 50-μg dose of Ig; those who were beyond 12 weeks received 100 μg of anti-Rho(D) Ig.

No routine antibiotics were used postoperatively. Any patients who required preoperative antibiotics because of a medical condition warranting prophylactic antibiotics were referred to a hospital for termination of the pregnancy.

When an emergency hospital admission was necessary, a clinic or private ambulance service was used to transfer the patient to the hospital. Arrangements were made to phone information to the gynecology resident on-call at the back-up hospital, and a transfer record was sent with the patient to the hospital. In addition, patients were asked to sign a release that

enabled the clinic to obtain hospital records for that admission in order to have better follow-up for the complication.

Except for the addition of general anesthesia in 1979, only one other change was made in the protocol during the 16-year period. Up until 1978, the eligibility requirements for abortion included being more than 8 weeks from the LMP. In 1978, this was changed to include only a positive pregnancy test and presentation 5 or more weeks from the LMP. This policy was suspended in 1987 because of the complexity of following very early patients, who frequently had such small quantities of tissue obtained that they had to be placed on ectopic-pregnancy high-alert protocols. Otherwise, the method of performing the procedure remained unchanged during this entire 16-year period. Each of the three centers reported the complications on a monthly "Abortion Complication Form" and these complications, in turn, were reported on a regular basis to the Medical Committee of Planned Parenthood of New York City for review. In addition, these centers were inspected by the Department of Health and Human Services of New York State at regular intervals and evaluated by the Planned Parenthood Federation of America every 3 years.

Results

From 1971–1987, 170,000 first-trimester abortions were performed in the three clinics. There was no significant difference in complications between patients given general and local anesthetics. The overall hospitalized complication rate was 0.071%. Minor complications occurred in 0.846%. It should be noted that our complication rate, which is based on those complications that were noted in the facility and those treated in the hospital, does not match the categories published by the CDC.[6] Part of this problem involved the difficulty of obtaining complete hospital records on patients who were hospitalized by physicians who were not connected with the Planned Parenthood of New York City facilities. Indeed, this was the rule rather than the exception because our doctors did not directly manage the in-hospital complications. However, using the definition of major complications proposed by the CDC (hemorrhage requiring transfusion; infection with 2 or more days of a fever with a peak of at least 40C, or with hospitalization of 11 days or more; and major unintended surgery), there were almost no major complications. We decided to classify patients as either hospitalized with a complication or non-hospitalized with complications to give us a clearer perspective as to the medical and socioeconomic impact of the problem. In addition, there was an unknown number of complications that may have occurred in the lost-to-follow-up group. There were 1360 patients (8%) for whom we had no follow-up record either at the clinic or by return of a physician's note. However, this is a more complete follow-up record than those of many other published series on abortion complications.[4,6–10] Table 1 indicates the type of complications requiring hospitalization. The most frequent of these was incomplete abortion, which required hospitalization for one in every 3617 cases. The perforation rate is worthy of note: One patient with a perforation was hospitalized for every 10,625 procedures. None of these perforations required hysterectomy or resulted in damage to any adjacent organs. Table 2 presents the minor complications. Again, our definition of minor complications was those that could be managed in the clinic setting and did not require referral to a hospital. Table 2 has two categories that represent the treatment of either a complication or a suspected complication: the categories of resuctioning the uterus on the day of surgery and subsequent resuctioning. Resuctioning was used as a therapeutic measure whenever the attending physician believed that the patient might have had postabortal uterine atony with retention of clots or might have some retained tissue. If the pregnancy test was positive or if the patient's uterus appeared to be larger

Table 1. Complications of First-Trimester Abortion Requiring Hospitalization

Complication	No. of cases	Occurrence rate
Incomplete abortion*	47 (0.028%)	1:3617
Sepsis†	36 (0.021%)	1:4722
Uterine perforation	16 (0.009%)	1:10,625
Vaginal bleeding‡	12 (0.007%)	1:14,166
Inability to complete abortion	6 (0.003%)	1:28,333
Combined pregnancy§	4 (0.002%)	1:42,500
Total	121 (0.071%)	1:1405

* Repeat curettage in the hospital.
† Two or more days of fever at 40C or higher.
‡ Requiring hospitalization.
§ Intrauterine and tubal.

Table 2. Minor Complications of First-Trimester Abortion

Complication	No. of cases	Occurrence rate
Mild infection	784 (0.46%)	1:216
Resuctioned day of surgery	307 (0.18%)	1:553
Resuctioned subsequently	285 (0.17%)	1:596
Cervical stenosis*	28 (0.016%)	1:6071
Cervical tear	18 (0.01%)	1:9444
Underestimation of gestational age	11 (0.006%)	1:15,454
Convulsive seizure†	5 (0.004%)	1:25,086
Total	1438 (0.846%)	1:118

* Causing amenorrhea.
† After local anesthesia.

than was anticipated at the follow-up appointment, resuctioning was used as the prime diagnostic and therapeutic measure. The results of these resuctionings included the recovery of blood clots (usually on the day of surgery) or of necrotic or infected decidua (on procedures done after the day of surgery). The most frequent complication found was mild infection. This, also, was a rather liberal diagnosis; no elevation of temperature was required before the diagnosis was made. The patient was classified as having a mild infection if the uterus was tender on motion, if the adnexa were tender to palpation, or if there was a history suspicious for uterine infection. Under any of these circumstances, the patient was electively treated with antibiotics rather than waiting for a firmer diagnosis to be made. There were no deaths noted in this series of 170,000 first-trimester abortions.

Discussion

It may seem almost superfluous to report on a large series of abortions. Certainly, there has been no dearth of literature in the last 17 years to attest to the relative freedom from major complications and to the safety of first-trimester abortion. One need only review the articles by Hodgson,[7,8] Nathanson,[9] Cates and Grimes,[6] and Forrest,[10] to cite but a few of the sources of data on abortion complications. However, this series differs from the single-author data that have been analyzed by Cates and Grimes and summarized in their 1981 article. The differences are manifested in size, duration, and the method of data collection. In their review of the literature, Cates and Grimes quoted data on complications from 12 studies of abortion performed at less than 12 weeks' gestation, including the joint program for the study of abortion data, CDC data, and individual author data compiling cases from single clinics. Their data had a fairly wide range of variance from study to study and clinic to clinic for the complications of hemorrhage, infection, cervical injury, and uterine perforation. However, nowhere in the literature is there a comparable group of cases that span a period of time of 16 years covering 170,000 procedures done under basically the same protocols for women who were not more than 14 weeks from their LMP. Furthermore, the selection criteria used for these patients were such that gestational age was controlled and the procedures were done on healthy women (or women who had only minor health problems). The complication rates, reported as both those requiring hospitalization and those that could be treated at the clinic, were all found to be well below any of the published rates in the cumulative table of Cates and Grimes.

Another observation can be made by some comparisons with the tables of Forrest[10] showing a secular trend in a reduction of complications for abortions studied in three time periods ending in 1975–1978. At their lowest (the most recent data), the major complication rates for suction abortion are at least twice those shown in this series. It is, of course, difficult to compare the exact meaning of the complication rates in the Planned Parenthood series with published multicenter studies. However, it is clear that the morbidity is low for procedures done in a free-standing center operating under a careful set of printed guidelines and limiting the procedures to basically healthy women. Only 0.07% (or one in every 1405 procedures) resulted in a problem that required hospitalization. Some of these patients were hospitalized because they were not seen at the clinic, and therefore represented problems that could have been managed on an outpatient basis had the patient returned to a Planned Parenthood Center. For minor complications (which again included a number of reevacuations that were performed prophylactically), the total number was 0.85% (or one in every 118 procedures). This record reflects the experience of the surgeons and the usefulness of the clinic policy's guidelines. The clinic hired only physicians who had experience elsewhere and did not have to be trained in the performance of these procedures. Furthermore, all physicians were observed directly by the Medical Director, who also periodically reviewed their performance and complication records. Residents were not used in this program.

There were other standards and guidelines: a careful review of the patient's past history; a physical examination that included evaluation of uterine size, shape, and position and the presence of any adnexal enlargements; and the checking of the patient for hypertension and arrhythmias. All patients who were suspected of having an ectopic pregnancy before the procedure (because of a suggestive history, presence of adnexal mass or tenderness, etc) were referred back to their own physicians or the back-up hospital. There were only 58 patients in this group. Another 37 ectopic pregnancies were detected because minimal quantities of tissue were obtained at the procedure or because the pathology examination was reported as negative for chorionic villi. Of those cases, four were subsequently shown to have a combined intrauterine and extrauterine pregnancy (an incidence of one in every 42,500 patients). None of these four were diagnosed preoperatively as having adnexal pathology. Two of them ruptured the ectopic pregnancy at the time of the abortion. The other two patients were diagnosed when they remained symptomatic after the procedure. The discovery of a positive pregnancy test led to pelvic

sonography, which demonstrated the presence of the second extrauterine gestation. The detection of only 95 ectopic pregnancies in a series of this magnitude is somewhat perplexing; only one ectopic pregnancy was detected in every 1789 patients. We have no evidence through our follow-up mechanism that this represented underreporting of ectopic pregnancies. We suspect that performing the procedures after 8 weeks led to the elimination of many patients who were diagnosed as having ectopic pregnancies before they ever arrived at Planned Parenthood Center.

The complication rates obtained with general anesthesia as compared with local anesthesia are also of interest. A number of studies reported by Grimes and Cates,[11] Grimes et al,[12] Peterson et al,[13] and Atrash and Cheek[14] have consistently demonstrated higher mortality rates in patients in whom general anesthesia had been used. A difficulty with the data from the CDC is that they used a retrospective investigation of deaths following performance of abortion, so that deaths were compared among different anesthesia methods at different clinics. Their data showed that general anesthesia was riskier than local. However, in this series, no deaths were reported and no difference in complication rates was shown between the groups. If there is an increased risk associated with general anesthesia, use of a strict protocol with full precautions and well-trained personnel makes the risk too small to be detected in a series of 44,569 patients. From a review of deaths in the literature, it is possible to conclude that some procedures were performed by untrained personnel who operated without adequate equipment and who frequently used toxic doses of methohexital.[15] A prohibition against the use of general anesthesia may be based more on the improper use of the anesthesia than on the safety of the anesthesia used under strict protocols. Although there were no deaths under paracervical block anesthesia, it should be noted that after the third year of clinic operation, there were no more convulsive seizures following the use of paracervical block. The five cases that we reported all occurred in that first 3-year period. These occurred among the first 22,000 patients who had their surgery performed at our centers. After the occurrence of the seizures, a protocol was initiated that limited the injection of 1% lidocaine to no more than 16 mL. Usually the procedure was performed with 12 mL. It is our view in retrospect that early anesthetic complications resulted from excessive amounts of anesthesia being given in fewer sites, without withdrawal of the syringe plunger to assure that the anesthetic agent had not entered a blood vessel. Knowing that seizures can occur during a procedure done under local anesthesia, it is necessary to have resuscitative drugs, an airway, oxygen, and trained personnel immediately available to the procedure room. We believe it necessary that the personnel include those who are certified in cardiopulmonary resuscitation. All patients who had a suspicious history of idiosyncratic reaction to local anesthetic agents were not given local anesthetic agents. After the introduction of these changes, no further convulsive seizures were reported.

Six patients had cervical uterine myomas that prevented reaching the gestational sac under local anesthesia, and the procedure had to be stopped. These patients underwent successful procedures under general anesthesia in a hospital after laminaria were inserted. It is conceivable that this could have been done at our center had general anesthesia been available at the time. Most of the minor complications that we reported (incomplete abortion, infection, cervical stenosis) were successfully treated in the Planned Parenthood Centers. Cervical stenosis detected by postabortal amenorrhea was believed to result from vigorous post-evacuation curettage of the endometrium and endocervix, causing trauma to the internal os. All of these 28 cases were treated by cervical dilatation under paracervical block in the Planned Parenthood Centers. The patients had a sensitive pregnancy test performed before the redilatation to rule out the possibility of continuing pregnancy in those women who complained of lack of menstrual flow 6 weeks after a procedure had been performed. The details of these cases were reported by Hakim-Elahi.[16]

There was a low incidence of cervical lacerations that required suturing (0.01%) and of uterine perforation (0.009%). This indicates the lack of difficulty in obtaining adequate cervical dilatation in this group of patients. The use of laminaria has been reported to prevent some of these complications. Schulz et al[17] and Grimes et al[18] reported that the use of laminaria to obtain cervical dilatation had a powerful protective effect against cervical injury. They reported that compared with procedures in which rigid dilators were used, the risk of cervical injury with laminaria dilatation was 80% lower. The overall rate of cervical injury in these series was 1.03%. Even with an 80% reduction, their cervical injury rate remained above our rate of 0.01%. However, osmotic dilators are useful in obtaining cervical dilatation.[19] They are of particular value with advanced gestational age at termination, cervical hypoplasia, the presence or possibility of cervical stenosis, the presence of extreme flexion deformities of the uterus with relation to the cervix, and a history of previous cervical conization or cryosurgery. However, despite these uses for laminaria, there was almost no need for their use in our series. The mandatory use of osmotic dilators would have increased the

time of the procedure, made the entire patient flow more complex, and added expense and discomfort for the patient. Of hypothetical interest is that postabortal cervical stenosis was detected in 28 of our patients. Whether this was a result of agglutination because of cervical injury with a sharp instrument or mechanical injury that resulted in scar formation after the procedure is unknown. Whether osmotic dilators would have prevented some or all of these 28 cases is not known.

It is possible that the low incidence of perforation might well have been reduced by the use of laminaria. However, the 16 cases (0.009%, or one in 10,625) represent the lowest perforation rate yet reported. Eight of the patients in whom a perforation was suspected did not have a laparoscopy performed because the surgeon believed that the uterus was free of all products of conception and that the perforation apparently occurred only with the sound. These patients were observed in a hospital for 1–2 days. No sequelae were noted, and the patients were then discharged. Seven women whose abortions were incomplete at the time of perforation had suction curettage repeated in the hospital while the uterus was observed through a laparoscope by a second physician. None of these patients required laparotomy or had any serious postoperative complications. One patient required laparotomy because an observed small area of ecchymosis on the small bowel was considered suspicious. However, upon gross examination of the bowel, the surgeon did not deem that resection was required and the posterior uterine wall was repaired by suturing. No other complications were noted in this patient. In this series, there was no uterine extirpative surgery as a consequence of first-trimester abortion.

Postabortal vaginal bleeding that required hospitalization occurred in 12 patients. All of these were patients who were 12–14 weeks pregnant at the time of the procedure. None of the patients required transfusion. However, four of them had a repeat curettage because of retained products of conception. The remaining eight patients responded well to intravenous oxytocin administration without the necessity of repeat curettage.

Patients who were categorized as "resuctioned day of surgery" usually had complaints of severe postabortal pain, increase in size of the uterus, or increase in vaginal bleeding after the procedure. There were 307 patients who required resuction on the same day for the indications described. Thirty-eight of them had retained placental tissue. The remaining patients were diagnosed as having postabortal uterine atony, described from our center by Sands et al[20] in 1974.

When pregnancy terminations are performed on patients less than 14 weeks from the LMP who ha 'e no other health contraindications to outpatient su gery, the procedure is extremely safe. This was repor d by Grimes et al[15] over a decade ago. This series co irms and reinforces their conclusions on the safety o outpatient abortion. We also have demonstrated th : the use of methohexital anesthesia did not add t the morbidity rate of these procedures.

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