

# A survey of over 20,000 abortions at the Cook County Hospital (1961-1965)

ABRAHAM F. LASH, M.D., Ph.D.

AUGUSTA WEBSTER, M.D.

JOHN J. BARTON, M.D.

Chicago, Illinois

*The survey of 22,287 abortions (1961 through 1965) at the Cook County Hospital, and a prospective study of 1,000 consecutive incomplete abortions from Jan. 1, 1968; on, have for their aims a clinical analysis of the many factors contributing to the early diagnosis of menacing complications. There follows logically the immediate and adequate therapy which may prevent ("brink") cases, or prove futile if instituted too late (with resulting death). Although febrile reactions indicate septic incomplete abortions, the majority of the patients who come here are potentially (if not manifestly) infected. The index of suspicion is very high as to criminal induction, whether induced by the patient or by another agent. It was considered of interest to compare the results of the management of 30 years ago which followed the so-called conservative regimen, with the current trend of more aggressive procedures aided by the modern therapeutic modalities and knowledge of shock and of blood volume and replacement as well as electrolyte and fluid balance.*

DURING THE PERIOD from 1961 through 1965, 22,287 abortions were managed at the Cook County Hospital. This period covered our peak census and the therapeutic methods were identical with our present concept of therapy. Since the characteristics of these abortions remain the same from year to year, a prospective study was undertaken to determine the detailed factors related to uterine perforation, sepsis, shock, and hemorrhage, and to evaluate the importance of central venous pressure monitoring, bacteriological studies, blood transfusion, plasma volume expanders, and antibiotic therapy. Previous reports from this hospital may serve as a basis of comparison between

the earlier or conservative method and the current more aggressive management. Such a study may be more meaningful than a comparison of these facets of abortion problems from different institutions.

The Cook County accepts all patients in need of hospitalization whether or not they have been previously booked. The clientele in the Obstetric Department is 87 per cent non-Caucasian, and largely from a medically indigent socioeconomic group. Most of these patients do not seek prenatal care early, and when an emergency arises they appear at the admitting room at the Cook County Hospital. Consequently, the ratio of abortions under 20 weeks' gestation to live births at the Cook County Hospital in the 5 year period (1961 through 1965) was 1 to 4.1, as contrasted to that of the state of Illinois hospitals with a ratio of 1 abortion to 10.3 live births.

On admission, the type of abortions is

*From the Division of Obstetrics and Gynecology, Hektoen Institute of Medical Research, Cook County Hospital, and the Department of Obstetrics and Gynecology, Northwestern University Medical School.*



considerably different from that encountered in private hospitals. There is a relatively smaller number of threatened abortions at the Cook County Hospital. There are obvious reasons for this. These women are often the heads of families; they have responsibilities toward children and they are unwilling to leave home until absolutely necessary. Threatened abortions are managed on an outpatient basis with bed rest and sedatives. Not until the diagnosis of incomplete or inevitable abortion can be made are these women hospitalized.

**Material and method**

The retrospective survey of 22,287 abortions at the Cook County Hospital covered the period from 1961 through 1965. This period represented the heaviest obstetrical census at the Cook County Hospital. During this time there were 92,321 live births, giving a ratio of one abortion to 4.1 live births (Table I). A similar ratio was found in earlier reports<sup>2, 3</sup> from Cook County Hospital. The prospective study began on Jan. 1, 1968. A thousand consecutive incomplete abortions were studied and detailed information was obtained. During this period, there were 7,536 live births.

Residents in their second and third years and internes performed all evacuations of the uterine cavity. All bleeding patients are treated on admission, or soon after, depending on the extent of hemorrhage, the height of fever, and the general condition of the patient. It is emphasized in our resident program that evacuation of the uterine contents by ring or ovum forceps is adequate without resorting to furlowing the endometrial surface by a curette. Dilatation is

usually not necessary in an incomplete abortion and, if it is required, a dilator no larger than a No. 11 Hegar is used, thus avoiding trauma to the internal os of the cervix. If the products of conception are adherent, curettage may be required. When a false passage or perforation occurs, or is encountered, a senior attending physician is notified so that further examination may confirm the injury and evaluate its significance. X-ray studies of the abdomen are performed to determine the presence of free air in the peritoneal cavity. Perforation of the uterus may be silent clinically and it is difficult to determine when it occurred. The history given by the patient is most unreliable (see Table IV). All these patients with perforations of the uterus denied instrumentation or interference.

Table II presents the age range of 13 to 46 years, with over 20 per cent of the abortions occurring in teenagers, 40 per cent in the 20 to 25 age group, and 18 and 14 per cent, respectively, in the next two 5 year groups.

The chief complaint of the patients presented was vaginal bleeding, with a duration of one day in 50 per cent, two days in 17 per cent, and three days in 10 per cent. It is significant that 88 per cent entered within five days of the onset of bleeding.

History of duration of gestation was most unreliable. The size of the uterus was considered a more objective method of determining the stage of gestation. Forty per cent of the patients were in the first eight weeks of gestation and 48 per cent at 10 to 12 weeks—almost 90 per cent in the first trimester.

Previous abortions or curettages were denied by over 70 per cent of the patients. Fewer than 20 per cent gave a history of one previous abortion and about 5 per cent admitted two; very few experienced more than three.

After the patient's history has been obtained, our immediate therapy consists of intravenous administration of fluids, usually 5 per cent glucose in water with oxytocin. The interval between time of admission and

Table I. Incomplete abortions at Cook County Hospital in selected years

| Years     | No. of abortions | No. of deaths | No. of live births |
|-----------|------------------|---------------|--------------------|
| 1939      | 1,000            | 10            | 4,552              |
| 1945-1949 | 8,245            | 16            | 33,571             |
| 1961-1965 | 22,287           | 20            | 92,321             |
| 1968-     | 1,000            | 3             | 7,536              |



Table II. Clinical features of 1,000 consecutive incomplete abortions, 1968

| Age (yr.) | No. of patients | Vaginal bleeding |          | Size of uterus |          | Previous abortions |          | Previous D. & C. |          |
|-----------|-----------------|------------------|----------|----------------|----------|--------------------|----------|------------------|----------|
|           |                 | Duration (days)  | Patients | Weeks          | Patients | No.                | Patients | No.              | Patients |
| 13-19     | 222             | 1                | 510      | 4-8            | 409      | 0                  | 714      | 0                | 724      |
| 20-25     | 385             | 2                | 170      | 9-12           | 483      | 1                  | 196      | 1                | 185      |
| 26-30     | 179             | 3                | 94       | 13-16          | 102      | 2                  | 45       | 2                | 54       |
| 31-35     | 142             | 4                | 64       | 17-20          | 6        | 3                  | 25       | 3                | 24       |
| 36-40     | 54              | 5                | 42       |                |          | 4                  | 14       | 4                | 10       |
| 41-46     | 18              | 6-10+            | 120      |                |          | 6-8                | 6        | 5-7              | 3        |

Table III. Evacuation of uterus in 1,000 consecutive incomplete abortions, 1968

| Interval after admission |          | Fever before evacuation |          | Fever after evacuation |          | Hospital stay after evacuation |          |
|--------------------------|----------|-------------------------|----------|------------------------|----------|--------------------------------|----------|
| Hours                    | Patients | Temperature             | Patients | Temperature            | Patients | Days                           | Patients |
| 1-12                     | 543      | 100.4                   | 456      | 100.4                  | 185      | 1                              | 13       |
| 13-24                    | 359      | 105<br>(and less)       | 150      | 104.4<br>(and less)    | 71       | 2                              | 218      |
| 25-36                    | 58       |                         |          |                        |          | 3                              | 521      |
| 37-48+                   | 40       |                         |          |                        |          | 4                              | 143      |
|                          |          |                         |          |                        |          | 5-10+                          | 105      |

evacuation of the uterine cavity is dictated by the extent of hemorrhage, height of fever, and general condition of the patient.

Since there exists a high index of suspicion of criminal interference, there has been free use of antibiotics pending culture and sensitivity reports. Penicillin, streptomycin, chloromycetin, and keflin are the principal antibiotics used.

The therapy of the septic incomplete abortions (over 60 per cent febrile on admission, Table III) uncomplicated by shock syndrome is divided into three phases at this hospital. The appropriate antibiotics are duly sought, but delay in acquiring the required bacteriological information does not prevent the immediate administration of antibiotics.

The second phase of therapy is directed toward the replacement of blood volume in the presence of hemorrhagic septic incomplete abortion. The correction of the fluid and electrolyte balance follows. The accompanying acidosis is treated—the preference is for 44.7 mEq. doses of sodium bicarbonate. It is of the utmost importance that this acidosis be corrected; other agents (such as

digitalis, vasopressors, or vasodilators) used in the treatment of the shock syndrome will not be otherwise effective. Either whole blood or plasma, depending on the patient's hemogram, is used to replace blood volume deficits.

The third phase of the therapy is directed toward evacuation of the uterus. If on admission the patient has an open cervix with tissue or blood clots, immediate evacuation with ovum forceps is accomplished, regardless of fever or obviously infected products of conception. If fever is present without hemorrhage, there is a 12 hour period of antibiotic therapy; during this time plasma volume, electrolytes, fluid balance, and acidosis are being corrected. The uterus is then evacuated with ovum forceps and the occasional use of a dull curette.

For the septic incomplete abortion complicated by the shock syndrome, therapy is divided into two major categories. The general therapy is similar to that described above for the septic incomplete abortions without shock. The second or more specific therapy is directed toward the correction of the altered hemodynamic status of the pa-



tient. The chief aim is to correct the unfavorable tissue perfusion status of the patient in shock. To accomplish this aim, a cooperative effort was developed in conjunction with Dr. William Shoemaker, Chief of the Surgical Research Division at the Cook County Hospital. The septic shock patient is monitored by a shock team consisting of an attending and chief resident of the Division of Obstetrics and Gynecology, a chief resident assigned to surgical research, and two nurses. The patient is monitored on a multi-channel recorder; serial cardiac output curves, continuous central venous recordings, mean arterial pressure, serial blood gases, and serial serum lactate levels are recorded. Further calculations of cardiac work, mean transit times, and total peripheral resistance are later made in the laboratory. For those patients with low central venous pressure and low cardiac output, the first requirement is to restore circulating plasma volume. Whole blood, plasma, low viscosity dextran, and clinical dextran are the principal plasma volume expanders utilized. If the central venous pressure has returned to normal limits and the patient is still not responding, and if oliguria or anuria persists, then isoproterenol is administered. The modes of action of isoproterenol are: (1) directly on the heart, resulting in increased myocardial contractility and heart rate, and (2) as a beta-adrenergic stimulator which produces vasodilation. If isoproterenol is ineffective then a vasoconstrictor is used—principally metaraminol.

In those patients with a normal or elevated central venous pressure and normal cardiac output, isoproterenol is administered after the acidosis has been corrected. Steroid therapy is not used routinely. Only in patients with a high central venous pressure and normal cardiac output, or in those patients who do not improve following the return of central venous pressure to normal limits after the administration of plasma volume expanders, is the use of steroid therapy considered.

The surgical procedures employed in the evaluation and treatment of septic incom-

plete abortion with complications are colpoctentesis, posterior colpotomy, and exploratory laparotomy. The ice mattress is frequently employed in the presence of high temperature before surgery. A general inhalation anesthetic (cyclopropane oxygen or 50 per cent nitrous oxide oxygen) is usually used and administered by a capable anesthesiologist. In the course of treating uterine perforation, the bladder and the bowel are meticulously explored. Hysterectomy is indicated according to the extent of the perforation and character of infection. The uterine perforation and bowel injury, if present, are treated as detailed in Table V for this series of patients.

#### Results

It is of interest to note that the incidence of abortions to live births was 1:4+ (Table I) in all three periods (1939, 1945 to 1949, and 1961 to 1965), whereas in the 1968 period it was 1:7.5. The survey reveals a downward trend in the incidence of abortions as well as term deliveries. There are some who would attribute this downward trend to the current use of the contraceptive drugs or devices. Twenty-two per cent of the abortions occurred in the teenage group, 38.5 per cent occurred in the group aged 20 to 25 years or over, 60 per cent in the group under 25 years, and the remaining 40 per cent occurred among the older group.

It is significant that almost 70 per cent of the patients come to the hospital within two days of bleeding. There is a distinct advantage in the early effort to seek aid, since it allows for earlier diagnosis and treatment.

Almost 90 per cent of the abortions occurred in the first trimester of pregnancy.

Over 70 per cent of the patients gave a history of no previous abortions or dilatation and curettage, almost 20 per cent admitted one previous abortion, and 20 per cent a previous curettage. Only about 5 per cent had had two abortions, and very few patients had had three or more abortions.

The remarkable decrease in time between hospital admission and evacuation of uterine

pp 114-117 omitted  
(medical treatment charts)



cavity—54 per cent within 12 hours and over 90 per cent within 24 hours (Table III)—is a change from the former (1939) conservative management. This change occurred in spite of the fact that more than 60 per cent had fever on admission, one third of them of a serious degree.

The advantage of early initiation of therapy is shown in the quick resolution of the problem of bleeding and incipient infection. The early therapeutic effect may be reflected in early discharge, since 75 per cent (Table III) were discharged by the third postevacuation day, and about another 15 per cent by the fourth day. The 10 per cent who remained longer in the hospital were the ones who arrived late in the course of septic incomplete abortion.

In Table IV are the details of the 20 deaths which occurred among the 22,287 abortions during the period from 1961 to 1965. Autopsies were performed in all. Fourteen of the 20 deaths were due to infection with concomitant cardiac and kidney complications. The so-called spontaneous abortions were always suspect as to their etiology. The various methods of induction included Lysol douche, catheter, and instrumentation (?), and recently a straightened wire coat hanger has been used in several instances.

Over fifty per cent of the patients who died were under 25 years of age; the youngest was 17. This age group (under 25 years) contributes the highest incidence among the abortions. In this group, 3 patients had had one previous term pregnancy each, 4 patients had had two term pregnancies, and 1 patient had had three term pregnancies. The older group (29 to 41 years) had had two to ten term pregnancies.

The histories were inaccurate and misleading as to the time of the induction or onset of the abortion, except in a few instances. The patient was at times so sick as to be unable to give any history. There was delay in seeking medical aid. Due to misleading histories, two patients were admitted to the general surgical ward, and two to the medical ward.

On the surgical service, one patient (17

years old) was given a diagnosis of a ruptured viscus. Three uterine perforations were found at laparotomy and sutured. Generalized peritonitis and bronchopneumonia developed postoperatively, and death occurred 13 days postoperatively.

The second patient (34 years old) had a ruptured duodenal ulcer. She aborted 14 hours after she arrived in the hospital; this event was followed in one hour by evacuation of the uterus. Three hours later she had a small bowel resection; she died 18 hours later with thrombosis of the mesenteric artery.

One of the patients (35 years old) on the medical service was in uremic coma. She aborted on the thirteenth hospital day, and was then transferred to the obstetrical ward, where the uterus was evacuated. She died the following day in uremia. A blood culture was positive for hemolytic *Staphylococcus aureus*.

The second patient (25 years old) was admitted to the medical service because of jaundice; incomplete abortion was discovered at this time. She was transferred to the obstetric service the following day, and the uterus was evacuated. Peritoneal dialysis was performed four times because of anuria, but she died in uremia on the thirteenth hospital day. Autopsy revealed toxic nephrosis, hepatitis, and an intact uterus.

The third patient (20 years old) had ingested some unknown abortifacient three days before admission. She died 10 hours after admission; autopsy revealed a toxic hepatitis and hydronephrosis due to an acute halogenated hydrocarbon poisoning and a perimetritis.

In this group of fatal cases, the usual therapy for septic incomplete abortion and shock was instituted. The surgical procedures were evacuation of the uterine cavity, colpocentesis, colpotomy, and only one hysterectomy. The hysterectomy was performed on the 41-year-old patient (gravida 11, para 10) who, eight days before coming to the hospital, had inserted a catheter into her uterus and left it in place for 48 hours. On the day of admission, a pelvic



abscess was drained by a posterior colpotomy. On the second hospital day, the hysterectomy was performed. On the twenty-sixth hospital day, subdiaphragmatic abscesses were drained. She died on the twenty-eighth hospital day; at autopsy, generalized peritonitis and multiple abscesses were found.

Septic shock accounted for 40 per cent of the fatal cases. Half of these were in shock on admission or within 30 hours; in only one did it occur after 53 hours.

Chemicals and drugs were infrequent causes, but again there was the delay before coming to the hospital.

Five interesting patients were grouped together (see Table V) under the heading "brink" mortality. These patients were on the brink of death and might have died if the therapy had not been carried out. All five patients denied interference, yet all had perforated uteri. The last patient, O. P., caused her treatment to be delayed four days by giving misinformation to an inexperienced resident. The current group of patients (1968) received more aggressive surgical intervention than the groups of 1961 to 1965, 1945 to 1949, or 1939.

The three patients of the 1968 series who died (Table VI) were 30, 38, and 41 years of age. All were multiparas. All were seriously septic on admission and the duration of the sepsis was uncertain. Therefore, the life-threatening conditions were well advanced when the patients entered the hospital. Patient E. S. denied any interference with her pregnancy, yet when the uterus was evacuated an intrauterine contraceptive device was found. She went home on the third hospital day afebrile. She returned nine days later in septic shock, which was treated in the intensive care unit. Although she responded partially to therapy, almost 48 hours later exploratory laparotomy was considered necessary; the general surgeon performed a hysterectomy because of perforation in the fundus uteri and repaired two lacerations in the small bowel. She died 18 hours later.

The second patient entered in septic shock. The shock was overcome but, with uterine abscess, bilateral suppurative parametritis,

and septicemia, she died on the eleventh postevacuation day. In retrospect, one may question whether the treatment was adequate since there was no hysterectomy and drainage after the septic shock was overcome.

An embolic pulmonary lesion was present in the third patient on admission. With pelvic abscess and acute metritis, she was beyond salvage.

#### Comment

A survey of a large series of patients gives the basis for valid statistics and for self-appraisal in evaluating the diagnostic and therapeutic procedures used.

Comparative study of the reports of Hillis in 1939 and of Webster in 1949 with ours of 1961 through 1965 indicates a definite increase in the incidence of abortions as well as live births up to 1968, when there is noted a downward trend. In the groups described, the same ratio of one abortion to four live births persisted up to 1968. This ratio is still higher than in the city of Chicago, outside Cook County Hospital, where it is 1 to 10.8, and in the state of Illinois 1 to 10.3.

Significant changes are noted in the declining gross mortality rates in the different periods: in 1939, 1.0 per cent; in 1949, 0.19 per cent, and then a slight upswing in 1968, 0.3 per cent.

The factors contributing to the declining mortality in septic abortion may be considered under: (1) blood replacement, plasma and blood substitutes; (2) electrolyte and fluid balance; (3) control of acidosis; (4) antibiotics in large doses; and (5) appreciation of the hemodynamics of septic shock, with proper monitoring with central venous pressure and urinary output if the complete desirable array of monitoring equipment is not available. Biochemical blood studies are essential to the continuous observation of the patient. Microbiological information is important, but the culture and sensitivity reports are not available until 48 to 72 hours after the patient's admission. Therefore, empirical use must be made of broad-spectrum antibiotics. Also, it is most important to have a team—consisting of an obstetrician, resi-



dents, and nurses—in constant attendance. Individual analysis of each patient's status will determine what must be done surgically, and when. In removing remains of the products of conception, it cannot be overemphasized that this so-called simple procedure should be only an evacuation and not a traumatic operation. One has to admit that occasionally a superficial infection is converted into a deep one by iatrogenic perforation of the uterus when these simple rules are not followed.

Further surgical procedures are directed by the course of the infection and by the alertness of the observing team. Lash<sup>2-3</sup> emphasized the importance of watching the progress of a uterine infection by means of repeated examinations because it may not be static. He demonstrated that a progressing pelvic peritonitis may be checked by a simple posterior colpotomy and adequate drainage, even in the absence of a bulging cul-de-sac. When the evacuation of the uterine cavity has not proved sufficient to remove an infected nidus, then the uterus may require removal; the timing of the hysterectomy requires expert judgment. After the uterus has been perforated, either outside or inside the hospital, the keenest judgment is needed to time the exploratory laparotomy in order to determine uterine and bowel injury. To repair a laceration or do a hysterectomy in a young nulliparous patient taxes one's judgment. A perforated uterus with a foul, brown discharge must be removed. The general condition of the patient and the extent of the peritoneal infection certainly aid in deciding the extent of surgery indicated.

When over 60 per cent of the patients are under 25 years of age, and over 20 per cent are teenagers, the magnitude of the problem can be appreciated and the importance of early medical aid must be publicized. Survey of the statistics of the near fatalities ("brink") and the deaths in the 1968 series reveals the striking and most significant observation that early diagnosis of the extent of the trauma (uterine, bowel, bladder) and the character of the infection (smear and culture) establishes the guidelines for therapy and prognosis. It is better to prevent septic shock by dealing with it in its incipient form than to let it become severe (at which point it may become irreversible). The therapy must include the most careful and continuous observation in order to detect any changes in vital signs and urinary output. Aggressive surgical intervention, properly timed and adequately executed, may achieve success in an otherwise hopeless situation. The patient must be watched for the development of any postoperative complications such as abscess development (pelvic, abdominal, subdiaphragmatic), thrombophlebitis, pulmonary emboli, and hematological defects. By such a sophisticated approach better results will be attained in these serious septic abortions which continue to occur in spite of all the advances in obstetrical and contraceptive care.

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