THE CAUSATION AND TREATMENT OF RUPTURE OF THE UTERUS*

By Barton Cooke Hirst, M.D., Philadelphia, Pa.

THIS communication is a record of clinical experience in rupture of the uterus rather than a literary or statistical research. I find it necessary in reviewing my personal experience with the causes of rupture of the uterus, to divide the accident into ten separate classes, presenting one or two examples under each head.

1. Rupture of the uterus due to maternal obstruction: Contracted pelvis is usually thought to be the commonest cause, but in Koblanck's analysis of eighty cases, fetal obstruction was the cause more than twice as often as a contracted pelvis.

We have had a recent example in our out-patient service of a moderately contracted pelvis in a woman in labor for the fourth time, with a child that proved larger than the other three. She had been delivered before without special difficulty. After some eighteen hours of labor her pains suddenly ceased and there was a slight bloody discharge from the vagina with symptoms of shock. Unfortunately the practitioner in attendance apparently did not recognize the true nature of the case and there was some delay in procuring a consultant. Upon his arrival the case was transported to the University Hospital in the ambulance but there was a collision about a mile from the hospital with another motor car with the result that the woman was thrown onto the street. She was then taken to my hospital service in the lower part of the city and there operated on immediately. She died three days later of pneumonia apparently from exposure, but the postmortem examination showed that the peritoneum was perfectly healthy and that the uterine walls which were sutured instead of eradicating the uterus, had completely healed.

2. Fetal obstruction: Hydrocephalus, is the most important, as malposition and overgrowth are not so likely to be overlooked.

In the out-patient service we had a breech presentation which was delivered as far as the shoulder, but the practitioner then experiencing difficulty, a consultant was summoned who thought that enough strength had not been applied to the shoulders. Consequently he pulled much more vigorously with the result of rupturing the uterus its entire length and also rupturing a hydrocephalic head. I operated on the woman as soon as she arrived in the hospital, did a difficult hysterectomy under the most unfavorable conditions and fortunately she recovered.

3. Spontaneous: Rupture with or without a scar from a previous operation.

I have seen two cases of spontaneous rupture of the uterus in addition to those that are now unfortunately quite common following cesarean section. I regret to say that I have had one of these following my own operation, the only one as far as I know.

*Read at a meeting of the Obstetrical Society of Philadelphia, February 14, 1924.

The two cases of spontaneous rupture occurred in very fat women who had become suddenly obese just before their last pregnancy; there was no obstruction whatever in either case but the uterus ruptured extensively and the child was expelled into the peritoneal cavity.

One case was a transverse rupture of the fundus from tube to tube. I only saw the woman a month after her delivery and operated for what I supposed to be a pelvic abscess but found the uterus with a complete rupture through the fundus into the peritoneal cavity, walled off by peritoneal and intestinal adhesions. A hysterectomy fortunately, was satisfactory in this case.

4. Perforation from localized necrosis.

There was an interesting example in my service in the Philadelphia Hospital. A woman was delivered spontaneously without any suspicion of injury to her uterus, but when she got out of bed she suddenly discharged considerable quantities of clear fluid from the vagina. We naturally thought of an injury to the bladder but a careful examination showed that there was a round hole in the uterine wall corresponding with the promontory of the sacrum during labor and communicating with a limited portion of the peritoneal cavity in which there had been a secretion of ascitic fluid that was discharged through the orifice in the uterus from time to time with the patient in the erect posture.

5. Rupture by internal manipulation.

Unfortunately under this head a number of examples might be given, but two will suffice. In one, a physician attempting to control uterine hemorrhage at the fifth month ruptured the vaginal vault. He then succeeded in inserting his hand in the uterus whereupon he ruptured the fundus. When I saw the patient shortly afterward, I found the original operator with his hand and arm up to the elbow in the woman's abdominal cavity which he had opened with the instruments in his pocket case. He was holding on to the ruptured uterus with the idea he said, of controlling the hemorrhage.

In another case brought into the University Hospital, the uterus was completely ruptured, two pieces of intestine detached from the mesentery, were hanging out of the vulva and both the baby's arms had been pulled off in an attempt to do version, the arms, apparently, having been mistaken for the legs.

It is a commentary on the present fad for an immoderate resort to version that out of Koblank's eighty cases of rupture, twenty-nine or thirty-six per cent, were due to version.

6. Perforation by instruments through the vagina.

Under this head, too, numerous examples could be presented but I have chosen five out of a larger number.

In one, the uterus was perforated by an instrument inserted in the third month with the idea of emptying it. The small intestine was caught and was pulled on until the whole length of the small bowel was pulled out and then pulled off. In another case the uterus had been perforated by an instrument; the ileum, was caught just short of where it enters the caput coli, torn across, and then pulled back into the uterine cavity where it was firmly fixed, so that all the contents of the intestine except the large bowel oozed out of the external os uteri. I operated on this woman some twelve days after the original injury doing an intestinal anastomosis and a hysterectomy, but the woman was so toxic that she did not survive the operation.

In one of my hospital services an intern endeavoring to estimate the duration

of pregnancy in a partly completed abortion, perforated the uterus with a sound and I found omentum in the uterine cavity.

In another case in another hospital service, the intern perforated the uterus in an attempt to clean out an incomplete abortion and then gave the woman an intrauterine douche of bichloride of mercury. That was years ago when this antiseptic was generally employed, but instead of delivering the fluid into the uterine cavity, he passed his two-way catheter into the abdominal cavity and we recovered something like a quart of bichloride solution from the peritoneal cavity in the postmortem examination. In another case, in which a doctor had induced abortion on his wife, and then called in another physician to complete it, there was a rupture of the uterus by an instrument, with death shortly afterward, from peritonitis. The woman, when I saw her, was beyond aid.

In another case a patient had used a long handled buttonhook to induce abortion on herself. She perforated the uterus, twisted the buttonhook about in the peritoneal cavity, caught a loop of intestine in the hook and tore a hole in it. I was obliged to do an intestinal anastomosis and a hysterectomy, fortunately with a successful result.

7. Perforation of the uterus through the abdominal wall.

Under this head I have seen two rather remarkable examples.

In one, in the Maternity Hospital of Philadelphia, a young girl illegitimately pregnant, determined to destroy her fetus, so she passed a long hatpin into her abdomen at the umbilicus transfixing the fetus and accomplishing the result she desired. The fetus was born dead shortly afterward, but the woman suffered no ill consequence whatever, except for a few drops of pus which oozed out of the navel for two or three days.

In another case a girl attempted to commit suicide at the fifth month of pregnancy by shooting herself through the abdomen. She miscalculated the height of the fundus uteri, however, and placed the muzzle of the revolver just above the umbilicus. The bullet entered this point and emerged from her back. She made a perfectly spontaneous recovery and was delivered under my observation at term. This does not come under the head of a perforation of the uterus but was an attempt I think not only to commit suicide but to destroy the evidences of the girl's condition. At least that was the thought, I believe, in her mind.

8. Rupture of lower uterine segment in placenta previa treated by version.

There is a possibility of ruptured uterus in performing version for placenta previa no matter how carefully the operation may be performed. I once had an experience of this sort before a class of students, in which I treated a case of placenta previa in this manner; pointing out the danger of rapid extraction of the child; mentioning the possibility of rupture of the lower uterine segment on account of the alteration in its texture; waiting a considerable length of time after the performance of version before proceeding to extraction, at least an hour and three-quarters or two hours and then completing the operation with the utmost gentleness and care. I was chagrined to find a rupture of the lower uterine segment in which I could put my fist. The woman recovered with gauze pack and drainage.

9. Perforation of the vaginal vault.

I once saw an interesting example of perforation of the vaginal vault by forceps. The physician had attempted to apply forceps before any dilatation of the external os whatever, but with complete effacement of the cervix and great

distention of the lower uterine segment. Mistaking this portion of the uterus for the child's head, the blades of the forceps, which were inserted with a good deal of force had perforated the vaginal vault, then when traction was made, naturally the uterine wall itself was lacerated by the traction exerted on the lower uterine segment. When I saw this woman in consultation she was moribund and nothing could be done for her.

10. Partial rupture of peritoneal coat and superficial myometrium by imposition of weight on the abdomen.

Under this head I have seen a remarkable instance of rupture of the perimetrium and superficial portion of the uterine wall, without complete involvement of the myometrium and without entrance into the uterine cavity, but with death from profuse hemorrhage. This accident was due to coitus in the last month of pregnancy; the husband was a man of large stature and unusual weight; at least two hundred and fifty pounds. Curiously enough he had lost his first wife with the same symptoms at the same date of pregnancy and obviously I think, from the same cause.

The treatment of ruptured uterus must be adapted to the individual case. There is a choice of inactive treatment; irrigation and gauze drainage; gauze pack alone; and abdominal section, often with the necessity of intestinal anastomosis or closure of intestinal puncture.

I once had a remarkable case of complete recovery of ruptured uterus without any active treatment whatever. The woman refused the induction of labor which I first suggested; she then fell in labor which was obstructed by a rachitic pelvis. She refused a cesarean section which I urged on her; she stipulated that she might make an effort to deliver herself during the night and then if she did not succeed she would consent to the operation, but just before I arrived in the hospital the following morning, by one stupendous effort, she ruptured her uterus, expelled the baby at the same time, dead with a spoon-shaped depression in its skull. I then insisted on operation for the ruptured uterus but she flatly refused and curiously enough made a complete and satisfactory recovery without any treatment at all, having refused the correct advice I had given her on three separate occasions. Like everyone with much experience in obstetrics I have treated ruptured uterus by various plans: irrigation and gauze drainage through the vagina, with the rupture low down and posteriorly; hysterectomy a number of times; intestinal anastomosis in several of the cases; sewing the rent and peritonealizing it without attempting to remove the uterus and in some instances splinting the wound, if it was anterior, as Leopold suggested by pressing the uterus forward on itself by means of an extensive intra-pelvic tampon inserted from above, behind the uterus. There is no routine treatment for this condition, but the operator must use judgment and discretion and be guided by experience.

It is impossible for me to present a statistical account of my own

work of more than thirty years in a number of hospitals and in different localities. The best statistical study I know of which shows the results of various treatments, is that of Schultz, in which it appears that out of 323 cases of rupture of the uterus, the mortality of inactive treatment was 78.8 per cent; of irrigation and drainage 64 per cent and of the operative treatment 55.3 per cent.

1821 Spruce Street.

(*For discussion see page* 804.)

OBSTETRICAL SOCIETY OF PHILADELPHIA

MEETING OF FEBRUARY 14, 1924

THE PRESIDENT, DR. EDMUND B. PIPER, IN THE CHAIR

Symposium on Rupture of the Uterus

DR. EDMUND B. PIPER reported **Two Cases of Ruptured Uterus.**

1. Mrs. M. P. Admitted, Aug. 13, 1919. Two previous children. Confinement expected, Aug. 12, 1919. Family medical history negative. No miscarriages. First child, forceps delivery; second child, normal. Present labor long drawn out, patient had been given pituitrin, the amount of the dosage questionable. Upon admission with undelivered child she gave all the classical symptoms of a ruptured uterus. She was delivered by version before I saw her. Following delivery, examination showed large rent in anterior lower uterine segment. At operation the abdominal cavity was full of blood and blood clots. Anterior wall of the uterus was torn completely across leaving hardly an inch of cervix. The partial traumatic hysterectomy was completed and the stump peritonealized as well as possible. As the abdominal cavity had been contaminated from below, the patient was drained. Following operation, after which she was badly shocked, she made an uneventful recovery.

2. Mrs. A. P. Admitted Dec. 22, 1923. Age forty-three. Eight previous children. Previous labors all difficult. Patient had been in labor actively for over

twenty-four hours. Under anesthesia, delivery had been attempted, with failure, version was then tried unsuccessfully. Upon admittance to the hospital patient was semiconscious from ether and markedly shocked. Abdominal examination gave the appearance of the fetus very close to the skin. Version was completed with great difficulty as the fetal body had apparently protruded through a rent in the anterior uterine wall.

Operation: Following the extraction of the dead fetus abdominal section and hysterectomy was performed with no drainage. She was treated for severe shock, after which she made a surprisingly uneventful recovery.

DR. CHARLES S. BARNES reported two cases.

1. Mrs. E. P., Polish, twenty-seven years of age, of good family and personal history. A history of two pregnancies, spontaneous labors, two healthy children of five and three years respectively. Seen by the speaker, in her home, in consultation, March 14, 1923. A history of amenorrhea, the last menstruation occurring early in January, 1923. Menstruation habitually regular. No other history obtainable except that of two or three days of bleeding from the genital tract, indefinite pain in the lower abdomen and pelvis, and weakness.

Great pallor was evident, accelerated breathing, a rapid thready pulse not perceptible at the wrist, a subnormal temperature. Pelvic examination showed uterine signs of a two month's pregnancy, moderate tenderness and a visible moderate genital hemorrhage. The lower abdomen was somewhat rigid and tender and dull on percussion. A diagnosis of intraperitoneal hemorrhage was made, probably due to a ruptured extrauterine pregnancy. The patient was promptly transferred to a hospital and abdominal section done. The pelvis and considerable of the lower abdomen were filled with blood. The appendages were intact but a rupture or rent in the anterior wall of the uterus presented itself, so ragged and extensive as to necessitate supravaginal hysterectomy. The patient later admitted that the wound was self-inflicted. Deserted by her husband, and desperate in the thought of a third child to support, believing herself pregnant (which was true) she attempted self-induction of abortion by thrusting an ordinary hard rubber douche nozzle into the uterus. Evidently the nozzle, entering the cervical canal in the manipulation, had then been pushed through the anterior wall of the cervix into the peritoneal cavity, partially separating the bladder from its uterine attachment. One large piece of gauze was packed into the pelvis through the abdominal wound, to guard against hemorrhage, and, on its removal, to provide for the exit of probable infection.

The reaction of the patient was good, but her recovery, finally complete, was prolonged, due to local infection.

2. Mrs. A. B., Irish, thirty-two years old, in good health. On September 22, 1922, the patient was first admitted to the Philadelphia General Hospital six and a half months pregnant. Pains were present suggestive of threatened premature labor, but the predominant symptom was that of vomiting. After four days' observation and treatment the vomitus became dark green, pain was complained of in the right inguinal region and pain and tenderness under the right costal margin. The attending chief, deeming abdominal section imperative, found a cholelithiasis for which he did a cholecystotomy providing drainage which was continued for several weeks following. A six and a half months fetus was delivered by cesarean section. Needless to say the above treatment was at the hands of a competent man. Eight months subsequent to the above outlined treatment, May 29, 1923, the patient, admitted again to the Philadelphia General Hospital, came under the writer's care. She gave a history, borne out by physical findings, of a five and a half

months pregnancy, the seventh. The first five had terminated spontaneously at full time, the sixth as above cited by hysterotomy.

On admission, she had a normal temperature, normal blood pressure, a pulse of approximately 100, a hemoglobin of 60 per cent. The patient gave a history of having had for several days, beginning a week previous to admission, "smothering spells" with vague occasional slight abdominal pain; of having been seized two days before admission with tenesmus of the bowel and bladder, accompanied, while on the toilet, with acute pain in the pubic region. When admitted, very moderate irregular pains in the lower abdomen were complained of, and there was slight tenderness in this area. An incisional hernia appeared above the umbilicus.

No evidence of fetal life. Dullness was observed in the flanks. The patient at no time gave clear evidence of a serious condition, but during a few hours observation, the abdominal pain increased and the pulse became slightly accelerated. Abdominal section was done with a preoperative diagnosis of probable rupture of the uterus, possibly intestinal obstruction.

After removal of considerable free blood from the preitoneal cavity the uterus appeared with a longitudinal rupture of its anterior wall, four inches in length, clean cut, evidently a separation at the line of incision at the time of cesarean section. The intact amniotic sac inclosing the fetus lay free in the peritoneal cavity.

The previous operator informed me that he is accustomed to use several layers of catgut in closing the uterine wound. After removing thin strips of tissue, to freshen the apposing uterine walls, I closed the wound, as is my custom, with three layers of chromic catgut.

It seems that no infection was present following the primary operation to interfere with firm union of the wound. The most rational predisposing cause of rupture is doubtless the early occurrence of pregnancy, conception taking place two and a half months following hysterotomy.

DR. NORRIS W. VAUX reported three cases.

1. Mrs. T. B., white, age forty-one. Admitted to Chestnut Hill Hospital, September 22, 1923. Diagnosis on admission: Pregnancy, ruptured membranes, not in labor. Para viii. Seven previous labors, one set of twins, seven children living and well. Patient had been attending the Prenatal Clinic, normal pregnancy. Patient admitted eight days after estimated probable date of confinement with early rupture of membranes. Labor began six hours after rupture of membranes. Fetal heart sounds heard on admission with difficulty. First rectal examination: Heavy, thick gristly cicatrical cervix, dilatation three cm. Labor progressed until midnight (slowly) ten hours after rupture of membranes, pains increased in severity, regular three minutes. First vaginal examination: Cervix fully dilated, head engaged. Diagnosis: L. O. P., large firm head of overdue baby. Head did not engage well, one attempt at forceps delivery under ether was unsuccessful. Uterus was contracted firmly about child, head in occiput posterior position, easily pushed out of its engagement and difficult version performed. Large aftercoming head delivered by forceps. Baby stillborn. Weight 9.5 ounces.

Patient's condition excellent, some hemorrhage following delivery, uterus contracted well, moderate hemorrhage continued with firmly contracted uterus. Pulse rose to 120 ten minutes after delivery, it was noticed that the cord was retracting quite rapidly into vaginal orifice. Condition of patient showed early symptoms of shock. Twenty minutes after delivery pulse rose to 140, placenta removed manually from left side of abdominal cavity through a large circular tear above vaginal vault on left side, hemorrhage not excessive. Patient quite conscious, moderate shock, was treated for further shock and vagina packed. Forty-five minutes after delivery condition had improved, laporotomy was performed, easy rapid hysterectomy

followed. Patient left table in good condition, pulse 140 and of good quality, respirations 26, temperature 97.4, reacted well, no further hemorrhage. Pulse gradually rose to 160 at the end of twelve hours, no external bleeding or symptoms of hemorrhage.

Death followed thirty-nine hours after hysterectomy without further rally after transfusion, etc.; some blood clots and free blood in peritoneal cavity at time of operation.

2. Mrs. S., white, age twenty. Admitted to Lying-In Charity Hospital on October 22, 1923. Diagnosis: Pregnancy. Primipara, in labor. Small, rather pale young woman with a definite history of neisserian infection two years previously, followed by an illness lasting three weeks, at which time she had abdominal pain and tenderness of right and left sides, and pain in lower abdomen with difficult urination, purulent discharge, distention, with fever and vomiting. Slow convalescence about three weeks at home. No return of abdominal pain or distress, periods to time of pregnancy normal, pelvis small but normal, labor, twenty-six hours of normal first and second stage. Baby weighed 6 pounds, 5 ounces.

Two vaginal examinations made, placenta expressed spontaneously, temperature 97° after delivery, no postpartum hemorrhage, pulse 96, respiration 18. After two days of normal convalescence temperature rose to 102°, some foul, odorous lochia with pain in right side and definitely tender and enlarged uterus, marked on right side. On fifth day temperature reached 104, pulse 120, some vomiting and acutely tender over right side of uterus and pelvis, lochia distinctly purulent. On seventh day temperature went to 103, moderate sized firm mass felt at right side of uterus in pelvis, lochia much improved in character, patient's general condition about same, on tenth day mass had definitely increased rapidly in size, very tender and extended up right side on abdomen to level of umbilicus.

Vaginal examination showed no other areas of inflammation of pelvic masses other than sensitive uterus and mass on the right side connected with uterus, nonfluctuating. Laporotomy was performed on tenth day, large mass of omentum adherent to uterus, when gently removed, about six ounces of foul-smelling blood and pussy material evacuated. There was a distinct rupture or rent in right lateral anterior wall of uterus about three inches in length. Hysterectomy and uninterrupted convalescence.

3. Mrs. F. M., white, age twenty-one. Admitted to Bryn Mawr Hospital Ward on Jan. 16, 1924. Diagnosis: Ruptured Uterus. Primipara. History given by attending physician outside hospital that patient had had forty-six hours of labor with no advancement. After completion of the first stage he advised removal to hospital, this was refused. Forceps applied in home under poor and unsanitary surroundings. After several attempts child was delivered stillborn. Perineal lacerations. Afterbirth did not deliver and physician made attempt to remove it manually at which time he found the examining hand went well into the abdominal cavity through a rent in the left side of the vaginal vault. Patient was then sent to hospital in an ambulance with placenta retained.

On admission: Pulse 110, temperature 98°, respirations 24, moderate bleeding, symptoms of shock not marked, no attempt had been made to suture perineal laceration. Placenta removed manually. Diagnosis confirmed, vagina packed and patient treated for shock, condition became critical but responded to treatment. Twelve hours after admission condition of patient justified further procedure. Patient was prepared for section, etherized and packing removed. Thorough examination of birth canal made, revealed the following: Laceration of birth canal of severe magnitude, cervix was lacerated in many places but a large left lateral tear extended up into the abdominal cavity.

Immediate hysterectomy. The laceration extended on left side posterior to the broad ligament upward, about 3½ inches. Pelvis contained blood clots and some

free blood. Vaginal drainage placed. Patient reacted well from operation, convalescence has been quite normal with exception of inability to control flow of urine, patient was incontinent. At present time patient is recovering the bladder function. General condition is such that she could be discharged except for occasional incontinance of urine.

DR. CHARLES C. NORRIS reported three cases.

CASE 1. Illadvised forceps operation resulting in rupture of umbilical cord; deep tear in the myometrium prior to admission to the Philadelphia General Hospital. Easy forceps delivery, abscess formation, rupture of abscess on the 13th day and death from general peritonitis on the fifteenth day. Autopsy.

Mrs. E. Mac T., para xii; pains started at 11 P. M., forceps were applied one hour later; between then and her admission to the hospital at 6 A. M. the next morning, forceps were unsuccessfully applied three additional times. When seen by me two hours after admission, her temperature was 98, pulse 120 and respiration 40; general condition of the patient was worse than these figures would indicate. The pulse was of poor quality, the skin leaky and no fetal heart sounds could be heard. Examination showed a wide vaginal outlet and an L. O. A. position. An easy midforceps operation was performed and the placenta was manually extracted. A deep tear was found involving the right side of the uterus low down and extending outwards to, or nearly to, the peritoneum. No communication with the peritoneal cavity could be demonstrated. The infant weighed nine pounds, was dead, and the cord was torn off flush with the umbilicus, evidently the result of the previous attempts at delivery. Subsequent to delivery, the temperature showed evidence of mild pelvic peritonitis, but the patient seemed to be doing moderately well. This condition continued until the thirteenth day, when after moving in bed, she complained of sudden pain in lower right abdomen, followed by evidence of shock. General peritonitis developed and death occurred on the sixteenth day. Autopsy confirmed the clinical findings.

CASE 2. Mrs. M. G., para iii, in labor twenty-four hours and was finally delivered after considerable difficulty with forceps by family physician. The patient showed marked evidence of shock and on my examination two or three hours later, a large tear in posterior uterine wall which easily admitted the hand into the peritoneal cavity, was demonstrated. This patient was transported five miles in a Ford car to a county hospital where supravaginal hysterectomy and conservation of tubes and ovaries was performed, normal convalescence. The tear in this case was about 10 cm. in length and ran diagonally downwards through the posterior uterine wall. This case illustrates the amount of trauma to which pregnant women may be subjected and still survive. After her arrival at the hospital, her general condition was moderately good.

CASE 3. J. R. A cesarean section had been performed upon the patient two years previously at the Philadelphia General Hospital. She subsequently became pregnant and during labor, the uterus ruptured. The patient was brought to the hospital with the clinical signs of rupture and immediate supravaginal hysterectomy with conservation of tubes and ovaries was performed. This was followed by a normal convalescence. The infant weighed 7 ½ pounds and was found with the placenta lying among the coils of the intestines. The membranes were ruptured. The scar from the previous cesarean section could be demonstrated as a thin razor-edged cicatrix on the anterior uterine wall. There was absolutely no thinning of the myometrium, and to all intents and purposes, the scar appeared to be an excellent one. The tear started at the upper limits of the cicatrix, followed this downward for about 1 cm., diverged to the right and paralleled the previous incision, leaving about 3 or 4 mm. of apparently normal muscle tissue between it and the old scar. His-

tologic examination in this specimen confirmed the above findings. There was no ingrowth of endometrium into the cicatrix as has sometimes been observed. This case is of interest because it demonstrates that even with good healing of the uterine wound, rupture may occur. Unfortunately we have been unable to ascertain what was the position of the child or whether pituitrin had been administered. The pelvic measurements were normal.

I have been able to follow four patients on whom I performed the high cesarean section and who subsequently became pregnant. The first of these was admitted to the Philadelphia General Hospital at about 6½ or 7 months of pregnancy, suffering from an acute cholecystitis. The usual palliative treatment was instituted for a few days but the gall bladder condition rapidly became worse, marked jaundice developed together with a high fever and all the indications of purulent cholecystitis. About this time, the patient developed symptoms of beginning premature labor, the cervix was thick and firmly contracted and delivery from below would have been difficult. Cholecystectomy and the removal of a gallstone from the common duct was performed, the gall bladder contained pus. On account of the condition of the patient, it seemed unwise to submit her to the added strain incident to premature labor, and for this reason, a cesarean section was performed prior to the gall bladder operation. Convalescence was complicated for the first week by a moderate elevation of temperature, and from that point, was normal. This patient subsequently became pregnant and the uterus ruptured. This is the case which has been reported tonight by Dr. Barnes. Whether or not there was good healing of the uterine wound, is impossible to determine, as the fever present during the first week may have been due to the gall bladder wound.

In addition, I have two cases of central placenta previa, upon which cesarean section was performed; one of these patients was delivered in Chicago last fall and wrote me that she had had an easy, spontaneous labor at term. The other I have delivered twice since her cesarean section, both times, however, in the hospital. Both labors were uncomplicated.

One other case is strongly impressed upon my mind, as it was the first cesarean section which I had ever performed, a rather elderly primipara with a large and firmly contracted cervix; she had a premature separation of placenta. A dead baby was diagnosed. Cesarean section was performed as a life-saving measure and was followed by normal convalescence. I subsequently delivered this patient in the maternity hospital and convalescence was normal.

DR. BARTON COOKE HIRST, then read a paper on the **Causation and Treatment of Rupture of the Uterus.** (For original paper see page 757.)

DISCUSSION

DR. EDWARD R. DAVIS.—So far as the recovery of the mother is concerned, the most favorable rupture of the uterus is through the fundus with complete escape of the child into the abdominal cavity. The reason for this is in the fact that if such an accident occurs and the alkaline plug of mucus in the cervix remains intact, it is possible for the woman to escape infection, and the chances of recovery are vastly better than if there is rupture through the lower segment. In a recent case a woman fell from a passenger elevator, breaking two ribs, injuring her breasts severely. She continued to do her own house work for eleven days after rupture of the uterus. Complete recovery resulted after operation. In that case the blood in the abdominal cavity, not large in quantity, was cultured and was sterile, so was the ruptured uterus and there was no evidence whatever of infection.

The most dangerous uterine ruptures are in the lower segment. Hemorrhage must occur because there is no adequate uterine retraction. Rupture of the uterus at

the placental site, is due to local autolysis and weakening of the uterine muscle. That brings up the question of spontaneous rupture: fatty degeneration of the uterine muscle in multiparae, insidious and accompanying partial separation of the placenta is not infrequent. In these cases one will find on the posterior wall a longitudinal rent several inches in length where the uterus has ruptured through its peritoneal covering.

To illustrate how difficult it may be to ascertain the precise cause of uterine rupture, in six instances there will be one in which no adequate cause can be found. Cases of especial interest are those of degeneration of the uterine muscle and especially those of necrobiosis, autolysis, and of complete rupture through the fundus with the entire contents of the uterus in the abdominal cavity, followed by recovery after prompt operation.

DR. RICHARD C. NORRIS.—The types Dr. Davis alluded to are of great interest, but they are not the kind of cases hurried into the hospital *in extremis*. As I look back on my experience spontaneous ruptures are very rare indeed. Hydrocephalus, neglected shoulder, a few such cases I can recall, but almost always it has been bad obstetrics. The symptoms of shock and hemorrhage are often misleading; if a woman is being operated on and under anesthesia the operator does not have these classical symptoms to go by. So I would like to stress that one point that the important pathologic changes in the uterus Dr. Davis has referred to have a bearing on the ruptured cesarean and have a bearing on so-called spontaneous rupture of the uterus. Spontaneous ruptures are rare, but they are becoming more frequent since cesarean section is being more frequently done. Danger of rupture is very much less operating on the lower uterine segment and is a distinct argument in its favor. The problem of rupture following cesarean: What are we to do for these patients? I am afraid to take care of a woman who has once had a high cesarean unless she is in a hospital, unless she is pretty close at hand in the last few weeks of pregnancy, on account of the insidious progress of these cases and apparent freedom of shock. The early incomplete ruptures were treated by tampons, but the man who will bungle, do version or forceps, is not capable of doing tampon treatment in a skilled way. Any case of ruptured uterus I was going to operate on I would first transfuse. I believe transfusion would have saved loss in the past and it is worth taking the chance of transference of the patient to the hospital. There are, of course, exceptional cases where tampon treatment might be applied.

DR. WM. R. NICHOLSON.—I have seen quite a number of cases of rupture of the uterus under the various headings mentioned by Dr. Hirst, but to my mind the most interesting part of the discussion relates to the rupture of a scar of a preexisting cesarean section. I happen to have had three of these cases, one fatal and two resulting in recovery. The fatal case was taken to one of the large hospitals in town but was refused admission by the interne on duty since this hospital did not admit maternity cases and his examination did not reveal to him that this woman was anything other than a beginning labor. Two cases ruptured, one in the succeeding pregnancy, while the other had had a vaginal delivery between her cesarean and the pregnancy during which I saw her. Both these cases had been operated upon by competent men.

The point to call attention to in each of these cases is that the rupture occurred apparently while they were in the hospital, and without symptoms which were at all diagnostic. When they were seen by me each was having slight pain, not at all characteristic of labor and without pulse or temperature rise. In neither case was the cervix obliterated and in neither case was the membrane ruptured. Operation in both instances disclosed intact membranes, the fetal sac with the placenta being free in the abdominal cavity, while the ruptured uterus was firmly contracted

in the pelvis. Both these cases recovered with a perfectly normal postoperative history. While the microscopic study was not absolutely conclusive, in either instance, I believe that both cases lacerated through the old cesarean scar.

As far as the etiology of rupture is concerned, my personal belief is that to a large degree it depends upon the site of placental attachment. If a woman who has had a cesarean has an implantation of the placenta in her next pregnancy, over the old scar, the syncytial activity will digest the scar tissue and will therefore result, in a large proportion of cases, in the type of rupture which I am describing. In other words, that rupture may occur, and probably will occur, before labor begins, and that the pain results simply from peritoneal foreign body irritation.

I do not believe that it makes the slightest difference how the uterus is repaired, as far as the probability of subsequent rupture is concerned. While I do not claim that it is necessary for a woman who has had one cesarean to always be delivered by a cesarean subsequently, I nevertheless feel that it is a very much safer procedure, and I also believe that if it were possible to obtain reliable statistics, that subsequent rupture would be found to occur in cesareanized women very much more frequently than any statistics have so far indicated.

DR. EDWARD A. SCHUMANN.—I can add two cases, one occurring after a condition not previously reported here. The first was a rupture by direct violence in a woman pregnant at almost term. She was carrying a chair downstairs when she fell, the leg of the chair passing through the vagina and into the abdominal cavity. The chair was extracted, the leg having been tightly wedged into the abdomen and the patient was rushed to the hospital where she died within half an hour after admission before any operative measures could be instituted. The second case was in a woman whom I had previously delivered with high forceps and in her second pregnancy she had been in labor several hours, when my associate, Keller, elected to do version. He told me as he attempted to turn the child the legs came down with difficulty. Suddenly the legs came down and there was a rent in the right side extending through the abdominal cavity. The patient was in profound collapse and he decided rather than perform immediate operation he would pack the rent and hope for reaction, with a second hysterectomy. However, the patient did so well that at the end of two weeks no one could possibly have detected the presence of a uterine rupture. The uterus had completely involuted, although the original rupture had extended to the fundus.

DR. GEORGE M. BOYD.—Meddlesome midwifery, also disregard for the time element in labor, is the cause of some of these disasters. We can reduce the number of cesarean sections in the doubtful cases by giving the labor test. Failing in this we can still resort to a low cesarean. The dictum, once a cesarean always a cesarean, if not adhered to, should be kept in mind because of rupture.

DR. JOHN A. McGLINN.—During twenty-five years of practice, I have never had nor have I ever seen, in all these years, a case of ruptured uterus. I have had cases of perforation of the uterus. Several years ago I read a paper before the American Gynecological Society on intraperitoneal cesarean section, and predicted that if the craze for intraperitoneal and low cervical section kept up that we would have many more cases of rupture following cesarean section. I based my contention on the fact that spontaneous rupture usually occurs in that part of the uterus where the incision is made for low cervical section. My contention has not been borne out by statistical returns but I still expect when more cases of low cervical section have been reported that we will find many more cases of rupture. I have had recently three cases of attempted version referred to me where it was necessary to do a craniotomy on the head in two cases and on the third a hysterectomy. These three uteri must be made of cast iron not to have ruptured.

DR. J. C. HIRST.—About a year ago we had a true spontaneous rupture of the uterus in the University Maternity. The baby was lying entirely free with the placenta in the abdominal cavity, having been extruded through the very top of the fundus. After hysterectomy the uterus was found to have undergone considerable hyaline degeneration in and around the ruptured area. The interesting feature about this case was that she had never had a labor pain nor a fall nor any possible cause for the rupture.

A different case followed this in the Philadelphia General Hospital where a multiparous patient after a long labor developed a rupture of the entire left side of the uterus resulting in the retention in the uterus only of a hydrocephalic head. The question of craniotomy arose here but we were sure of the injury and therefore performed a successful hysterectomy. Each of these women made a complete recovery.

DR. ALICE WELD TALLANT.—During the years I was at the Woman's Medical College, the only case I ever saw was from an outside physician, brought to the hospital, and version was done. We never knew when the uterus ruptured. It was an interesting point to know who had done it. Version was done rather early. There was some little bleeding and an assistant began to pack the uterus. I then found a small rupture. The patient had a hysterectomy done and made a good recovery. I mention this case as it might have been caused by packing too vigorously, or I may have ruptured uterus by version.

DR. NORRIS W. VAUX.—Statistics which I have been able to find in this college library seem to prove conclusively that the majority of ruptures, no matter how they occur, are in the lower uterine segment. The lower uterine segment apparently is the expansible portion of the uterus. The upper portion is the contractile portion. If the contractile portion is contracting against the lower expansile part it is rather natural to suppose the stretching area is more likely to split or rupture. The majority occur in the poor obstetrics we see occasionally practiced and I reported these cases in the hope that we would gain from discussion some result at betterment and some further criticism as to the judgment used in the time and method of operative interference. I believe that spontaneous rupture takes place and usually occurs in the uterus where some degeneration of the muscle wall exists, such as the perforation of the chorionic villi or where myomatic or inflammatory change has weakened the wall structure.