COMPLETE RUPTURE OF THE PREGNANT UTERUS.

A STUDY BASED UPON 37 CASES.

BY RALPH WALDO LOBENSTINE, M.D., Attending Surgeon.

In this study we have eliminated, first, all cases of trauma during curettement, punctures from bougies, etc.; second, all cases of incomplete rupture of the uterus, because we believe that a considerable number of such pass unrecognized, and because many others are classified simply as lacerations of the cervix, thus making statistics of doubtful value; third, cases of so-called "spontaneous rupture during pregnancy;" fourth, cases of rupture of vaginal vault without actual rupture of the uterus.

The present study is based on the total number of cases of complete rupture of the uterus which have been observed in 41,800 labors at or near term.

Rupture of the uterus occurs far more commonly among the poorer classes than among the rich and more commonly in multigravidæ than in primigravidæ. Bandl gives the frequency as 88 per cent. of the former to 12 per cent. of the latter. Ivanhoff (in 24 cases) gives the frequency as 91.2 per cent. of the former to 8.8 per cent. of the latter. The Lying-In Hospital series gives 86+ per cent. of the former to 13+ per cent. of the latter. The chief reasons for the greater frequency in multigravidæ are: (*a*) The general health which, as well as the muscular tone, is not as a rule as good as in primiparæ. (This is especially true among the very poor.). (*b*) In a certain number of these the uterine musculature has been weakened locally by previous operative interference, as Cæsarean section, myomectomy, etc. (*c*) Because of a greater percentage of pelvic tumors causing dystocia and resulting in rupture.

Etiology.

(1) Conditions due to the uterus:
   - (*a*) A scar of a previous Cæsarean section, etc.
   - (*b*) Prolonged dry labor.
   - (*c*) Tumors of the uterus.
   - (*d*) Inflammations of uterine wall.
   - (*e*) Poor muscular tone of uterine wall.
   - (*f*) Operations for fixation of the uterus, especially vaginal fixation.

(2) Conditions due to the child:
   - (*a*) Abnormal presentations, such as transverse, brow, face, etc.
   - (*b*) Monstrosities, such as hydrocephalus, etc.

(3) Conditions due to the pelvis:
   - (*a*) Deformities.
   - (*b*) New growths originating in any of the pelvic organs or in the pelvic bones.

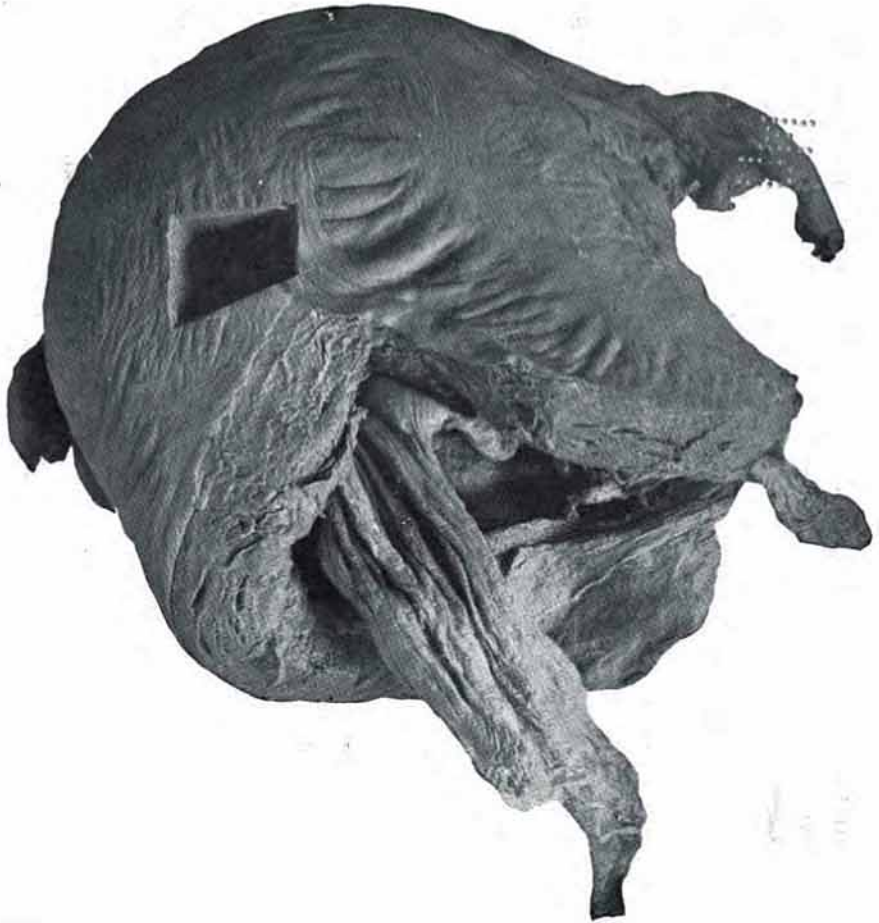

PLATE XII.

Fig.1 - Complete Longitudinal Rupture of left side.

Fig. 2 - Slightly Atypical Transverse Rupture through the lower Uterine Zone.

(4) Intrauterine manipulations, viz., rapid manual or instrumental dilatation of the cervix, forceps, versions, embryotomies, etc.

Pathology.

Complete rupture of the uterus may be either spontaneous or traumatic.

The rupture may be only large enough to admit the finger or it may allow the escape of the child into the peritoneal cavity. The rupture may occur in any portion of the uterus, but by far the most frequent situation is the lower uterine zone. The two fundamental types are: (*a*) the transverse rupture; (*b*) the longitudinal, extending upwards through the cervical portion of the uterus along its lateral wall towards the fundus or actually to it, involving the uterine vessels with extensive damage to the layers of the broad ligament. These types are, in our experience, usually more or less associated with each other and but rarely sharply defined. The method of occurrence of the rupture, *i. e.*, whether due to intrauterine manipulation or spontaneous in origin, largely determines the *primary nature* of the rupture, the former giving rise to the longitudinal type of rupture, the latter to the transverse rupture in the lower zone.

In our series, there were 19 cases probably starting as the longitudinal type, while 17 cases probably started as the transverse. Of the transverse ruptures, only 7 occurred in the posterior wall.

Rupture in the fundal region (as the primary site) is very unusual. In our series it occurred but once.

The mechanism and the actual changes that take place in the uterus have been so well described by Williams that I will quote him at this point:

"Normally under the influence of labor pains, the uterus becomes differentiated into two portions, separated by a circular ridge of tissue, to which the term 'contraction ring' is usually applied. The upper, by its contractions, serves to expel the child, while the lower undergoes dilatation and merely forms part of the canal through which the contents of the uterus are forced. On the other hand, when a serious obstacle is opposed to the passage of the child, the active portion of the uterus is stimulated to *more forcible efforts*. As it contracts, it likewise slowly becomes retracted; its lower margin—the contraction ring—eventually occupying a much higher level than usual. As a result, particularly if the lips of the cervix are caught between the presenting part and the superior straight, powerful upward traction is exerted upon the passive portion of the uterus, which becomes more and more stretched, and thinner and thinner."

This theory—commonly called the "Bandl theory"—explains the mechanism of the greater number of complete ruptures. However, according to Olshausen, the *typical utero-raginal ruptures*—seen most frequently in transverse presentations—cannot be explained, entirely, or at all, by Bandl's theory. Olshausen believes, and we share his belief, that in these cases the part most exposed to danger is *the raginal vault, at the utero-raginal junction, and not the lower uterine zone proper.*

Etiological Factors in Our Series.

I. Spontaneous ruptures due to
   (*a*) Pelvic contraction.....17 cases
   (*b*) Feeble scar after amputation of cervix..... 1 case

II. Traumatic ruptures due to
   High forceps ..... 2 cases
   Internal Podalic version.....12 "
   Accouchement forcé..... 4 "
   Embryotomy ..... 1 case

Symptoms of Spontaneous Rupture.

(*a.*) *Premonitory.*

Prolonged and severe uterine contractions, increasing in intensity, the presenting part not making the proper advance; a pulse increasing in frequency; the patient becoming more and more worn and haggard.

(*b*). *Active Symptoms of Rupture*:

As a rule, the patient after presenting for some time the symptoms of the premonitory stage, suddenly during a severe uterine contraction, complains of a sharp pain in the region of the uterus, and at times exclaims that something has given away in the abdomen. The uterus, at the site of rupture, becomes exceedingly tender. Immediately following these symptoms, the uterine contractions cease entirely (with few exceptions). There may or may not be profuse external or internal hemorrhage, or both.

Vaginal examination shows a retraction of the presenting part (*not always, we believe*); a laceration in

some part of the uterus; the child, *wholly or in part*, free in the peritoneal cavity. Eversmann maintains that the fœtus escapes into the abdominal cavity much less frequently than is generally believed. His figures are 7.2 to 16 per cent. of all cases. In our series this occurred in 5 cases, *i. e.*, in 13.5 per cent.

If the child is entirely outside the uterus, the latter may be felt either directly behind the symphysis or well over to one side of the false pelvis. *Although some authors* claim that in such cases the uterus is always firmly contracted, we do not believe this to be the case. It is, we believe, only the case in the milder grades of trauma. In our cases the uterus has been *large, flabby and boggy*. Soon after the occurrence of the rupture, the patient develops symptoms of shock. The pulse becomes rapid and wiry; the face becomes pale and anxious, and covered with sweat; the abdomen distended and tender. (There are, however, exceptions to the latter). If there is profuse hemorrhage, there is chilliness; air hunger, etc. Death occurs frequently within a few hours either from shock or hemorrhage or from both—sometimes very suddenly. If the patient does not die during the first twenty-four hours she becomes gradually weaker, the face becomes more pinched and anxious, the abdomen more and more distended, the pulse weaker and more rapid, the temperature subnormal or rising higher and higher. The urine is diminished in quantity and is often bloody. Vomiting is usually present. The *chief cause of the "late deaths" is sepsis*. To the above symptoms we must add *operative interference* in the traumatic cases.

The following are brief abstracts of the histories of the thirty-seven cases which form the basis of this paper:

CASE I.

Mrs. Lena T., para I, at term. Total duration of labor uncertain, membranes ruptured early; second stage 6 hours. When first seen by us, patient found to be in a condition of moderate shock. All uterine contraction had ceased. There was severe abdominal pain. The diagnosis of rupture of uterus was made at once. The child was dead. An internal podalic version was performed (as being the quickest mode of delivery) and a craniotomy of the after-coming head. After the removal of the placenta, the uterus and laceration were packed with iodoform gauze. The amount of bleeding was moderate. The dystocia was due to a *simple flat pelvis*. The patient was then transferred to my service in the hospital and an hysterectomy performed. On opening the peritoneal cavity, only a moderate amount of blood was found therein. The uterus was large, soft and boggy. The rupture was a large transverse one, in the lower zone anteriorly at the level of the internal os, opening both the vagina and left broad ligament. The uterus was removed, leaving a small section of the cervix. All bleeding was checked; all raw surfaces covered with peritoneum. After the toilet of the peritoneal cavity, the abdominal wound was closed without drainage. The patient made a rapid recovery.

N. B.—Spontaneous rupture.

CASE II.

C. N. 7429, Mrs. F. L., age 32, para II; at term. Patient's membranes had been ruptured for 5 days; she had been in labor 2 days and in the second stage many hours, when she suddenly began to show symptoms of collapse. When first seen by us, there was vomiting and marked abdominal distress. Her temperature was 103 degrees F. and the pulse 140. There was no fœtal heart; there was a foul discharge from the uterus.

A craniotomy was at once performed and an infusion given. The patient continued to bleed moderately and was in severe shock. A laparotomy was then performed by the writer. The peritoneal cavity contained but little blood, but the odor thereof was very bad. The uterus was large and flabby. There was an extensive laceration in the anterior uterine wall, at the vault of the vagina, extending transversely and involving the entire left broad ligament. A panhysterectomy was quickly performed, the peritoneal cavity cleansed with physiological salt solution and drained per vaginam. The abdominal wound was closed without drainage. The patient seemed to rally for a while, but died about 6 hours after the operation. Dystocia due to flat (simple) pelvis.

N. B.—Spontaneous rupture.

CASE III.

C. N. 6689. Mrs. R. G., para II; at term. Patient went into active labor 2½ days before entering the Hospital. About 12 hours before being brought to us, the pains suddenly ceased, after several unusually severe ones, and the child seemed to the patient to escape from the uterus. There was moderate bleeding. On admission, she looked septic. There was no very great amount of shock; there was moderate oozing from the uterus. The abdomen was distended and tender, vaginal examination showed a generally contracted pelvis, with a true conjugate of 7 cm. The

PLATE XIII.

Complete Fundal Rupture.

vaginal mucosa was badly lacerated. There was a large transverse uterine rupture posteriorly at the utero-vaginal junction. The hand passed freely into the general peritoneal cavity. The uterus was fairly well contracted; the child and placenta were free in the peritoneal cavity. A laparotomy was at once performed by the writer. The abdomen was found to emit a foul odor and to contain child, placenta and blood clots. After their removal, the uterus was removed by a panhysterectomy. The broad ligaments were not badly torn, but were markedly œdematous, so that ligaturing of the uterine vessels was difficult. The pelvis was drained with iodoform gauze. After cleansing the peritoneal cavity, the abdominal wound was closed in 3 layers. The patient stood the operation fairly well, but we feared that she was too septic to live. At the end of 24 hours, she had passed no urine. We feared occlusion of the ureters by our ligatures of the uterine vessels. Dr. Walter C. Klotz kindly catheterized the ureters for me. Both catheters were checked at about 3 cm. from the ureteral orifices. Thereupon I, at once, reopened the abdominal wound, found both ureters greatly distended down to a short distance from the bladder. Two suspicious ligatures that were apparently compressing (although not surrounding) the ureters, were cut, and at once the ureters collapsed, emptying themselves into the bladder. This accident occurred, I believe, because of the difficulty at the primary operation in making the ligatures hold in the œdematous broad ligaments. The abdominal wound was rapidly closed. The patient passed thereafter a fair amount of urine, but died unexpectedly, about six hours later, of streptococcus septicæmia.

N. B.—Spontaneous rupture.

CASE IV.

C. N. 6457. Mrs. S. G., para V; at term. The patient had been in labor for 24 hours with the membranes ruptured from the start. After being in the second stage for about three hours, she suddenly had a very severe pain which caused her to feel as if "something had given way within her abdomen." There was a profuse hemorrhage; all uterine contractions ceased. The patient was at once delivered with forceps without much difficulty. The uterus and laceration (which existed) were packed with iodoform gauze and the patient sent to my service in the Hospital, at once. The packing controlled the hemorrhage largely. There was no intense shock. A laparotomy was performed. On opening the peritoneal cavity this was found to be full of blood and blood clots. The laceration in the uterus extended upward through the cervix along the right lateral wall of the uterus nearly to the fundus. The anterior leaf of the right broad ligament was torn away. The bladder seemed intact, although a catheterized specimen of urine before operation showed some blood. A supravaginal hysterectomy was performed and a strip of iodoform gauze passed down through the remains of the cervix. The peritoneal cavity was washed out with salt solution and the abdominal wound closed in three layers, with catgut. The patient convalesced rapidly, but developed on the ninth day a vesico-vaginal fistula, which was closed, at a later date by another operator.

N. B.—The pelvis was a simple flat pelvis. Spontaneous rupture.

CASE V.

C. N. 7976. Mrs. J. S., age 34, para VI; at term. Patient had a placenta prævia centralis. When examined by Dr. Harrar, there was profuse bleeding with the cervix dilated to 6 cm. and soft. A rapid dilatation was performed, the hand passed through placental tissue and an internal podalic version done. There was some difficulty in bringing the after-coming head through the rim of the cervix that persisted. A living child of good size was obtained. After the delivery of the placenta, there was found to be a complete longitudinal tear of moderate extent through the anterior lower segment of the uterus, through which intestine could be felt. The opening was at once packed with iodoform gauze and the patient stimulated. There was no great amount of shock, and as the rent was moderate and apparently not bleeding, no laparotomy was done; convalescence proceeded satisfactorily.

N. B.—Traumatic.

CASE VI.

C. N. 2383. F. M., age 16, para I; at term. Second stage not known. Total duration of labor uncertain. Admitted in second stage, with profuse hemorrhage. Membranes had ruptured prior to admission. Unsuccessful attempts had been made to deliver with high forceps. Cervix found to be torn through, on both sides. On left side tear extended through vaginal vault into and through the broad ligament. Delivery accomplished with high forceps in Hospital. Patient in profound shock after delivery; pulse 140. Operation deemed unadvisable. Tamponade of uterus and broad ligament. Intravenous infusion given. Condition very poor, but held out for five days and died on the sixth day—puerperal sepsis.

N. B.—Traumatic rupture.

CASE VII.

C. N. 2760. T. H., age 33, para IV; at term. Sec-

ond stage unknown. Total duration of labor about 48 hours. Membranes ruptured 26 hours prior to admission. Transverse presentation—prolapse of arm and leg. Several attempts at podalic version by private physician. On admission general condition very poor, pulse feeble and rapid. Examination revealed left arm protruding through tear in uterus, which extended from below in front, vertically upward through the attachment of the left broad ligament, involving all the layers of uterus. Bleeding profuse. A version and craniotomy on after-coming head were performed. Laceration, packed with sterile gauze, followed by immediate removal of uterus. Death occurred shortly after operation.

N. B.—Traumatic rupture.

CASE VIII.

C. N. 2300. A. R., age 37, para VII; at term. Duration of labor not known. Membranes ruptured during first stage. On admission, patient suffering from shock. Profuse bleeding; pulse, 160. Version and extraction—still-birth. Rupture of uterus found. Immediate hysterectomy was performed, but before peritoneum could be sutured the patient died.

Pathologist's report: Laceration in uterus four inches long on post. surface transversely.

N. B.—Spontaneous rupture. Contracted pelvis.

CASE IX.

C. N. 2252. K. McN., age 27, para III. Placenta prævia centralis; accouchement forcé—version, extraction—profuse bleeding after delivery. Laceration of cervix into left broad ligament and through into peritoneal cavity. Uterus and vagina packed with gauze. About three hours later pulse began to fail and patient died in one-half hour.

N. B.—Traumatic rupture.

CASE X.

C. N. 1243. A. D., age 37, para VII; at term. Second stage not known. Total duration of labor 48 hours 27 minutes. Time of rupture of membranes not known. Brought finally to Hospital. Transverse presentation, embryotomy. Examination after delivery revealed laceration of cervix posterior and to left, considerable oozing; uterus and vagina packed with sterile gauze. Sudden death of patient on eighteenth day. Autopsy showed perforation of fundus uteri size of a lead pencil, localized sub-acute peritonitis surrounding perforation. Cause of death—sepsis.

N. B.—Traumatic rupture.

CASE XI.

C. N. 1229. A. S., age 28, para III; at term. Second stage 8 hours. Total duration of labor 14 hours 5 minutes. Membranes ruptured spontaneously in first stage. Presentation breech L. S. A. Presenting part suddenly receded and active bleeding began. On investigation it was found to be a ruptured uterus. Case transferred to hospital. Patient showed signs of increasing shock. Immediate hysterectomy decided on. Fœtus and placenta delivered through abdominal incision—still-birth. Patient died during operation. The rupture involved the uterus posteriorly, running from the right broad ligament across to the left and then upwards along the left side of the uterus, stripping away the left broad ligament.

N. B.—Spontaneous rupture. Justo-minor pelvis; large child.

CASE XII.

C. N. 1139. K. F., age 32, para VI, gestation 6 months. Placenta prævia; accouchement forcé; manual extraction of fœtus and placenta. Examination immediately afterwards revealed a deep laceration into peritoneal cavity through the cervix to the right posteriorly. Bleeding moderate but continuous and general condition very poor. Uterus and vagina were tightly packed with iodoform gauze, but patient never rallied and died one hour and forty minutes later.

N. B.—Traumatic rupture.

CASE XIII.

C. N. 585. L. R., age 28, para VII; at term. Second stage 3 hours 45 minutes. Total duration of labor 13 hours and 46 minutes. Membranes ruptured spontaneously second stage. Impacted shoulder presentation. Prolapsus funis; podalic version and extraction; hand introduced for membranes, and rent discovered in left lower uterine segment and broad ligament. Packed with iodoform gauze and transferred to Hospital. Hysterectomy performed. The rupture extended through cervix and through anterior fold of left broad ligament into peritoneal cavity. Pulse very weak at end of operation and death occurred six hours later.

N. B.—Traumatic rupture.

CASE XIV.

C. N. 4164. Y. C., age 26, para III; at term. Second stage unknown. Time of rupture of membranes unknown. *Oblique irregularly contracted pelvis.* Patient in labor for three days, attempted forceps by

outside physician. Admitted to Hospital, with uterus in state of tonic contraction. While undergoing preparation for Cæsarean section uterus ruptured. Abdomen incised, child found free among intestines; no signs of life. Oblique or nearly transverse rent in uterus anteriorly in lower zone, extending into left broad ligament. Hemorrhage almost absent. Hysterectomy performed. General condition good after operation. Recovery and discharge on forty-seventh day.

N. B.—Spontaneous rupture.

CASE XV.

C. N. 4091. E. C., age 29, para I, gestation seven months. Membranes ruptured artificially during first stage. Eclampsia, moribund on admission, rallied somewhat after infusion. Accouchement forcé, podalic version. After delivery symptoms of hemorrhage. Exploration revealed laceration in right side of cervix extending upwards along the right wall of uterus to a point 2 cm. above internal os, into peritoneal cavity. Patient died during packing.

Autopsy: Vertical laceration through right side of cervix and lower portion of the body of the uterus, involving also the right broad ligament.

N. B.—Traumatic rupture.

CASE XVI.

C. N. 4029. C. W., age 26, para IV; at term. Duration of second stage not known. Membranes ruptured in first stage spontaneously. Contracted pelvis. Previous labors, (I) forceps, (II) craniotomy, (III) Cæsarean section. Cord prolapsed, with rupture of membranes in first stage. Labor pains severe, uterus ruptured sometime (?) in second stage. Sudden signs of shock and profuse hemorrhage. Version and craniotomy on after-coming head performed. Laparotomy immediately after delivery. Laceration transversely in lower anterior uterine zone, involving extensively the left broad ligament. Total hysterectomy. Death of patient the following day.

N. B.—Spontaneous rupture.

CASE XVII.

C. N. 3344. T. B., age 34, para V; at term. Duration of second stage not known. Total duration of labor not known. Time of rupture of membranes not known. Patient admitted to Hospital with rupture of uterus subsequent to version by outside physician. General condition very poor. Laparotomy and hysterectomy immediately done. Death before completion of operation. Uterus showed two complete tears in posterior wall and one in anterior, transversely in lower zone. Peritoneum was stripped off from right lateral wall of pelvis. Abdominal cavity full of blood.

N. B.—Traumatic rupture.

CASE XVIII.

C. N. 3108. I P. D., M. Z., age 25, para I; at term. Total duration of labor 31 hours 55 minutes. Dry labor. Non-engagement of head after 30 hours with ruptured membranes. Cervix completely dilated manually. Attempted forceps; podalic version and extraction. Hemorrhage profuse after delivery. Transferred to Hospital on second day and died same day. General peritonitis. Post-mortem examination revealed rupture of bladder and transverse rupture of uterus.

N. B.—Traumatic.

CASE XIX.

C. N. 3080. E. S., age 40, para VI; at term. Total duration of labor 3 hours 30 minutes. Membranes ruptured artificially in second stage. Hemorrhage profuse. Placenta prævia centralis. Accouchement forcé, version and extraction. In manual dilatation cervix gave way on left side and it was evident rupture of uterus had taken place. Patient almost exsanguinated. Rupture extended through left side of cervix upward into and through the left broad ligament. Hemorrhage checked by tamponade. Abdominal hysterectomy then performed. Patient stood operation fairly well. Patient discharged in good condition on 33d day.

N. B.—Traumatic rupture.

CASE XX.

C. N. 409. B. J., age 35, para VIII; at term. Duration of second stage not known. Total duration of labor 120 hours 40 minutes. Membranes ruptured spontaneously in first stage. Patient in the care of a midwife for all this time. She was finally brought to the Hospital, in poor condition. Shoulder presentation, podalic version and extraction. Profuse hemorrhage after delivery. Laceration of uterus discovered on left side extending upward into broad ligament and into the peritoneal cavity. Abdomen opened and uterus removed without cervix; hemorrhage checked and condition improved steadily for 24 hours, then sudden collapse and death.

N. B.—Traumatic rupture.

CASE XXI.

C. N. 2804. H. L., age 34, para VII; at term.

Duration of second stage 3 hours. Total duration of labor 14 hours 30 minutes. Midwife on case. Membranes ruptured spontaneously in second stage. L.-I. H. doctor called in. An encephalic monster, head born; shoulders caught above brim. Patient in state of moderate collapse. Moderate hemorrhage. Extraction completed with aid of blunt hook. On examination of uterus, it was found to be ruptured. Uterine cavity then packed with gauze. After stimulation and infusion patient was transferred to Hospital. Large rent in uterus on left side extending vertically up into the broad ligament and through into the peritoneal cavity for about half the length of the uterine body, tearing open the base of the bladder and stripping off the peritoneum from the anterior surface of the uterine body for one-third its extent. Hysterectomy performed, but before the organ could be removed, the patient died.

N. B.—The pains were very strong; the second stage was probably longer than three hours. Spontaneous rupture.

CASE XXII.

C. N. 2787. M. M., age 30, para III; at term. Second stage 3 hours. Total duration of labor 10 hours 28 minutes. Membranes ruptured prior to arrival of L.-I. H. doctor at beginning of second stage. Patient found in state of collapse. Profuse hemorrhage. Version and extraction. Craniotomy on after-coming head. Uterus then found to be ruptured in both lateral attachments of broad ligaments and whole anterior vaginal attachment torn off. Wound packed with gauze. Patient rallied somewhat under stimulation and was sent to Hospital. Hysterectomy performed; considerable shock from operation. Patient recovered and was discharged on 51st day.

N. B.—Collapse due to spontaneous rupture, before arrival of doctor. Laceration no doubt began as a transverse one. Contraction of pelvis.

CASE XXIII.

C. N. 1700. A. G., age 18, para I; at term. Second stage 4 hours 53 minutes. Total duration of labor 52 hours 53 minutes. Membranes ruptured spontaneously during first stage. Brow presentation; version and extraction; still-birth. After delivery patient showed signs of collapse. On vaginal examination a tear in uterus, beginning at vaginal vault and extending almost to fundus on left side, was discovered. After delivery patient was transferred to Hospital and admitted in condition of profound shock. After stimulation, hysterectomy performed. Good recovery made and patient discharged on 27th day.

N. B.—Traumatic rupture.

CASE XXIV.

C. N. 23417. S. K., age 38, para IX; at term. Duration of second stage not known. Total duration of labor 27 hours. Membranes ruptured spontaneously early in first stage. History of amputation of cervix, double hernia with Alexander's operation two years ago. When first seen by L.-I. H. doctor, patient was having considerable hemorrhage; moderate shock. Complete laceration of uterus at utero-vaginal junction transversely posteriorly, with tendency of intestines to prolapse. Uterus and laceration packed with iodoform gauze. High forceps applied and dead fœtus delivered. Patient became pulseless and was infused. General condition improved for a time, but died later of hemorrhage and shock.

N. B.—Spontaneous rupture in scar, of operation for amputation of cervix.

CASE XXV.

C. N. 22350. R. D., age 29, para VII; at term. Duration of labor not known. Membranes ruptured before arrival of L.-I. H. doctor. Pulse, 124; patient extremely weak. Rupture of uterus diagnosed. Abdomen at once opened and child, which was in abdominal cavity, extracted. Tear extended from broad ligament of one side to the opposite broad ligament transversely and anteriorly, dividing the cervix from body of uterus. Right bread ligament was infiltrated with blood, the two layers of broad ligament being dissected apart, amputation of uterine at the utero-cervical junction. Patient did not recover from the shock and died 6 hours after operation.

N. B.—Spontaneous rupture. Contracted pelvis.

CASE XXVI.

C. N. 21167. M. M., age 24, para II; at term. Duration of second stage unknown. Total duration of labor 18 hours 20 minutes. Membranes ruptured spontaneously during first stage. When seen by L.-I. H. doctor there was profuse hemorrhage and severe shock. Child in abdominal cavity. Pulse imperceptible. Rent in uterus low down in lower uterine segment almost transverse, nearly entire width of uterus out into left broad ligament and around to the posterior surface of uterus. Abdominal hysterectomy immediately performed. Patient's condition at end of operation very poor. Did not respond to treatment. Gradually grew weaker and died five hours after operation.

N. B.—Spontaneous rupture. Contracted pelvis.

CASE XXVII.

C. N. 3267. C. S., age 34, para VII; at term. Duration of second stage not known. Total duration of labor 23 hours 45 minutes. On arrival of L.-I. H. doctor patient was suffering from marked shock; pulse, 150; hemorrhage profuse. Examination revealed a deep laceration extending through cervix into left broad ligament and through into peritoneal cavity. With great difficulty a still-born child was delivered by version and extraction. Operation lasted 5 minutes and caused little shock to patient. Peritoneum washed out through wound; many clots coming away; wound packed with iodoform gauze. The further progress of case was of steady dissolution. Stimulants were used, but no reaction took place, and the patient died 36 hours after delivery.

N. B.—Spontaneous rupture. Contracted pelvis.

CASE XXVIII.

C. N. 1198. H. S., age 36, para VI. Duration of second stage not known; duration of labor not known. Delivery podalic version. Membranes ruptured artificially, second stage. Patient had been bleeding for 12 hours rather severely, before arrival of L.-I. H. doctor. Had been under care of two private physicians. Diagnosis was that of placenta prævia. Patient extremely weak, lips white and all symptoms of acute hemorrhage. After delivery of child and placenta, hemorrhage ceased. While attempting to extract placenta, coil of intestine was encountered, revealing a moderate laceration through the cervix and lower uterine zone posteriorly. Uterus and vagina tamponed. Shock was severe, patient rallied under medication for a time, but died at the end of 36 hours.

N. B.—Traumatic rupture.

CASE XXIX.

C. N. 3314. T. L., age 23, para II. Second stage 4 hours 50 minutes. Total duration of labor 12 hours 30 minutes. Membranes ruptured artificially in second stage. Visited by L.-I. H. doctor (attending). Pains unusually severe at this time. House surgeon instructed to return in an hour and deliver with forceps if advance were slow. On his return he found presenting part had receded and funis prolapsed; pain had ceased; woman in collapse. Version performed and still-born child delivered. Transverse rupture found in lower uterine segment; no hemorrhage. Uterus packed with gauze. The condition of patient seemed to be one of improvement up to the fourth day, but she died suddenly on this day from heart failure.

N. B.—Spontaneous rupture. Contracted pelvis.

CASE XXX.

C. N. 7263. F. G., age 41, para XV; at term. Duration of second stage not known. Total duration of labor not known. Membranes ruptured before arrival of attendant. Considerable hemorrhage second and third stage. Case seen by L.-I. H. doctor one hour after beginning of second stage. Cord prolapsed, pulsating feebly. Version performed and child delivered—still-birth. While giving douche after the delivery of placenta, a rupture was discovered through the cervix on left side and up through the left broad ligament into peritoneal cavity. Uterus and vagina were at once tamponed. Pulse, 120. Patient passed into state of collapse after operation, but rallied somewhat during night and continued to improve up to fifth day when temperature ranged from 101 to 102.5 degrees; pulse became more frequent and patient showed signs of sepsis. Death occurred on 6th day after gradual rise of temperature. Pulse became imperceptible and rapid increase of symptoms of sepsis.

N. B.—Traumatic rupture.

CASE XXXI.

C. N. 173. L. W., age 24, para III; at term. Duration of second stage 8 hours 37 minutes. Total duration of labor 16 hours 20 minutes. Membranes ruptured artificially at end of first stage. Contracted pelvis; hydrocephalus; skull perforated. Version and extraction. Birth of child was followed by profuse hemorrhage. On examination uterus was found to be ruptured; manual extraction of placenta performed with great difficulty. Patient stimulated and wound packed with iodoform gauze. On following day patient was transferred to Hospital; condition at time of admission fairly good. Pulse, 140. Hysterectomy performed. Rupture found to extend from base of left broad ligament across the lower posterior uterine zone to the right broad ligament and through the right side of cervix. Temperature varied from 100 degrees to 104½ degrees during first 2 weeks. After this temperature fell to normal and wound healed rapidly. Patient discharged on 46th day after operation in good condition.

N. B.—Probable traumatic rupture.

CASE XXXII.

C. N. 877. M. W., age 33, para VIII; at term. Duration of second stage 7 hours 30 minutes; total duration of labor 24 hours 40 minutes. Membranes ruptured artificially 2 hours after beginning of

second stage. Flattened pelvis. Prolapse of cord; attempted high forceps; unsuccessful; podalic version and breech extraction. Patient began to bleed actively. A vertical rent 4 inches in length was felt to exist in right side of body of uterus in lower segment through the cervix. Patient transferred to In-Door service immediately after delivery. Condition of extreme shock. Stimulants administered and hysterectomy performed. After operation symptoms of severe shock prevailed. Death on third day.

N. B.—Probable traumatic rupture.

CASE XXXIII.

A. N. 29628. R. B., age 40, para IX; at term. Hospital was called to case by outside physician who gave following history. Woman went into labor 12 hours (?) previously and had been attended by midwife, who, when the labor did not progress to her satisfaction, summoned to her assistance two outside physicians who gave the woman chloroform and applied forceps. This procedure was carried out for 6 hours, during which time the patient was given chloroform many times. Woman found with uterus in tonic contraction, vulva swollen and œdematous. Pulse *very* weak and rapid. Head of fœtus above brim. Cervix 4½ fingers dilatation. There was but little external bleeding. Patient rapidly became weaker, finally became pulseless and died undelivered. Diagnosis: Rupture of uterus and bladder, found to exist after death. The rupture involved the lower uterine zone, anteriorly and transversely.

N. B.—Traumatic rupture.

CASE XXXIV.

C. N. 20365. S. E., age 37, para VIII; at term Duration of second stage not known; total duration of labor not known. Membranes ruptured sponta neously early in second stage after strong bearing down pains for several hours. The patient suddenly became quiet, complained of pain and tenderness in abdomen; she began to bleed actively; pulse became weak and rapid. Vagina packed and stimulation administered by L.-I. H. doctor. Woman in state of collapse. After short time, podalic version and ex traction were performed. Two hours after delivery temperature 98.6 degrees, pulse 130, patient gasping for breath. Hand introduced into vagina; passed directly into abdominal cavity. There was found to exist a complete laceration of uterus, through the cervix the right broad ligament and the lower uterine zone anteriorly. A laparotomy was at once performed, a supravaginal hysterectomy being performed. Discharged on 55th day, cured.

N. B.—Spontaneous rupture. Contracted pelvis.

CASE XXXV.

C. N. 18686. S. W., age 32, para VI; at term. Duration of second stage not known. Total duration of labor 15 hours 55 minutes. L.-I. H. doctor arrived in second stage. Midwife in charge of case for over four hours stated that patient had been having good, strong pains. Soon after the doctor's arrival pulse suddenly became rapid, pains ceased and patient went into a state of moderate collapse; some hemorrhage. Forceps applied and head delivered with great difficulty. General condition at this time very poor; pulse 140, irregular and very weak. Examination showed rupture of uterus through lower uterine zone anteriorly and transversely, extending down through the right side of the cervix, involving also the anterior vaginal wall. Laceration packed with iodoform gauze, saline intravenous infusion. Preparations made for hysterectomy, but operation postponed as patient's condition seemed hopeless. Woman died at 10 p. m. of the same day.

N. B.—Spontaneous rupture. Deformed pelvis.

CASE XXXVI.

C. N. 4297. T. M., age 34, para IV; at term. Second stage not known. Total duration of labor about 18 hours. Membranes ruptured before admission. Brow presentation; contracted pelvis.. Version attempted by outside physician; not completed. On admission uterus somewhat tonically contracted; version completed. Extensive rupture of uterus into and through broad ligament found to exist. On opening abdomen there was found to be in left broad ligament a laceration extending almost to fundus uteri on that side. Hemorrhage profuse; finally controlled after loss of an enormous quantity of blood. Vagina packed with gauze after removal of uterus. Patient was in very poor condition after operation and died within an hour from shock following loss of blood.

N. B.—Traumatic rupture.

CASE XXXVII.

Mrs. A. G., age 37; Multi Gravida; started in labor October 12, 1906. The pains continued weak and far apart, until October 15th, when they became very severe. A midwife was called in. At 2 a. m., October 16th, as the patient was making no progress despite her frequent and severe pains, two physicians were called in. The diagnosis of rupture of the uterus was made and the child delivered by version.

At 9 a. m., October 16th, Dr. Asa B. Davis was called in, in consultation. He advised removal to the Lying-In Hospital, as the woman was in fairly good condition. There was but little hemorrhage; pulse

100 and strong. The uterus was fairly well contracted. There was a longitudinal rupture through the left side of the cervix, the left broad ligament, involving the lower portion of the uterus.

The patient was taken at once to the Hospital. Dr. Davis performed a pan-hysterectomy. The patient stood the operation fairly well. Convalescence proceeded satisfactorily and the patient was discharged, on the 28th day after the operation.

N. B.—Probable spontaneous rupture. The time of the rupture of the membranes could not be determined.

Treatment: *Prophylactic.*

(1) Have the patient in as good physical condition as possible, at the time of labor.

(2) Be aware, in time, of the presence of a deformed pelvis; of tumors in the pelvis, etc.

(3) Make the labor as easy as possible.

(4) Remember the *dangers of a prolonged dry labor.*

(5) Do not allow the *second stage* to be *prolonged*, particularly if the uterine contractions are very severe.

(6) Do not be *too speedy* in the dilatation of the cervix, when doing an "accouchement forcé."

(7) Do not *perform, or even try, a version in a "tonic uterus," or one that is rapidly becoming tonically contracted.*

(8) Do not apply forceps, with a rigid rim of cervix still present.

(9) Finally, ever keep in mind the danger signal—the warning symptoms of an impending rupture. When they develop, deliver at once.

Treatment after the occurrence of the rupture:

(1) The child should be delivered at once. If the child is *not* entirely in the peritoneal cavity it can be usually delivered through the vagina. If entirely free in the peritoneal cavity it will, as a rule, have to be delivered by laparotomy.

(2) After the delivery of the child and placenta (or before, if these are free in the peritoneal cavity), the extent of the injury must be determined and the entire parturient tract tamponed with gauze. In anterior lacerations, it may be of advantage to compress the uterus against the pubis, after the packing; and in posterior lacerations to compress it in a retroflexed position.

(3) We must now decide whether to rely entirely upon the tamponage, or, whether to resort to more active measures. The following are the further modes of treatment:

(1) We may suture a portion of the laceration and then tampon.

(b) We may perform a vaginal hysterectomy.

(c) By means of a laparotomy, we may (1) simply irrigate the peritoneal cavity and drain through the laceration (having, of course, removed child and placenta); (2) we may suture the rupture, according to the method of Zweifel; or (3) we may perform either a supravaginal or a pan-hysterectomy, and drain from below.

The general treatment for the hemorrhage and shock should be given at once.

The results of the different methods of treatment in complete rupture are interesting to follow for a moment.

Schultz, out of 193 cases, collected from the literature, gives the following results

Complete ruptures without treatment, 79.8 per cent. mortality. Complete ruptures treated with tamponage, 64 per cent. mortality. Complete ruptures treated by laparotomy, 55.3 per cent. mortality.

Valenta reports 14 cases:

6 cases not operated on, 100 per cent. mortality.

8 cases operated on, 62 per cent. mortality.

Valenta recommends vaginal hysterectomy.

Eversmann firmly believes in the tamponade.

Varnier, Fritsch, Labusquière, Zweifel, Edgar, etc., believe that the best results are to be obtained by laparotomy.

In the 37 cases of complete rupture of the Lying-In Hospital series, the mortality is 73 per cent. Of the last 6 cases treated during the past 2 years (5 by myself and 1 by Dr. Asa B. Davis) 4 lived, giving a mortality of 33 1-3 per cent. (5 of these were treated by hysterectomy and 1, which lived, by packing). Of these 37 cases of complete rupture 23 were treated by hysterectomy, with a mortality of 60 per cent.; 14 were treated by packing, with a mortality of 92 per cent.

The weight of authority seems to favor immediate laparotomy, where this is possible. *We believe that a laparotomy should be performed, as soon as possible* (providing the physician on the case is familiar with abdominal surgery) *in all cases of complete rupture,* with two exceptions: (a) Clean cases with small amount of damage, with hemorrhage easily controlled by the packing; (b) Bad cases with marked shock. Some of these cases will not last through an immediate laparotomy. After delivery of child and placenta (where this is possible from below) tamponage should be relied upon. If the patient's condition improves, a laparotomy can *later* be performed, and the child and placenta be removed, where this has been impossible from below. When we open the abdomen we find that hysterectomy is the most satisfactory operation, in the majority of cases. Suturing

the uterine wound can only be resorted to in the simple, uncomplicated cases. In our series, the damage has usually been so extensive that suturing would have been impossible. Finally, the *danger of sepsis*, in the severe cases, is so great, that we have therein a very important reason for removing the uterus. There is, of course, a great advantage in operating upon these cases in a hospital, but where transportation is not advisable, the laparotomy can be performed without a great array of instruments, etc., in the patient's home, or in a tenement house.

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