

SURGERY, GYNECOLOGY AND OBSTETRICS

PROLAPSUS FUNIS

ITS ETIOLOGY AND A NEW METHOD OF TREATMENT IN CEPHALIC PRESENTATIONS. A REVIEW OF FIFTY-ONE CASES

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NAEGALE (1) defines a cord as fore-lying or presenting when it can be palpated within the intact membranes, and as prolapsed when it has passed outside of the bag of waters after the liquor amnii has wholly or partially escaped. Inasmuch as the cord may be subjected to pressure while still within the uterine cavity, and complicate the labor to the same extent as if it appeared externally, we may say that the cord has prolapsed when it has passed to or below the level of the greatest diameter of the presenting pole of the fetus, so that it may become subject to harmful pressure between the fetus and the uterine wall or the pelvic canal. Jacquemier (2) distinguished three varieties of this complication: the fore-lying cord, prolapse into the vagina, and prolapse externally, and claimed that the fetal mortality was increased the further the loop of the cord protruded from the cervix, a claim that is still true in many cases. This division is, however, dependant upon the duration of the prolapse and the length of the cord, for, if it be long enough, nearly every cord will finally appear externally.

From the earliest times recorded, the fetal mortality from prolapse of the cord has been very heavy, notwithstanding all the various methods of treatment that have been tried with varying success. Hecker (3) places the mortality at 37.6 per cent, Scanzoni and Churchill at 53 per cent, Charpentier at 79 per cent. Englemann claims that in head labors 64 per cent are lost, while in breech and transverse presentations only 50 per cent survive. Condie (4) found that in 722 cases of prolapse in over 150,000 labors, 375 children died, over 50 per cent. Churchill (5) in another series of 355 cases found that 220 children perished, over 60 per cent. Schaad (6) reported 34 per cent mortality from the ciric in Berne. In the Berlin Lying-in Hos-

pital from 1858 to 1871, Englemann (7) reports 365 cases of which 194 children died, 52.5 per cent. N. M. Porschnjakow (8) found a mortality of 53.5 per cent in his series of about 225 cases. In the fifty-one cases reported by the author, twenty-six children were lost, giving a gross mortality of 50.9 per cent. We may safely say, therefore, that prolapse of the umbilical cord kills about one half of the children at birth, but that, in selected cases, where the patient is under competent care early in the labor, this fetal mortality can be some what reduced.

In over 7900 labors under the care of the Chicago Lying-in Hospital and Dispensary, prolapse of the cord occurred 48 times, or once in 164 cases. The frequency of prolapse varies with different authors. Michaelis gives the highest ratio in Kiel, finding 27 cases in 2,400 labors or 1 to 89. The ratio is explained by the great prevalence of rachitis in this district. Scanzoni, in 178,043 women, found 699 prolapses or 1 to 254 cases. Condie (4) found among 84,991 British women, 404 cases or 1 to 210; among 36,546 French women, 98 cases or 1 to 373; and among 31,037 German women, 197 cases or 1 to 163. This gives a gross ratio of 1 to 218. Simpson believes the difference of frequency in the women of these countries is due to the posture assumed during labor. The French women, he claims, lie with the shoulders low and the pelvis raised; the English women are delivered on the side; while the German women lie on the back, with the shoulders raised and the pelvis low. Hecker and Hildebrandt found the ratio to be 1 to 148 in head labors. Churchill found one prolapse to 240 cases in a series of 105,000 labors. Lachappelle reported 1 to 380; Jacquemier 1 to 170. Prolapse of the cord, while not a frequent complication, occurs sufficiently often to put the medical attendant on his guard, and is sufficiently dangerous to demand an early diagnosis and proper treatment.

The etiology of prolapsus is not complex. Too much weight in determining the etiological factors has been given to various conditions found at the time of labor that really play only a secondary part. The frequency with which these secondary factors occur in labors, not complicated by prolapse, should deter us from deciding offhand just what action they have been enabled to exert. Certain cases are seen in which it is impossible or impracticable to ascertain definitely the presence or absence of primary causes and, as a result, too much importance is ascribed to minor conditions which may be found and yet only predispose to this complication. In this series of 51 cases, a definite primary cause was found in 38 (75 per cent), and no record was made in 13. In several of these 13 cases, the internes were called late in the labor, and doubtless the primary cause was not discovered, as internal examinations are not made late in the second stage, except for special indications. The primary cause does not always act throughout the entire period of labor, though it may do so in many cases. Certain cases of hydramnion, sudden escape of the liquor amnii when the patient is erect, or when there is a malpresentation that becomes rectified spontaneously, are all examples of causes that are effective for a time only, and it might be difficult or impossible to discover their presence late in the labor. Hence it is reasonable to assume that in the majority of these 13 cases, the primary cause was present but was not discovered by the internes, because of a late arrival or through lack of a careful examination.

PRIMARY CAUSES

The chief cause of prolapse is a *lack of continuous and complete adaptation of the lower uterine segment to the presenting part of the fetus*. Normally, the lower pole of the fetus is kept applied to the lower uterine segment by gravity, the intra-uterine tension, and the intra-abdominal pressure. After the rupture of the membranes, the intra-uterine tension becomes the fetal-axis pressure. This contact becomes still closer during a uterine contraction. If the lower uterine segment is not closely applied to the presenting part of the fetus, and the liquor amnii is thereby enabled

to flow from the general cavity of the uterus toward the cervix, the cord, which has a specific gravity of about 1.018, usually lighter than the amniotic fluid, is apt to slip down into the so-called fore-waters and a fore-lying cord is the result. If the membranes rupture when there is a direct connection between the fore-waters and the remainder of the liquor amnii in the uterus, or if the vis a tergo is sufficiently powerful to force the fluid past the presenting part, not only is the cord liable to become prolapsed but the liquor amnii may become wholly lost. If it is not lost immediately, the fluid is liable to leak away gradually, and to allow the uterine walls to come in direct contact with the fetal body at all points. Any condition, therefore, that interferes with the close adaptation of the lower uterine segment to the presenting part, or that allows a connection between the two portions of the liquor amnii, will directly cause a prolapse of the cord.

Concerning *parity*, we find that in 51 cases of prolapse there were but 4 primiparæ (8 per cent) and 47 multiparæ (92 per cent). This percentage is small as compared with that of other reports. Of these four women, two had contracted pelves, one having a transverse presentation. Twenty-seven women (53 per cent) had had four or more pregnancies. The condition of many ill-nourished and overworked multiparæ, who are compelled to labor for years, would predispose to a weakened and relaxed condition of the uterine walls. The resistance or tonus of the uterus plays an important rôle in the etiology of prolapse. In the primiparous woman, the uterus is strong, active, and vigorous. The fetal head has been pushed down firmly into the pelvis, and against the internal os uteri. Frequently the head becomes engaged long before labor sets in, and the cervix and lower uterine segment can be felt stretched tightly over it. The abdominal muscles increase the intra-abdominal tension, and aid in keeping the head in its proper position. These are the cases in which prolapse is rarely seen. In the multipara, on the other hand, the uterus has lost its tonus. Infections from old lacerations of the cervix, from old abortions, or subinvolution, tend to reduce the elasticity of its walls. The organ may be displaced laterally by exu-

dates in the broad ligaments, or tumors in the pelvis, or by adhesions to the various viscera, and be unable to adapt itself to the fetal body. Its walls may be so relaxed from repeated pregnancies, that the fetus may assume almost any posture in its cavity. The fetal head may remain in or above the pelvic inlet until the pains of labor force it down, and as a result the cord may become fore-lying before the pregnancy terminates. The lack of support from the abdominal muscles, due to a wide diastasis, predisposes to a pendulous abdomen and uterus, and in this condition the lower fetal pole may be still further lifted out of the inlet.

A clear clinical history of previous labors may throw considerable light upon the case in hand. Twelve cases (26 per cent) gave a definite history of trouble, two of whom had had a previous prolapse. Case 3 is remarkable for having three labors, complicated by prolapse because of a flat pelvis, though in her last labor, hydramnion was the main cause. There was a history of two former transverse presentations, one in a flat pelvis. Five children were born dead, whether from compression of the cord we do not know. Six former labors were terminated by the forceps. In only 22 cases (43 per cent) was there a clear history of easy and normal labors.

Overdistention of the uterine walls is another primary cause of prolapse. Whether due to multiple pregnancy or hydramnion, the lower uterine segment is unable to adjust itself properly to the fetus. In the present series, there were no cases of multiple pregnancy, though probably fifty sets of twins and three sets of triplets have been cared for by the Dispensary. If both twins present longitudinally, it is easy to see how prolapse may occur in the case of that fetus that did the more effective work in dilating the cervix.

Hydramnion acts not only by allowing malpresentation, and a too great motility of the fetus, but the uterine muscle itself is so thinned out that its contractile and retractile power is markedly diminished. As the fore-waters and the main portion of liquor amnii are continuous, if the membranes rupture early, as they are apt to do, the gush of amniotic fluid carries the cord past the head out of the uterine

cavity. Hydramnion occurred five times (9.8 per cent), in one case complicating a prolapse of the arm, in another, a transverse presentation. Premature rupture of the membranes, though common in this condition, occurred only once.

Premature labor has much the same effect as hydramnion, though in a reversed way. The small size of the fetus, its greater motility, its softer and more pliable consistency, coupled with the unpreparedness of the cervix and lower uterine segment for labor, are potent factors in the production of prolapse. Estimating a fetus as mature if it measures 50 cm. or over (Shauta), we find that there were 16 children who were short, 8 of whom were 47 cm. or less. The smallest fetus measured 42 cm. The occurrence of hydramnion, multiple pregnancy, and premature labor, in the same labor, which not infrequently happens, would strongly predispose to prolapse of the cord.

The more completely the lower uterine segment closes down on the presenting part of the fetus, the rarer is the occurrence of prolapse, and the more dangerous the cases where it does occur. This close application of the cervix depends to a great extent upon the form and consistency of the presenting part. In vertex labors, and especially in Røderer's obliquity of the head, this relation is very intimate, and prolapse seldom occurs. In the deflexion attitudes, as brow and face presentations, and in breech and transverse presentations, this relation is so disturbed that prolapse is more common. *Malpresentation of the fetus* is largely dependent upon the size and form of the pelvic inlet, so that it can hardly be classed as a primary cause, and yet the presenting part forms the chief resistance to the dilating cervix, and plays a direct part in the production of prolapse. Of the 51 cases, 38 (75 per cent) were vertex, 2 (4 per cent) were face, 3 (6 per cent) were breech, and 7 (14 per cent) were transverse presentations. Of the 38 vertex labors, 17 children were lost (45 per cent). One face case was saved, the other was lost. The three children presenting by the breech were lost, while only three of the seven cross-births were saved. Other factors, however, had a part in raising the mortality outside of

the prolapse itself. Of the 38 cases, 16 are recorded as occipito-læva-anterior, 13 as occipito-dextra-anterior, 5 as occipito-dextra-posterior, and 2 as occipito-læva-posterior, 1 as a posterior-parietal-bone presentation and 1 not recorded. Probably many of the heads found in the second position were originally in the third, and the examination was made when anterior rotation was in progress.

None of the cases was complicated by *tumors* of the uterine wall or adjacent organs or tissues, unless we call the cases of placenta prævia an exception. The placenta, when situated low in the uterus, undoubtedly interferes with the mechanism of labor. The Dispensary women were found singularly free from fibroids and other tumors. Tumors, in order to cause prolapse of the cord directly, should lie in the lower uterine segment and interfere with the normal mechanism of labor. If the tumor is found in the uterine wall near or in the cervix, there will result during labor an unequal contraction and dilatation, as pointed out by Wiegand and Michaelis, and this fact constitutes an important cause in itself.

No *monsters* were found in the series, though quite a number have been cared for in the service. Other authors have reported cases where various fetal deformities were complicated by prolapse in labor. Chief among these are spina bifida, distended bladder, and cystic kidney, in breech presentations; and hydrocephalus, meningocele, hydrancephalocoele, and the various forms classed under the general head of teratocephalus, in cephalic labors. The different forms of united twins, classed under the head of epischistoi, hyposchistoi, and amphischistoi, while rare, would certainly have a great influence in causing prolapse of the cord in the labors which they complicate.

Deformities of the pelvis constitute one of the principal primary causes of prolapse of the cord. Upon the shape and size of the bony canal depends to a great degree not only the frequency but also the ultimate result of our treatment of these cases. Litzmann and Michaelis claim that prolapse occurs from four to six times as often in the flat as in the normal pelvis. Englemann estimates it to be sixteen times as frequent. Kaltenbach (10) says that prolapse in a primipara should al-

ways excite suspicion of a flat pelvis. Roper (11) reports a case in which prolapse occurred in three successive labors because of a flat pelvis. Hirschfeld reported 25 per cent of labors complicated by prolapse as occurring in flat pelvises. Hildebrandt raises the percentage to thirty-three. It is estimated that 10 per cent of deformed pelvises are complicated by prolapse of the cord.

In the present series, no record was made in 12 cases. Deformity was present in 22 pelvises. This leaves only 17 in which the pelvis was probably normal. Excluding the 12 cases, in which the pelvis may or may not have been deformed, we have a percentage of nearly 57. This rate is merely an estimate, for the reason that it is impossible to deduct accurately the true conjugate from the Baudelocque diameter, and further because these measurements were taken by a large number of internes, of more or less experience in taking pelvic measurements; still it goes to prove the great frequency of deformed pelvises in this complication, and helps to explain the high mortality in which at least some of the children are lost, not as a result of the prolapse, but from the mechanical difficulties in the extraction. Of the 12 flat pelvises, composed of the simple and rachitic variety, 4 children were lost. Two of these children were delivered by embryotomy because of the deformity. These deformities were not marked in two of the cases. Six pelvises are listed as generally contracted (18 per cent). The justo-minor, or round pelvis, is the most favorable variety in the treatment, provided a successful reposition can be carried out early in labor. The close application of the lower uterine segment to the well-flexed head, will leave no intervening space where a prolapse can take place. If reposition cannot be carried out, the fetus will die in nearly every case if the labor be at term. Of these six cases, two children died. The first woman was a para-ten, the second was a para-eight, the third had a placenta prævia, and the labor of the fourth was complicated by hydramnion. The sixth woman had the cord replaced and, as the head came down into the pelvis, a recurrence of the prolapse was prevented and a living child was born spontaneously. The prolapse was found to depend, therefore, upon

other conditions than the pelvis in four of the cases, while in two, no other reason was given in the records. One pelvis was found to be of the flat, generally contracted type, and the fetus had been dead for hours. No other cause assigned. There were three enlarged pelves. Two children died but both could probably have been saved by earlier operative treatment. In the determination of deformity, a flat pelvis was said to exist if the external conjugate was under 19 cm.; a just-major pelvis, if the Baudelocque was over 21 cm. The generally contracted pelvis was recognized by the decrease in the inter-spinous, inter-cristous, and external conjugate diameters, and by a circumference of under 90 cm. The mechanism of labor was also of material assistance in making the diagnosis.

Finally, under the primary causes, are those cases where prolapse occurred during the performance of a forcep-operation, a version, or an attempted reposition of a prolapsed arm. The relations of the lower uterine segment to the fetal head are mechanically disturbed by the hand of the operator, or by the presence of the instrument. No case of this character occurred in the series, but the author was privileged to see a case where the double manual of Siegmund was being tried, for a difficult and late version, and the cord not only prolapsed but persisted in getting tangled up with the version sling, until all pulsation had ceased and delivery was effected by craniotomy. Theoretically, prolapse would be more common in those cases where the hand was passed into the uterine cavity to grasp a foot in version, or in bringing down a foot in double breech cases.

SECONDARY CAUSES

There are several factors that lead a secondary rôle in the etiology of prolapse, although many authors have formerly laid much stress upon their importance. While they are frequently associated with prolapse, still, in the great majority of cases, other more potent factors were also present. No matter how frequently or persistently these secondary factors may be active, prolapse will not occur unless the relation of the cervix to the presenting part is disturbed.

Length of the cord. The cord varied in length from 42 to 140 cm. If, according to Shauta (12), the length of a normal cord is from 50 to 60 centimeters, we find that prolapse occurred in 19 cases where the cord was normal or less than normal. Five cords were between 40 and 50 cm., 8 were between 60 and 70, 8 between 70 and 80, 4 between 80 and 90, and 3 were over 110 cm. in length. Cases are frequently seen in which cords of great length are found in labor, and yet no prolapse has occurred. The fact that forty-three per cent of the cords were not of abnormal length, argues that length alone has little to do with the accident in the absence of stronger factors. The coiling of the cord around the head and neck is probably one of Nature's methods of treating a long cord in utero. Englemann asserts that if the fetal end of the cord is coiled around the neck, prolapse is prevented if the head presents; whereas, if the placental end is coiled, prolapse may occur as the loop of cord is placed permanently in the lower uterine segment and in close proximity to the cervix.

Low Insertion of the Placenta. The records are incomplete in showing the cases in which a low insertion of the placenta existed. The opening in the membranes indicates a low insertion if four inches or less of membrane lies between the rent and the placental margin. Without knowing the distance from the rent to the after-birth, little can be said. The openings are described as marginal, including two cases of placenta prævia, 27 are given as lateral, and 8 as central. While the presence of the placenta in the lower uterine segment and near the cervix predisposes to prolapse, I agree with Englemann that the main cause is not the proximity of the cord to the cervix, but the presence of a soft and yielding body in the pelvic canal that interferes with the normal mechanism of labor, in the same manner as a full bladder or rectum, and to a less degree as a tumor. In placenta prævia the danger to the mother from hemorrhage rightly overshadows the care given to the child, and some children are lost in the zeal displayed in following the injunction that he will save the greatest number of mothers who disregards the life of the child.

Insertion of the Cord. The insertion of the cord in the placenta is another minor point. A marginal insertion into the placenta lying in the lower uterine segment would predispose to prolapse but, unless other factors were also present, it would not occur. Four cords are recorded as being inserted into the placental margin, 18 are described as central, and 22 as eccentric and lateral.

Artificial rupture of the membranes was resorted to in 9 cases, 3 complicated by hydramnion. The cervix was dilated at the time of rupture in all save 2 cases, and these were accidental. The escape of a profuse quantity of liquor amnii, during an artificial or spontaneous rupture of the membranes, is liable to carry down a loop of the cord, and this danger should always be kept in mind in performing this little operation. The upright or squatting posture, or a position where the pelvis is lower than the shoulders, is apt to favor a prolapse, especially if the membranes rupture during a uterine contraction.

Premature Rupture of the Membranes. Rupture of the membranes in the first stage of labor is a lamentable accident, and one that should be avoided under all circumstances, except where compression of the cord occurs in the intact membranes. The amnion is the stronger membrane, while the chorion is usually weak and friable. The membranes are liable to rupture when the cervix admits one finger. The early rupture is oftentimes due to the same cause as the prolapse itself, usually a deformed pelvis and the disturbed mechanism of labor. The weakness of the membranes has been ascribed to a generally weakened and exhausted condition of the patient, either one suffering from constitutional disease, or one who manages to put forth a baby every year. Severe mechanical strain at the time of labor may overcome its integrity. Chronic disease of the cervix, with an irritating discharge, is said to corrode the membranes and lessen their resistance to the intra-uterine tension.

The Last Secondary Cause is the presence of prolapse of other portions of the fetal body. Prolapse of the arms and legs is simply another evidence of the lack of proper relation between the lower uterine segment and the presenting part. Generally the head is not engaged in

the pelvis unless it is premature or the pelvis is large. As the limb relieves the cord from pressure, if both lie together, the prognosis is better because of the added presence of the limb. Eight cases were complicated by prolapse of other members; two of the foot, six of the arm, and one of the hand and foot. Four children were lost; one because of the late arrival of the intern, one because of a difficult extraction, and one where the operation was delayed too long. This gives a real mortality of only twelve and a half per cent. Prolapse of the arm in cephalic presentations is rather a favorable accident, because it delays engagement of the head, and tends to prevent pressure on the cord.

The Final Treatment of the Cases includes one Braxton-Hick's version and subsequent extraction. This baby died. There were also 6 embryotomies, 26 versions, 5 forceps, 2 extractions by the breech, and 11 spontaneous deliveries. Of the 26 versions, 10 children were lost (38 per cent). Of the 5 forceps cases, 4 children lived, and in the high operation the child died. Both children extracted by the breech died, but they were in poor condition from the start. Of the 11 spontaneous deliveries, 7 children were born dead (63 per cent). Reposition of the cord was tried in 5 cases, with 3 living children. The Trendelenburg position was used in 9 cases and the knee-chest posture in 4.

The Death of the Fetus is undoubtedly caused by asphyxia, following compression of the cord. Various theories have been given by the earlier authors to account for the child's death. Smellie and Oslander claimed that the cooling of the cord, when it lay outside of the vulva, produced a coagulation of the blood and interfered with the funic circulation. Wiegand and Baudelocque found that the umbilical vein was compressed, while the arteries because of their more elastic walls escaped, and consequently the fetus died from syncope and acute anemia. Adolph and Gehrter, on the other hand, found compression of the arteries only, and said that the child died from apoplexy. Hebenstreit found that death resulted from the accumulation of blood in the heart, Adolph found hemorrhage in the lungs, and Waldkirch in the brain. As it is the plan of Nature that the

fetus shall receive its sole supply of oxygen through the cord and placenta, until it is delivered at birth, so any interference in this mechanism will result, according to the degree of compression, in threatened or actual asphyxia. The fetus is enabled to withstand a moderate compression of the cord for a certain period of time. While we cannot accept the report of Arneft (Bedford's *Obstetrics*, 1861, p. 462), who mentioned four cases in which no pulsation of the cord had been found for half an hour before delivery, and yet in each instance the child was born alive, still we know that a child can withstand a complete interruption of the funic circulation for at least eight minutes, and be revived after birth. Premature children withstand this compression much better than children at full term.

According to Bumm (13), the final result of disturbance of the funic circulation is the increasing venosity of the blood, a decrease of oxygen, and an excess of carbon dioxide. This leads to a stimulation of the respiratory center of the medulla oblongata, and the fetus reacts with attempts at respirations in the same manner as the new-born child. Whereas the newly born child fills its lungs with air, the other fills his lungs with liquor amnii, mucus, or blood. Because of the partial expansion of the chest, the blood-vessels in the lungs become opened, and receive a portion of blood from the right ventricle of the heart. The descending aorta receives little blood; as a consequence, through the ductus Botalli, the pressure in the arterial system and in the funic arteries falls, the placental circulation becomes weaker, and the interchange of gases decreases. With each effort at respiration, this vicious circle increases. Finally, the center of respiration becomes dulled by the increasing venosity of the blood, and the efforts to breathe cease. After a short interval the pulsation of the heart ceases, and the child is dead from asphyxia. It is not uncommon to find evidence of a former partial asphyxia in a normal labor, by the presence of old meconium in the amniotic fluid, and many of these children are born in a healthy and vigorous condition when the liquor amnii is even fetid. The presence of fresh meconium was noticed in 17 cases in my series, and in 4 of these the fetus was already dead. In only 32

cases was there any record of the condition of the liquor amnii, showing that in 53 per cent of the cases a partial or complete asphyxia was present. Of these 17 cases where meconium was present, 4 suffered from asphyxia livida, 2 from asphyxia pallida, and 11 babies died.

Many autopsies have been made upon the bodies of children dead from compression of the cord. The only findings are changes due to the disturbances of the circulation. Congestions, edemas, and hemorrhages of the spleen, kidneys, liver, lungs, brain, and meninges, constitute the main pathologic picture of the disease. In cases where the compression has been of moderate degree and of long duration, congestion and edema predominate; while in those cases where the compression has been complete and sudden, the hemorrhages abound. The colon is usually emptied of a portion of meconium, and the stomach contains meconium, lanugo hairs, and vernix caseosa, showing that the child had swallowed the fluid during its convulsive seizures.

The prognosis as to the child's life depends to a great extent upon the time when the prolapse occurs, and upon the interference with the funic circulation. If the conditions are present for an immediate extraction, the outlook is decidedly better than when the accident occurred in the first stage of labor. The earlier the prolapse occurs before the os is fully dilated, the more serious is the outlook. The second important fact to determine is as to the extent and degree of compression, and its effect upon the fetus. The three signs of threatened intra-uterine asphyxia usually given are: the presence of fresh meconium in the liquor amnii in all save breech presentations; the convulsive motions of the fetus; and the difference in the strength and rapidity of the heart sounds.

We may sum up the treatment of prolapse by saying, that unless the life of the fetus has been seriously compromised by asphyxia, we must relieve the cord from present and future obstruction, or we must extract at once. If the head is engaged and the conditions of the soft parts permit extraction, the forceps are called for and a rapid delivery effected. If the head is movable at or above the pelvic inlet, and there is no threatened or actual rupture of the uterus, a podalic version is indicated. If the

child is dead, or its life seriously affected, a natural delivery of a still-born infant may be awaited, or embryotomy performed. These operations are admitted by all obstetric surgeons, and their permanence in the treatment of this condition has been established. The serious aspect of these cases occurs when the cord has prolapsed below the head in the first stage of labor. This is the time when we must relieve the cord from pressure or lose the child, as we are not able to extract.

It is evident that our success in these difficult cases depends upon our ability to protect the cord from pressure until the cervix is fully dilated. It is a well-known fact that the danger to the fetus is reduced to a minimum as long as the membranes are intact, though a few cases occur in which harmful, and even fatal, compression of the cord can take place in the intact bag of waters. The child is immediately placed in serious danger as soon as the liquor amnii escapes, showing that *the presence of the fluid in the uterine cavity is the great protector of the cord*. If the child's head closely fits the pelvis and the lower uterine segment, only the fluid between the head and the external membranes will be lost, and the remainder of the liquor amnii, above the head, will be retained until the body is expelled. But in these normal cases, prolapse does not usually occur. There is nearly always some maladjustment whereby the cord can slip past the head and seriously jeopardize the child's life. In these cases, there is but little to prevent that portion of the fluid above the head from escaping, and the uterus is nearly drained of its liquor amnii. No record has ever been made of the amount of liquor amnii which has escaped, after the body has been extracted, in cases complicated by prolapse of the cord, but in the cases that the author personally attended there was little if any liquor amnii remaining in the uterus. As the fluid drains away, the uterine walls close down upon the body of the fetus and compress it directly.

Is the cord able to escape harmful pressure in this "dry" condition of the uterus? I do not believe that it is possible in many cases. The ideal position of the cord in utero is on the abdominal surface of the body, protected by the arms and limbs of the fetus. Inasmuch

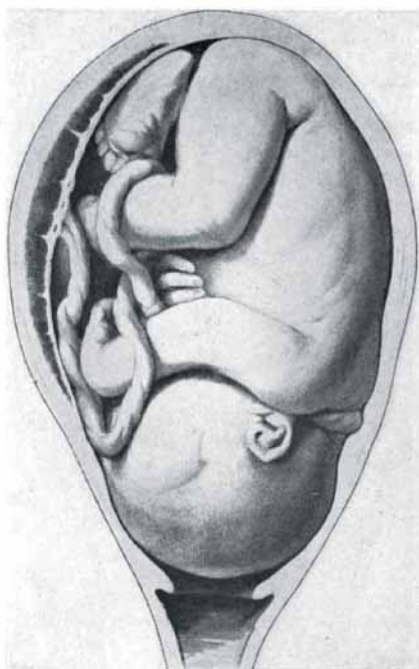


Fig. 1. Perfect adjustment between the head and lower uterine segment. (Bumm.)

as the distance between the navel and the insertion of the cord into the placenta, which lies directly opposite, is not very great, it follows that there must be considerable coiling of the cord in this region of the uterus. There are always extra coils of the cord present before a prolapse occurs. Where the liquor amnii is scanty or absent, we would expect some of the coils to be compressed when we remember that in threatened asphyxia the fetus jerks its limbs about in various directions, pushing out the uterine wall, if relaxed, and permitting a displacement of the coils to a position where harmful pressure may result. When the membranes are intact, the contraction of the uterus offers little opportunity of changing the position of the cord, and inasmuch as the general intra-uterine pressure is equal, and opposite in direction, the different degrees of tension do not



Fig. 2. Prolapse of the cord. (Bumm.) Maladjustment between the head and lower uterine segment.

affect the cord. When the integrity of the ovum is destroyed, the contraction of the uterus forces the cord in the direction of least resistance, or toward the cervix, and as the fluid wedge is now lost, the cord is apt to be pushed from its place of security to a position of danger.

When the cord does prolapse, it usually falls down opposite one of the sacro-iliac synchondroses. This is due to the fact that the navel is usually close to the posterior wall of the uterus. As the placenta is also found on the posterior wall, in a large number of cases, we see that both the fetal and placental ends of the cord lie posteriorly. As the abdomen of the fetus lies either to the right or left, we would expect the cord to prolapse in the direction of least resistance, or along the side of the head. If the diagnosis was occipito-leva-anterior, the cord would fall more frequently in the left and posterior quadrant of the pelvis, and sometimes in the right and anterior portion. It is rare to find the cord under the os pubis, and this position is dangerous unless relieved by

art. No record has been made of the location of the prolapse, in this series, so that no deductions can be made on that point.

The essential point in the treatment is to preserve the cord from pressure. The various methods used are divided into posture, reposition by catheters or bougies, manual reposition, and the introduction of foreign bodies into the uterus to block the way of a recurrence of the prolapse.

Posture has been used as a treatment of prolapse from the time when the accident was first mentioned in the literature. The knee-chest position, while first practiced in the early centuries was first used in the treatment of prolapse by v Deventer (14), in 1701. This author placed the patient on that side where the cord did not prolapse, pushed up the head with the hand, replaced the cord, and then either brought the head again into the pelvis or did a version. John Mowbray (15) placed the woman in the knee-chest position if the cord was found over the sacrum or os pubis. Henry Bracken (16) replaced the cord in head labors, with the woman on the knees and elbows, and then brought the head over the inlet. Ludwig Wilhelm von Knoer (17) placed the woman in the knee-chest position, to prevent a protrusion of the cord, while he did a podalic or cephalic version. Kiestra (19) placed the woman on her knees and chest, when a fore-lying cord was felt, to prevent a prolapse, and after prolapse to facilitate the return of the cord, and kept her there until the head was well engaged. v Ritgen in 1820 (18), and in 1855 (21), cautioned the midwife that if she found the cord fore-lying, she should get the patient into the knee-chest position for a few minutes. If the patient is too weak, or suffers severely from congestion of the brain, she may lie on the side with the pelvis raised, on that side where the cord did not prolapse. If the cord has gone back, the position is necessary to prevent its return. The gradual escape of the liquor amnii is also advised. Brothers (22) places the patient on the back, over an inverted kitchen chair placed on the bed. Thomas (20) also recommended the use of posture, and popularized its employment in this country. I believe that while the knee-chest position is theoretically better where the cord pro-

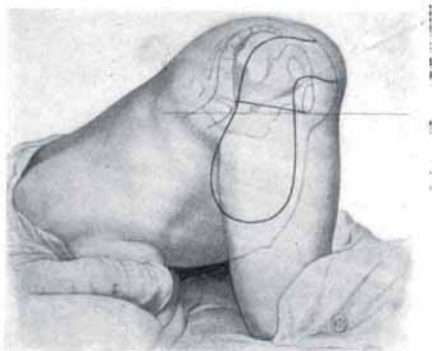


Fig. 3. Knee chest position. (Edgar.)

lapses in the posterior portion of the pelvis, still very few women are able to maintain it for any length of time; but if they are placed on their back over an inverted chair, they can lie for hours without much discomfort.

Posture alone may replace a fore-lying cord, as happened in Case 38 of this series. It will to a certain extent retain the liquor amnii, prevent pressure of the cord, and prevent any further protrusion from the cervix. The fundus of the uterus becomes the most dependant part of the abdominal cavity and, according to Spiegelburg, the cord is as liable to slip back into, as it was in the first instance to slip out, of the uterus. The use of posture, the Trendelenburg position, the knee-chest, and lateral positions, is very valuable in the treatment of prolapse, and should be used in every case unless a rapid delivery is called for. I believe that much of the value of posture, when tried early, is due to the retention of the liquor amnii in the uterine cavity and the consequent relief from pressure.

Reposition of the cord was first suggested by Louise Bourgeoise (23), in 1609, in the attempt to place the cord above the zone of danger, while the conditions for the extraction were not yet present. Since his day many authors have used the method, but without reducing the great fetal mortality. Reuter (23), for example, collected 340 cases, from 1860 from eight different authors, of version with a fetal mortality of 28.2 per cent, while 247 cases



Fig. 4. Lateral prone position. (Edgar.)

of reposition gave 41.3 per cent. The dangers to the fetus in reposition are evident. We know that much handling of the cord is hazardous to the fetus, and frequent attempts at reposition, if persisted in, may act injuriously on the child. In displacing the head by the hand, we allow the remainder of the liquor amnii to escape if any remained in the uterus. The advice to hang the cord over a knee, as first recommended by Croft, in 1786 (24), is bad, for if the cervix is dilated sufficiently for the internal hand to reach the knee with the cord in the grasp of the fingers, it is open enough to perform a version. If the fetus is very active, or the uterine contractions are strong, there is great difficulty in keeping the cord above the head. It often happens that with the attempts at reposition, more of the cord falls down into the vagina.

When the cervix is not sufficiently dilated to allow of manual reposition, many instruments have been used to replace the cord. The oldest is that of von Dudan, in 1826. Others have been invented by Kiwish, Robertson, Braun, Scholler, Vargas, and Charpentier (26). The greater num-



Fig. 5. Trendelenburg position. (Garrigues.)



Fig. 6. Manual reposition of the cord. (Edgar.)

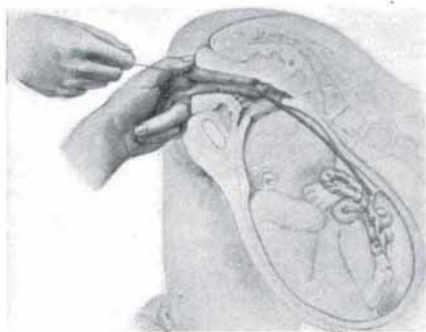


Fig. 7. Reposition by the catheter. (Edgar.)

ber of these instruments consists of a catheter, or bougie, and a stylet. A ring of tape is passed around the cord, and then caught by the stylet through the fenestrum and the end of the catheter. The patient is placed in the knee-chest position, the head pushed aside, if movable, and the cord and catheter pushed as far up as possible. The stylet is now withdrawn, the cord released, and the head brought over the pelvis. In other cases, the catheter is allowed to remain in the uterus until the fetus is delivered. The main trouble with this method is that retention is very difficult, and we usually see the cord slip down again. There is no pressure to counteract the fetal-axis pressure, and as the cord moves in the direction of least resistance, it slips toward the cervix.

Reposition with the hand is most successful when the child is in good condition; when the head is displaceable and yet fits the inlet; where there are no marked degrees of deflexion that cannot be rectified; where there is no marked deformity of the pelvis, except the generally contracted pelvis; and where the cord has not been prolapsed for a long time. If the membranes are intact, every care should be taken to preserve them until the cervix is effaced and dilated, as any attempt to replace by direct means is fraught with great danger of premature rupture, and the prognosis for the child is more serious. Efforts to place the

patient in the side position, with the hips raised; the use of the Braun metreurynter partially filled in the vagina, as recommended by Fritsch; and the avoidance of all bearing-down efforts; are beneficial. Reposition is useless if we are unable to push the cord beyond the greatest diameter of the presenting part. Even when the cord has been successfully replaced, many cases occur in which the fetal heart tones get slower and slower, and the child finally dies. Here, either the damage to the cord and circulation during the period of prolapse has been too great, or there is compression after the cord has been replaced. I believe the latter condition obtains when the fetus is fairly vigorous at the time of reposition.

The ideal condition, during the first stage of labor, consists of the presence of a normal amount of liquor amnii in the uterine cavity and the intact membranes. Reposition by the hand or catheter does not restore the ideal condition, because the fluid is absent or scanty. We must replace the liquor amnii with a sterile solution, and provide a substitute for the ruptured bag of waters. Schroeder (27) has his assistant press firmly on both sides of the lower uterine segment, against the head, in cases of suspected presentation of the cord, so as to lessen the space below and around the head. He ruptures the membranes with a

needle, and allows a gradual escape of the liquor amnii. As the head comes down and completely fills the inlet, the opening is widened. The assistant holds the head against the inlet for two or three pains.

Henne (28) reports the case of a cord 130 cm. long, with a low insertion. The cord was down and the cervix partially dilated. He took a piece of gauze 2.5 cm. wide, packed the cord past the head, and then pressed the head into the pelvis. After the chloroform was taken away, the pains returned and a living child was born two hours later. This is one way of counteracting the intra-uterine tension.

Blundell (29) recommends to take a sponge, about the size of the four fingers, and pack it into the cervix to retain the cord after it has been replaced. This method was also used by Osiander, Busch, Hughes, and Hopkins.

Schmeisser (30) fastened the loop of the cord to the base of a properly constructed bag. The bag was then passed into the uterus, inflated with air and so retained.

Ashford (31) used a Gariel's air pessary, attached to the cord by a piece of tape. After the bag and cord were passed into the uterus, the bag was filled with air and kept there until the head came down into the pelvis, when the air was released. Ashford saved the child by this method.

De Lee (32) recommends, in cases where the arm has prolapsed along the head, to place it within the loop of the cord so that it will be preserved from pressure. The labor is allowed to proceed normally, and if indications arise calling for the rapid termination of labor, to extract. In case 16 of this series, this method of treatment was followed out by him, and a living child was later delivered by forceps.

In my search of the literature, I have been unable to find the record of any one attempting to restore the normal conditions of the first stage of labor by introducing into the uterine cavity a fluid to take the place of the liquor amnii, and providing a substitute for the membranes. A very excellent substitute for the membranes is the metreurynter. The great objection to the Braun instrument is the elasticity of its walls, that allows it to slip out of the cervix before the os is fully dilated. I have devised



Fig. 8. Showing the instrument in operation.

a new instrument¹ by taking as a model the Voorhees bag, which is more inelastic and is easier to retain in the cervix. It also holds the liquor amnii from leaking, better than any of the other instruments. There are two sizes; the smaller bag has a basal diameter of 6 cm., and is 8 cm. from base to apex; the larger size has a diameter of 10½ cm. at the base, and is 10 cm. from base to apex. Through the bag, running from base to apex, is a separate rubber tubing that has no connection with the interior of the bag. Fluid forced through this tube passes directly through the bag and appears externally at the base. At the opening of this tube, in the base, are two small masses of rubber intended to prevent the presenting part from pressing directly against the aperture and obstructing the flow. The larger bag is used in all cases where it is possible to introduce it above the cervix, as the necessity of changing the bags during the first stage is undesirable. If it is impossible to use the larger bag, the smaller one is used until the cervix is better dilated. When the large bag

¹ These instruments are manufactured by Sharp and Smith, Chicago.

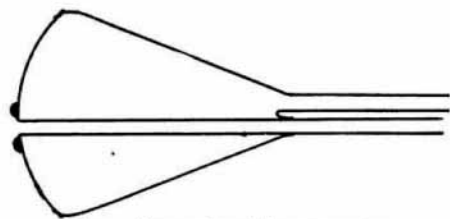


Fig. 9. Cross-section of the metreurynter.

pulls out, the conditions are present for an immediate extraction.

The instrument is rendered aseptic by boiling. It is used in the following manner: As soon as a diagnosis of prolapse is made in the first stage of labor, no time should be lost in placing the patient in the Trendelenburg position over the back of a chair. If the pains are vigorous, chloroform may be administered to produce relaxation of the uterus, to prevent pressure on the cord, and also to keep the cord from protruding further into the vagina. After boiling the instrument and preparing the field of operation, the bag is filled with a half-per-cent lysol solution. This solution is then expressed, with the tube under water and clamped with an artery forceps. The cord is now replaced, manually, and pushed up past the head; or if this is impossible, the catheter is used. The bag is now folded upon itself and introduced into the uterus above the cervix. It is then filled nearly full by Davison's bulb syringe. Sterile salt-solution is now injected slowly through the other tube. The quantity necessary to inject, varies in different cases. Generally, one pint is sufficient, but some allowance must be made for leakage. If the leakage is too free, the bag should be filled to its full capacity. After the salt-solution has been introduced, the chloroform is taken away, and the pains are allowed to return. If the abdominal wall is of medium thickness, it is possible to ascertain the necessary amount by palpation of the uterus. If the uterus has been overfilled, the pains become constant and very vigorous, similar to those occurring in a threatened rupture of the uterus. The release of a portion of the uterine fluid will cause this symptom to disappear. The danger of producing a rupture of the uterine wall is small.

Rupture is due, in the great majority of cases, to a localized pressure, and not by a generally equalized pressure, such as this fluid would cause. The method is used only in the first stage of labor, when the uterine walls have not been exhausted by a long and tedious labor. I do not believe that sufficient pressure would be brought to bear, to cause a rupture before the same pressure would force the fluid between the bag and cervix, and hence the condition would spontaneously relieve itself.

Should considerable leakage occur, the deficiency may be made up by the introduction of more fluid through the tube. Excessive leakage may be prevented, at least in part, by plugging the vagina with wet cotton. It is unnecessary to add that auscultation of the fetal heart should be made at frequent intervals, to ascertain the condition of the child. In the meantime, preparations for a version should be made, so that as soon as the os is well dilated the child may be delivered immediately. All means for the resuscitation of the child should be at hand. If it is thought necessary, we may keep the patient in the Trendelenburg position during the entire period of this special treatment. If it is impossible to replace the cord or to retain the bag above the cervix, the treatment is posture only, and the fetal mortality is raised accordingly.

The contra-conditions for the use of this method are as follows:

1. The life of the fetus must not have been seriously endangered by a long-continued compression of the cord. The child should be able to withstand a certain amount of shock in the final operation.
2. The pelvis must not be deformed to such an extent as to contraindicate the use of the forceps, or the performance of version and extraction.
3. There should be no tumors large enough to interfere with the mechanism of labor.
4. The fetus should not be a monster nor be incapable of extra-uterine life.
5. The prolapsed cord must be pushed back of the largest diameter of the presenting part.
6. The instrument should not be used when deep lacerations, or a previous amputation of the cervix, allow of too free a leakage.
7. The cervix should not be dilated, and an

immediate delivery of the fetus should not be threatened.

In conclusion, I would say that the ideal treatment of prolapse of the umbilical cord, in the first stage of labor, has never yet been carried out. It includes the restoration of the conditions present in normal labor, the integrity of the membranes, and the presence of the liquor amnii or a similiar fluid in the uterine cavity.

The cord is relatively immune from harmful pressure during the period when the ovum is intact. This immunity exists even when the cord presents in front of the fetal head. In the great majority of cases, the cord is immune from harmful pressure as long as the membranes are intact, no matter where it may be situated. The danger to the fetus is markedly increased the moment the membranes rupture, and active efforts must be instituted to prevent pressure of the cord, or the child is usually lost. In these cases, not only the fore-waters, but all, or nearly all, of the remainder of the liquor amnii are lost, because the same conditions that allowed the cord to prolapse, provide for an escape of fluid above the presenting part. In many of the cases of supposedly successful reposition of the cord, the fetus dies because pressure is still present, although no direct point of pressure can be recognized by the palpating hand.

The high fetal mortality has held its own for generations, and from a third to a half of the children have perished in spite of our best efforts to save them. All the former methods of treatment have not restored the normal conditions existent in the first stage of labor. The liquor amnii is the great protector of the cord. It distributes the intra-uterine tension equally and prevents any direct pressure on the cord. When the integrity of the ovum is destroyed, all the contents of the uterus are propelled toward the cervix. The liquor amnii, and the cord, are alone movable, and if the relations between the lower uterine segment and head are abnormal, they will escape. There is no disposition on the part of the cord to become displaced if the tension is equal and opposite, in all directions. The objection to reposition alone is that the cord is being continually forced toward the cervix by the uterine con-

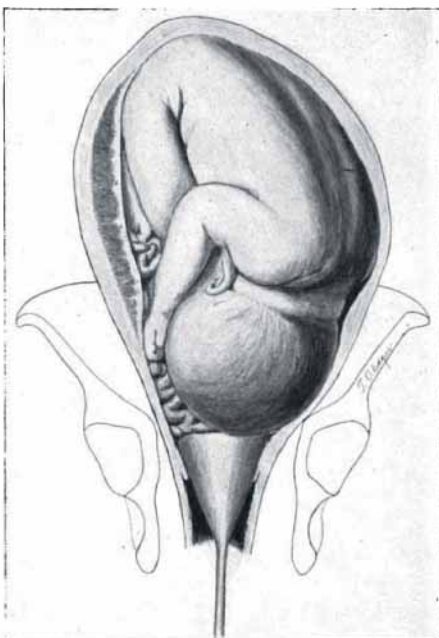


Fig. 10. Recurrence of the prolapse and compression after manual reposition. Absence of liquor amnii in uterine cavity.

tractions, because of the absence of that pressure that acts in the direction from the cervix to the fundus. The introduction of fluid in the uterine cavity, and its retention by the metreurynter at the os uteri, restores the counterpressure on the cord, and removes any tendency for it to move toward the cervix. The presence of fluid in the uterine cavity prevents any direct pressure between the fetal body and uterine walls. The introduction of fluid into the uterus is not dangerous if proper care is taken. Any excess will leak out before a rupture occurs.

The ideal final operation is version, and the fluid prevents the uterine walls from closing down on the child and so rendering a version impossible.

The following forty-eight cases of prolapsus funis have occurred in the hospital and dispensary service of the Chicago Lying-in Hospital since its organization in 1895.



Fig. 11. The hydrostatic action of the fluid in the uterine cavity tends to prevent a recurrence of the prolapse and the danger from pressure on the cord is minimized.

I am indebted to Dr. Joseph B. De Lee, medical director of the institution, for the privilege of reporting these cases.

Most of the patients were Russian Jewish women and were of that class who inhabit the slum districts of Chicago. They nearly all suffer from overwork and frequent pregnancies, and are poorly nourished and debilitated. They often delay calling for assistance until well along in labor, and, when the cord has prolapsed, until the child's life is in great danger. The calls at the Dispensary are answered by an intern and a senior medical student. The diagnosis of prolapse of the cord being made, a hurried call was given to a member of the operating staff, and an hour was required for him to get to the house of the patient. Mean-

while, the intern endeavored to prevent compression of the cord by placing the patient over the back of a chair, by the use of the knee-chest position, or, if the child was dying, by a manual reposition. As a consequence of these delays, the operator frequently found the child in a dangerous condition. Many of the operations were done because a feeble pulsation was felt in the cord, and the child was given the benefit of the doubt. Out of fifty-one cases, the condition of the fetus was found impaired in thirty-two instances.

These results should be improved upon in private practice, where the obstetrician is called earlier in his cases and the long delays, necessary in dispensary practice, are obviated.

No mothers were lost in the series, and there was no temperature or infection in any case. This result is due to the rigid routine of antiseptics that is carefully followed by all who have to do with the lying-in woman.

CASE 1. Miss P. Para I. Age 29. Hosp. No. 107. The patient started in labor November 20, 1900. *Diagnosis:* Occipito-læva-anterior. The fetal heart tones varied from 108 to 68 during the second stage of labor. The membranes ruptured spontaneously and immediately the cord prolapsed into the vagina. The liquor amnii was stained with fresh meconium showing the presence of a threatened asphyxia. Forceps were applied to the head and the child quickly extracted. The baby, a boy, was markedly cyanosed but resuscitation, though difficult, was finally successful. Considerable mucus was removed from the pharynx by the tracheal catheter. The child weighed 6.5 pounds and was fully matured. The cord was 58 cm., long and was inserted into the placenta eccentrically; the opening in the membranes was lateral. Labor lasted seven hours and thirty-five minutes. No pelvic measurements were recorded. This case shows that asphyxia may occur from pressure on the cord in the intact membranes. The head was well down on the pelvic floor before the membranes ruptured, and the short period of labor would in all probability dispose of direct compression of the fetus by the uterine walls.

CASE 2. Mrs. S. Para v. Age 33. Hosp. No. 438. Last labor instrumental. Labor began May 30, 1903. *Diagnosis:* Occipito-dextra-posterior. The pelvic measurements were: IS, 27.5 cm.; IC, 27 cm.; Bi Tro., 31 cm.; Ext. Conj., 17.5 cm.; CV, estimated 7.75 to 8 cm.; BI Isch., 11 cm.; A funic souffle was heard at the level of the navel and on the right side. The fetal heart tones were from 135 to 150 and regular. The membranes were ruptured spontaneously in the first stage and the cord was found prolapsed. The cervix was partially dilated artificially and the cord replaced, with the woman in the lithotomy position. She was then placed in the knee-chest posture, the hand

being in the uterus, and a more complete reposition made. She was placed in bed for four hours. At this time the head had moved over into the left iliac fossa, and the first sound of the heart had become impure. There were no uterine pains. Internal version was done, after which the pulsations in the cord quickly ceased, notwithstanding the cord was placed in the child's groin, and no point of pressure or constriction could be located. Rapid extraction could not be done because the cervix was not fully dilated. A slow extraction was made and a dead baby delivered. The fetus was a male, mature, weighed 8.75 pounds and was 50 cm. long. The cord was 56 cm. long; the insertion was central; the placenta was situated partly in the lower uterine segment and was removed manually. The cause of the prolapse was due to the flat rachitic pelvis.

CASE 3. Mrs. R. Para III. Age 27. Disp. No. 344. The two previous labors were complicated by prolapse of the cord. Labor started September 5, 1896. *Diagnosis:* Occipito-lava-anterior. Pelvic measurements: IC, 29.5 cm.; IS, 27.5 cm.; BiTro., 33.5 cm.; and Ext. Conj., 18 cm. The patient is short and very obese. After the woman had been in labor for sixteen hours, the membranes were ruptured artificially, and a profuse amount of liquor amnii escaped, carrying down a long loop of the cord. As the head was movable at the pelvic inlet, and the cervix was fully dilated, a podalic version was at once performed. The posterior leg was brought down as it was the one nearer to the internal hand. The child's back rotated posteriorly and then across the sacrum to the os pubis. The extraction was not difficult and a living baby was delivered. The child was a girl, weighed eight pounds, measured 52 cm., in length and was fully matured. The cord measured 60 cm.; the insertion was eccentric; and the opening in the membranes was lateral. Labor lasted seventeen hours and fifteen minutes. The prolapse in this case was due to the slightly flat pelvis and the large amount of liquor amnii.

CASE 4. Mrs. M. Para X. Age 35. Disp. No. 605. Labor began February 11, 1897. The case was seen for the first time during the second stage of labor. No diagnosis was recorded. Pelvic measurements: IS, 24 cm.; IC, 26.5 cm.; BiTro., 28 cm.; Ext. Conj., 18.75 cm.; Circum., 82 cm. The membranes ruptured spontaneously soon after the arrival of the intern, the head was found high in the pelvis, and the cord prolapsed into the vagina. A podalic version was done at once, and a third-degree laceration of the perineum resulted from the rapid extraction. An eight-pound girl was delivered, suffering from asphyxia pallida, and was resuscitated with difficulty. The tracheal catheter, hot baths, La Borde's tongue tractions, and Schultze's swings were used. The cord was 50 cm. long. The perineum was repaired at once. The prolapse was due to the generally contracted pelvis, which caused the head to remain high in the pelvis until late in the labor.

CASE 5. Mrs. S. Para V. Age 31. Disp. No. 805. The previous labors were easy. No miscarriages. *Diagnosis:* Occipito-lava-anterior. Labor oc-

curred June 13, 1897. Pelvic measurements given were: CD, 12.5 cm.; CV, 10.5 cm. In the first stage, the fetal heart tones numbered 145 beats to the minute. The membranes ruptured spontaneously two hours after the cervix was dilated. The liquor amnii was stained with meconium. The head was high. A spontaneous delivery took place ten minutes after the liquor amnii escaped. The cord had prolapsed slightly. No special treatment was given as the progress of labor was rapid at this time. The little girl was deeply asphyxiated (asphyxia pallida), and was slowly revived. She weighed seven pounds and was 47 cm. long. The cord measured 72 cm., and was inserted into the placental margin. Labor lasted thirteen hours and twenty minutes.

CASE 6. Mrs. T. Para I. Age 20. Disp. No. 1080. The interne was called and arrived during the second stage. The child presented by the breech and one foot of the cord had prolapsed. There was only slight pulsation. The patient was immediately placed in the Trendelenburg position while preparations were being made to deliver. Both feet presented. The sacrum rotated to the os pubis. Both arms were stripped over the head. A rapid extraction delivered a dead, female infant, eight pounds and a half in weight, 52 cm. long and well developed. The cord was 72 cm. long, insertion marginal, the opening of the membranes was lateral. No pelvic measurements were recorded. Labor lasted eight hours and forty minutes. This prolapse was due to the footling presentation and the asphyxia was so severe, at the arrival of the intern, that any treatment would have been of no avail. It was a case of being too late.

CASE 7. Mrs. L. Para III. Age 30. Disp. No. 1159. *Diagnosis:* Occipito-lava-anterior. Fetal heart tones were 140 and regular. No funic souffle. Pelvic measurements: IS, 25 cm.; IC, 28 cm.; BiTro. 30 cm.; Ext. Conj., 20 cm.; Circum., 85 cm. The head was engaged but movable. No fore-lying cord found in the first stage. In the second stage, the cord was felt. The heart tones were still 140 and regular. Pains were weak and there was no progress. The membranes were ruptured artificially, and a version and extraction was done at once. The baby, a female, was slightly asphyxiated. She weighed seven and a half pounds, was 50 cm. long and matured. The cord was 52 cm. long; insertion eccentric; opening of the membranes lateral. Duration of labor, fifteen hours and forty minutes.

CASE 8. Mrs. L. Para VIII. Age 38. Disp. No. 1214. *Diagnosis:* Mento-lava-anterior. Pelvic measurements: IS, 25 cm.; IC, 28.5 cm.; BiTro., 29 cm.; Ext. Conj., 18 cm.; Circum., 90 cm. The heart tones were 136, regular and heard to the right of the navel. The membranes ruptured spontaneously and four inches of the cord prolapsed through the cervix. The liquor amnii was clear. The fetal heart tones gradually grew more rapid, but as the pains were strong and frequent, and the progress of labor rapid, the cord pulsating well, nothing was done and soon a male babe was delivered spontaneously, but suffering from asphyxia pallida. He weighed six pounds and measured

54 cm. The cord measured 54 cm.; insertion was eccentric; the opening in the membranes was lateral. Labor lasted twelve hours and forty minutes. The face presentation was the primary cause in this case.

CASE 9. Mrs. O. Para III. Age 27. Disp. No. 1254. The first child was delivered with forceps; the second labor was normal. *Diagnosis:* Occipito-dextra-anterior. Labor occurred February 2, 1898. The intern arrived in the second stage. The uterine pains were severe, the head movable and the fetal heart tones 136 and regular. There was no funic souffle. The membranes ruptured spontaneously, and a large amount of liquor amnii escaped. There was no meconium. The cord prolapsed about eight inches. The staff operator found the head engaged, and the cord still prolapsed and pulsating. The pains were severe. A living child was extracted with the forceps. The baby was a male, weighed nine and a half pounds, and was matured. The cord was 112 cm. long, and contained many false knots. It was not coiled around the child's neck. The opening in the membranes was large and lateral. Duration of labor twenty-six hours and a half. The interesting features in this case were the hydramnion, and the great length of the funis.

CASE 10. Mrs. C. Para XI. Age 40. Disp. No. 1453. The first child died at birth. *Diagnosis:* Occipito-dextra-posterior. Pelvic measurements: IS, 26 cm.; IC, 29 cm.; BiTro., 29 cm.; Ext. Conj., 20 cm.; Circum., 85 cm. The fetal heart in the first stage beat 160 and regularly. The bag of waters ruptured spontaneously in the first stage, and the cord immediately prolapsed. The patient was placed in the knee-chest position for ten minutes, and then in the Trendelenburg position for forty-five minutes. The cervix was not completely dilated and a Braxton-Hick's version was performed. After the version, the fetal heart tones disappeared. Nature was allowed to take its course and a dead, female baby was born spontaneously, about three hours later. The babe weighed seven pounds and was 54 cm. long. The cord was 79 cm. long; insertion eccentric; and opening lateral. Duration of labor, seven hours and fifteen minutes. After the version, the pressure on the cord continued and the child immediately perished.

CASE 11. Mrs. E. Para VIII. Age 35. Disp. No. 1494. All the previous labors were normal. Labor, June 6, 1898. *Diagnosis:* Occipito-lava-anterior. Pelvic measurements: IS, 24 cm.; IC, 27 cm.; BiTro.; 29 cm.; Ext. Conj., 19 cm.; Circum., 82 cm. The fetal heart tones were not heard during the labor. The head was movable in the inlet. The membranes ruptured spontaneously and prolapse of the cord recognized. There was no pulsation. The liquor amnii was stained with fresh meconium. Spontaneous delivery occurred in half an hour. The baby was a boy, weighed eight pounds, was 52 cm. long and mature. The cord measured 72 cm.; insertion eccentric, many false knots; the opening was lateral. Duration of labor, ten hours and ten minutes. This baby, in all probability died in the early part of labor.

CASE 12. Mrs. K. Para V. Age 32. Disp. No. 1601. History of one prolapse and one version

in former labors. *Diagnosis:* Occipito-lava-anterior. Labor, August 8, 1898. Pelvic measurements: IS, 23.5 cm.; IC, 28 cm.; BiTro., 31 cm.; Ext. Conj., 19 cm.; Circum., 90 cm. Fetal heart tones 140 and regular. The membranes ruptured spontaneously at the close of the first stage. The liquor amnii was clear. Pains were weak. The cord had prolapsed three inches. The patient was placed in the Trendelenburg position, and the cord was found to have slipped back two inches and still pulsating. Version was done four hours after the membranes had ruptured. The heart tones at this time had become weak. The extraction was difficult. The child lived two days, during which time, he spit up large quantities of bloody mucus. He weighed nine pounds and was 51 cm. long. The cord was 48 cm. long; insertion was eccentric; and opening lateral. Help came too late in this case.

CASE 13. Mrs. R. Para XII. Age 43. Disp. No. 1650. Former labors were normal. *Diagnosis:* Occipito-dextra-anterior. Pelvic measurements: IS, 22.5 cm.; IC, 27 cm.; BiTro., 29 cm.; Ext. Conj., 19 cm. In the first stage, examination disclosed placental tissue over the cervix, and a pulsating vessel on its posterior surface. The fetal heart tones were 140 and regular. Progress of labor slow. The membranes were ruptured and the liquor amnii was allowed to escape slowly. The cord was found prolapsed. The fetal heart tones rose to 160 and higher after the amniotic fluid escaped. The liquor amnii was clear. Spontaneous delivery occurred while preparations were being made to deliver with the forceps. The final diagnosis was placenta-prævia-marginalis, velamentous insertion, and prolapse of the cord. The baby, a girl, was alive, weighed six pounds and was 45 cm. long. The cord was 53 cm. long, and the opening in the membranes was marginal. The primary respirations were delayed for fifteen minutes. Labor lasted fifteen hours and twenty minutes.

CASE 14. Mrs. P. Para VI. Age 30. Disp. No. 1768. Former labors were tedious and hard. Three babies were born dead. The last was a forcep operation. Labor, December 20, 1898. *Diagnosis:* Scapula-lava-anterior. The fetal heart tones varied from such a rate that they could not be counted down to 140 beats a minute. Pelvic measurements: IS, 24 cm.; IC, 27 cm.; BiTro., 30 cm.; Ext. Conj., 20 cm. Through the intact membranes, the hand was palpated. The contraction ring of Bandl was felt, one finger's breadth below the navel. The membranes were torn artificially, when the cord prolapsed and was pulsating slowly. The liquor amnii was stained with meconium. Podalic version was performed and a difficult extraction followed. The patient was placed in the Walcher posture, and the head came through the inlet, under strong external pressure, with a "slump." The fetus was moderately asphyxiated. There was a spoon-shaped depression on the right parietal bone. The child was a female, weighed six pounds and was 48 cm. long. The cord was 49 cm. long; the opening in the membranes was lateral, the insertion eccentric. The primary respirations were delayed for five minutes.

CASE 15. Mrs. H. Para II. Age 28. Disp. No. 1810. The last child died at birth from unknown

causes. Labor began November 14, 1898. Pelvic measurements: IS, 27 cm.; IC, 29 cm.; BiTro., 30.5 cm.; Ext. Conj., 19 cm.; Circum., 85 cm. The fetal heart tones numbered 120. The fore-lying cord was felt running across the cervix which admitted two fingers. The patient was placed in the Trendelenburg position for two hours. At this time, the head was freely movable. After two hours, the cord had disappeared. The membranes were then ruptured and version performed. There was considerable hemorrhage during the operation. The liquor amnii was stained with meconium. A posterior-parietal-bone presentation was detected. A rapid extraction was made because of the slowing of the fetal heart. Subsequent examination showed an incomplete rupture of the uterus on the left side, one and a half inches in length, going into the left broad ligament. Both mother and child recovered, though it required fifteen minutes to revive the child. The baby was a boy, weight seven pounds, length 48 cm. The cord was 53 cm. long, and the insertion was lateral. In this case, the Trendelenburg position alone was responsible for removing from the child the danger of a prolapsed cord.

CASE 16. Mrs. B. Para iv. Age 32. Disp. No. 1879. Labor came on December 26, 1898. *Diagnosis:* Occipito-dextra-anterior. The pelvic measurements were not taken but were probably normal. The membranes ruptured spontaneously when the cervix admitted three fingers. The liquor amnii was clear. There was a prolapse of the cord and the left arm. The pulsation in the cord was slight. Dr. De Lee adjusted the cord on both sides of the arm, so that pressure would fall on the arm itself. After this adjustment, the pulse became stronger. The uterine wall was firmly contracted around the child's body. The patient was placed in bed to await a normal delivery, unless the heart tones would indicate a rapid delivery. Later, the pulsation became weak and rapid, and the forceps terminated the second stage. The cord was around the neck twice. The babe was alive, a male, weighed seven and a half pounds and measured 50 cm. in length. The cord was 66 cm. long; the insertion eccentric; and the opening of the membranes lateral. Labor lasted eighteen hours and a half.

CASE 17. Mrs. P. Para x. Age 38. Disp. No. 1916. Former labors were long and painful. Labor began January 14, 1899. *Diagnosis:* Occipito-dextra-anterior. The pains were weak and irregular in the first stage. Pelvic measurements: IS, 27.5 cm.; IC, 29 cm.; BiTro., 31 cm.; Ext. Conj., 19 cm.; Circum., 95 cm. The fetal heart tones were 138 and regular. When the cervix admitted four fingers, the cord was felt in the intact bag of waters. The pains were severe, every three to five minutes, at the close of the first stage. The patient was placed in the Trendelenburg position. The membranes ruptured spontaneously soon after, and the liquor amnii was stained with meconium. External version was first attempted but in vain, and a podalic version and extraction delivered a slightly asphyxiated baby. The child was a male, weighed eight and a half pounds, and measured 51 cm. The cord was 72 cm. long; the opening was median; and

the insertion was central. The duration of labor was eleven hours and forty minutes.

CASE 18. Mrs. B. Para vi. Age 34. Disp. No. 2051. Former labors easy. *Diagnosis:* Scapula-læva-anterior. Prolapse of the cord, hand and foot, complicated by placenta prævia lateralis. Pelvic measurements: IS, 27 cm.; IC, 31 cm.; BiTro., 34 cm.; Ext. Conj., 20 cm.; Circum., 96 cm. Spontaneous rupture of the membranes occurred. The heart tones in the first stage were 165, and regular. The patient was delivered by a version and a slow extraction. The placenta was delivered at once. The babe was dead, a female, weighed eight pounds, and was 50 cm. long. The cord was 58 cm. in length, the opening in the membranes was marginal; the insertion was eccentric.

CASE 19. Mrs. B. Para iv. Age 24. Disp. No. 2103. The first labor was operative, occiput-posterior; baby dead. The other two labors were normal. Labor began April 23, 1899. *Diagnosis:* Scapula-dextra-anterior. The pelvic measurements: IS, 24.5 cm.; IC, 28 cm.; BiTro., 32.5 cm.; Ext. Conj., 20 cm.; Circum., 92 cm. The fetal heart numbered 136 beats a minute, and was heard on the left of the navel. A fore-lying cord was felt in the cervix which admitted five fingers. The pains were strong. When the heart tones became feeble, the patient was placed on the table, and a version was performed by the intern. The version was easy and as the pulsation in the cord became very feeble, the extraction was hurried. The child was moderately asphyxiated and was revived by hot water and the catheter. The boy lived, weighed nine pounds, and was only 42 cm. long. The cord was 85 cm. in length; the insertion was eccentric; and the opening in the membranes was lateral. Labor lasted two hours and fifteen minutes.

CASE 20. Mrs. A. Para. III. Age 25. Disp. No. 2397. Labor occurred October 22, 1899. The Dispensary physicians arrived during the second stage of labor. On examination, the cord was found prolapsed, and a loop eight inches in length lay outside the vulva. There was no pulsation. *Diagnosis:* Occipito-læva-anterior. The head was engaged in the pelvis and was fixed. No fetal heart tones could be heard. The membranes had ruptured spontaneously, three and a half hours previous to the arrival of the internes. The liquor amnii was stained with meconium. Normal labor was allowed to proceed and a dead baby was born an hour later. The child was a male, weighed eight and a half pounds, and measured 58 cm. The cord was 86 cm. in length, and was inserted eccentrically into the placenta; the opening in the membranes was lateral.

CASE 21. Mrs. G. Para vi. Age 31. Disp. No. 2647. The previous labors were normal. Labor occurred March 29, 1900. *Diagnosis:* Scapula-dextra-posterior. The heart tones were 150 and regular. The elbow presented at the cervix. The abdomen was pendulous, the external diagnosis was difficult, and the position was determined with difficulty. Before the membranes ruptured, the fetal heart was heard on the right side, afterwards on the left. A profuse amount

of liquor amnii escaped when the membranes were ruptured artificially. The child was freely movable. The cord prolapsed about eight inches. A version was attempted, but the pulsation ceased immediately and the child died. The Karl Braun blunt hook was used, but bent in the operation, and the delivery was effected by evisceration. There was no history of the pelvis. Hydramnion and a pendulous abdomen were the probable causes in this case.

CASE 22. Mrs. P. Para VII. Age 30. Disp. No. 2908. Four previous labors were normal, two children died at birth. *Diagnosis:* Occipito-dextra-anterior. Labor occurred August 24, 1900. The fetal heart tones were 100 and irregular. In the second stage, an anterior-parietal-bone presentation was found. The membranes ruptured spontaneously, and the liquor amnii was stained with fresh meconium. The cord prolapsed, but was not pulsating. Forceps were applied and a difficult extraction made. On account of the great girth of the shoulders, a double cleidotomy was performed and the delivery effected. The cord was around the neck once. The fetus was a male, weighed ten pounds, and measured 57 cm. in length. The cord was 74 cm. long with central insertion; the opening was lateral. Duration of labor was eleven hours and thirty minutes. Though no measurements were given in this case, the prolapse was probably due to the contracted pelvis and the length of the cord.

CASE 23. Mrs. C. Para VII. Age 35. Disp. No. 2969. Former labors normal. Labor September 19, 1900. *Diagnosis:* Occipito-dextra-anterior. The fetal heart tones were 136 and regular. Pelvic measurements: IS, 23 cm.; IC, 25 cm.; BiTro., 30 cm.; Ext. Conj., 19 cm.; Circum., 80 cm. The pelvis was generally contracted. Hydramnion was present. The fore-lying cord was palpated in the first stage. The patient was placed in the knee-chest position, for half an hour, but without any effect on the cord. At this time the membranes ruptured spontaneously. The cord was now pushed back above the head, with the hand passed internally, and the head was then forced into the inlet externally, and kept there until it became engaged. This is excellent treatment in generally contracted pelvis, provided the reposition can be effected. Later, the forceps were applied and a living, male child was extracted. The babe weighed eight and a half pounds, was 49 cm. long and was mature. The cord was twice around the neck. The cord was "quite long" and was inserted laterally into the placenta, the opening in the membranes was lateral. Labor lasted thirteen hours and fifty-five minutes.

CASE 24. Mrs. B. Disp. No. 3188. Labor occurred June 16, 1901. Mrs. B. had employed a midwife to attend her in confinement. Upon examination, a face presentation was discovered, and the intern was called. He attempted to do a version, but found a loop of the cord prolapsed and pulseless, and the baby dead. Later, a craniotomy was performed and the labor terminated. No further details of the case were recorded.

CASE 25. Mrs. T. Para VIII. Age 27. Disp. No. 3491. The former labors were normal and easy. There were four abortions, from seven weeks to four months. Labor began July 23, 1901. *Diagnosis:* Sacro-dextra-anterior. In the first stage, the breech was high and movable. The fetal heart tones were 160, and regular, and were heard to the right of and below the navel. The pelvic measurements were: IS, 26 cm.; IC, 30 cm.; BiTro., 31 cm.; Ext. Conj., 21 cm.; Circum., 98 cm. In the second stage, the heart tones were 180, irregular, and were heard above the navel. The uterine contractions were weak. The membranes ruptured spontaneously. Meconium was present. The cord had prolapsed to the vulva and was nearly pulseless. Extraction resulted in the delivery of a dead, male infant, eight pounds in weight and 54 cm. long. The cervix was torn to the vaginal fornix, and a severe hemorrhage necessitated a uterovaginal tamponade. The cord measured 60 cm., and was inserted eccentrically into the placenta. The labor lasted fifteen hours and ten minutes.

CASE 26. Mrs. G. Para IV. Age 28. Disp. No. 3611. Her first labor was instrumental, the second difficult, and the third was precipitate. Labor occurred September 29, 1901. Pelvic measurements: IS, 25 cm.; IC, 26 cm.; BiTro., 30 cm.; Ext. Conj., 20 cm.; Circum., 88 cm. No diagnosis was recorded. The intern arrived during the second stage when the cord was found to be prolapsed, and lying externally to the mother. The patient was placed in the Trendelenburg position, but as she was very nervous it was difficult for her to maintain the position for any length of time. An attempt was made to replace the cord and, during the procedure, a spontaneous delivery resulted. The baby, a male, was born dead. He weighed six pounds and measured 48 cm. in length. The cord was 91 cm. long, and was centrally inserted; the opening in the membranes was central. Labor lasted eleven hours and fifteen minutes. A moderate postpartum hemorrhage responded to a hot intra-uterine douche.

CASE 27. Mrs. G. Para IV. Age 28. Disp. No. 3792. The former labors were normal. *Diagnosis:* Occipito-dextra-anterior. Labor occurred November 30, 1901. The presenting part was movable. The fetal heart tones were 130 and regular. The uterine contractions were severe. While making an examination in the second stage of labor, an accidental rupture of the membranes occurred. There was a gush of liquor amnii and a long loop of the cord prolapsed. The patient was immediately placed in the Trendelenburg position, and several attempts made to replace the cord. During these manipulations the hand also prolapsed but this member was replaced by the intern. The case was terminated by a difficult version and extraction. Both arms were in the nape of the neck. The right clavicle was fractured during the extraction. The child could not be revived. The cord was 84 cm. long; insertion was central. Labor lasted thirteen hours and thirty minutes. The baby, a male, weighed ten pounds.

CASE 28. Mrs. M. Para III. Age 30. Disp. No. 3922. The former labors were easy and normal.

Diagnosis: Occipito-læva-anterior. Labor occurred March 28, 1902. Pelvic measurements: IS, 24 cm.; IC, 25 cm.; BiTro., 30 cm.; Ext. Conj., 19 cm. The membranes ruptured in the first stage of labor, and the cord found prolapsed. Higher up in the pelvis, the right foot was also felt. The fetal heart tones were scarcely audible. The head was not engaged. In the second stage, the fetal heart tones were heard in the left, lower quadrant, numbered 140 and were regular. The uterine contractions were severe. A podalic version and extraction was made. The baby, a female, weighing five and a quarter pounds was asphyxiated but lived. She measured 48 cm. in length. The cord was 55 cm. long; insertion eccentric; opening of membranes lateral. As the leg prolapsed later in the labor, it acted as a protector to the cord, and in a measure relieved the pressure.

CASE 29. Mrs. U. Para VIII. Age 36. Disp. No. 4040. Previous labors normal. There were two miscarriages; one at three, and the other at four months. *Diagnosis:* Occipito-læva-anterior. Labor occurred June 16, 1902. The interns arrived during the second stage. The cord had prolapsed to the vulva. No pulsation. Baby dead. Delivery was spontaneous. The child weighed ten pounds, measured 57 cm. and was a girl. The cord was 140 cm. long, the longest in the series; the insertion was central; opening of membranes lateral. Labor lasted ten hours and forty-five minutes.

CASE 30. Mrs. C. Para III. Age 26. Disp. No. 4243. *Diagnosis:* Occipito-dextra-anterior. Pelvic measurements: IS, 26 cm.; IC, 29 cm.; BiTro., 32 cm.; Ext. Conj., 19 cm.; Circum., 90 cm. In the first stage, the fetal heart was heard in the right, lower quadrant, regular and 142 beats per minute. After the cervix was completely dilated, the membranes ruptured spontaneously, and the cord prolapsed. The liquor amnii was clear. The cord was pulsating, 142 times a minute. The patient was placed in the Trendelenburg position and the head, which was movable, was held out of the inlet by the internal finger. The pains were weak throughout the labor. After the cervix had been dilated for fourteen hours, the membranes ruptured for seven, the staff operator arrived, found the cord pulseless and the baby dead. A craniotomy was performed. The child was a female, weighed nine and a quarter pounds, and was 51 cm. long. The treatment in this case was delayed. The child could have been saved by an earlier operation. Another case of being too late.

CASE 31. Mrs. G. Para XI. Age 32. Disp. No. 4353. The previous labors were normal. Two miscarriages occurred, at three and four months respectively. *Diagnosis:* Occipito-dextra-anterior. Labor took place December 6, 1902. Pelvic measurements: IS, 28 cm.; IC 30 cm.; BiTro., 35 cm.; Ext. Conj., 22 cm. The patient was very obese, and the heart tones could not be heard during the labor. The uterine contractions were severe. The membranes were ruptured artificially, soon after the cervix was dilated, and the pulsating cord prolapsed with the liquor amnii. Considerable fresh meconium was

present. While awaiting the arrival of the staff operator, the baby was born spontaneously. The child, a female, was born dead. She weighed ten and a half pounds and measured 55 cm. in length. The cord was 50 cm. long; insertion central; opening of membranes lateral. Labor lasted thirty-one hours. This child might have been saved by an earlier operation.

CASE 32. Mrs. A. Para III. Age 30. Disp. No. 4434. The previous labors were normal. Labor occurred February 13, 1903. *Diagnosis:* Occipito-læva-anterior. The intern arrived during the second stage. At this time the cord was found lying in the vagina and pulsating from 120 to 160 times a minute. The head was movable and not engaged. The membranes had ruptured spontaneously. The patient was placed in the Trendelenburg position and the cord replaced by the hand. Spontaneous delivery occurred thirty minutes later. The baby was a male, weighed six and three quarter pounds and measured 46 cm. The labor was premature. The cord was 68 cm. long; insertion central; opening of membranes lateral. Labor lasted six hours and forty minutes. No pelvic measurements were recorded. The small baby, and the large pelvis, would account for the favorable outcome in this case.

CASE 33. Mrs. W. Para III. Age 32. Disp. No. 4501. The previous labors were both operative. *Diagnosis:* Occipito-læva-transversa, Naegale's obliquity. Labor occurred February 21, 1903. Pelvic measurements: IS, 24 cm.; IC, 29 cm.; BiTro., 31 cm.; Ext. Conj., 19 cm. This pelvis was of the simple, flat variety. The mother and child were in good condition in the first stage, the fetal heart tones were 120 and regular. After the cervix was dilated, the staff operator found the cord prolapsed and pulsating 140 times a minute. The liquor amnii was clear. A version was performed, but it was impossible to extract the after-coming head through the pelvic inlet, and craniotomy followed. A severe postpartum hemorrhage was treated by tamponading the entire birth canal. The baby was a girl, weighed nine and a quarter pounds, and was 52 cm. long. The cord was 50 cm. long; insertion central; opening in membranes lateral. Labor lasted twenty-nine hours and forty minutes. The death of this child was due to the difficult extraction through the deformed pelvis.

CASE 34. Mrs. C. Para II. Age 23. Disp. No. 4535. Previous labors were normal. *Diagnosis:* Occipito-læva-anterior. Date of labor, March 10, 1903. An internal examination, during the first stage, showed the cord prolapsed on the right side of the head, which was high and movable. The sagittal suture lay transversely. The heart tones were 128 and regular. The woman was placed on the left side for three hours, and then in the knee-chest and Trendelenburg postures, but there was no improvement, the cord being prolapsed as far as ever. A podalic version was then performed, but the extraction was difficult on account of the flat inlet. The right clavicle was fractured. The baby, a girl, was mildly asphyxiated. She weighed eight pounds, and was 48 cm. in length. The cord was 61 cm. long. Central insertion. Run-

ture of membranes lateral. Labor lasted twelve hours and five minutes.

CASE 35. Mrs. R. Para III. Age 27. Disp. No. 4538. The first labor was hard and tedious, the second was easy. No miscarriages. *Diagnosis:* Scapula-dextra-anterior. Date of labor, March 12, 1903. Pelvic measurements: IS, 26.5 cm.; IC, 28 cm.; BiTro., 33 cm.; Ext. Conj., 20 cm. The membranes ruptured spontaneously in the first stage, and the cord and an arm prolapsed into the vagina. Meconium had been passing all the afternoon. Pulsation in the cord was feeble but later was absent. Podalic version was comparatively easy. The baby, a girl, was born dead. Weight, six pounds. Length, 51 cm. The cord was 51 cm. long. Insertion lateral. Opening of the membranes lateral. Duration of labor eighteen hours. Operative treatment was delayed too long to be of any use.

CASE 36. Mrs. R. Para VII. Age 33. Disp. No. 4623. One miscarriage occurred at six months. *Diagnosis:* Occipito-læva-anterior. Date of labor, May 5, 1903. The presenting part was not engaged in the first stage. The fetal heart tones were regular and 126 beats per minute. Uterine contractions weak. In the second stage, the head was movable at the time of the artificial rupture of the membranes. The cord came down to the vulva, and immediately the pulsation was only 60 and irregular. A version was performed and the baby saved. The little girl weighed eight pounds and was 50 cm. long. The cord measured 95 cm.; insertion eccentric; opening of membranes lateral. On account of a postpartum hemorrhage, the utero-vaginal tract was tamponed. This case clearly shows the protective influence of the liquor amnii. Labor lasted fifteen hours and forty minutes.

CASE 37. Mrs. A. Para V. Age 35. Disp. No. 4691. Previous labors were normal. *Diagnosis:* Occipito-dextra-posterior. Date of labor, June 29, 1903. The intern was called during the second stage. The first examination showed the cervix effaced and the os dilated. The intact membranes lay at the vulva. The head rested at the inlet. When the membranes had ruptured, the cord and a hand prolapsed. During this time the fetal pulse was regular and 120 beats per minute. The patient was placed in the Trendelenburg position, and upon the arrival of the staff operator, a podalic version and extraction was done at once. The little girl lived, weighed nine pounds and measured 48 cm. The cord was 66 cm. long; insertion central; opening of the membranes lateral. No pelvic measurements were recorded. The high arrest of the head would indicate a deformed pelvis.

CASE 38. Mrs. D. Para II. Age 21. Disp. No. 4932. Date of labor, October 30, 1903. *Diagnosis:* Occipito-dextra-posterior. Pelvic measurements: IS, 24 cm.; IC, 27 cm.; BiTro., 29 cm.; Ext. Conj., 17.5 cm. In the first internal examination, prolapse was discovered. The cord pulsated freely, and the presenting part was movable. The fetal heart tones were regular and 120 beats per minute. In this instance, the patient was placed in the knee-chest position, and held there for an hour. Before the second examination

was made, the cord had disappeared and was no longer palpable. The delivery was spontaneous and the child was born alive. This pelvis was generally contracted, and when the head had entered the pelvis ahead of the cord, a repeated prolapse was improbable. The child was a male. Weight six and a quarter pounds. Length 47 cm. The cord was 42 cm. long; insertion central; opening of membranes lateral. The length of the labor was ten hours and forty minutes.

CASE 39. Mrs. L. Para VI. Age 33. Disp. No. 5299. One former labor was a transverse presentation, the others were normal. *Diagnosis:* Occipito-læva-anterior. Date of labor, May 8, 1904. Pelvic measurements: IS, 25 cm.; IC, 28 cm.; BiTro., 30 cm.; Ext. Conj., 20 cm. The membranes ruptured spontaneously, after three hours of pains. Os dilated to admit three fingers. Fresh meconium in the liquor amnii. Prolapse of the cord and the right arm. The fetal pulse in the first stage was 160 and regular. Later in this stage, the heart tones increased in rapidity and became irregular. The uterine contractions were severe. One hour and forty-five minutes after the cervix was dilated, a podalic version was performed. A dead baby was delivered. It was a girl, weighed five pounds. Length 47 cm. The cord measured 76 cm.

CASE 40. Mrs. K. Para VIII. Age 38. Disp. No. 5506. Date of labor, August 14, 1904. *Diagnosis:* Scapula-læva-anterior. Pelvic measurements: IS, 27 cm.; IC, 30 cm.; BiTro., 31 cm.; Ext. Conj., 22 cm. The membranes had ruptured spontaneously in the first stage. The liquor amnii was clear. The fetal heart tones at first were 120, but later became very feeble and rapid. The cord had prolapsed outside of the vulva and pulsation was barely palpable. When I arrived, the os had dilated, and a version was done immediately, but the baby died during the extraction. The operation did not last over five minutes. The little girl weighed seven pounds, and was 50 cm. long. The condition of the child at the time of delivery offered only a desperate chance of saving its life.

CASE 41. Mrs. F. Para V. Age 31. Disp. No. 5625. Previous labors normal. Labor occurred October 6, 1904. *Diagnosis:* Occipito-læva-posterior. The fetal heart was not heard. Presenting part movable and not engaged. On internal examination in the second stage, the cord was found prolapsed about six inches from the cervix. The pulsation was weak. The membranes had ruptured spontaneously in the first stage, and the liquor amnii was stained with fresh meconium. The intern attempted to replace the cord with the hand, but being unsuccessful, he immediately performed a version. The baby, a boy, was delivered dead. The cord was 110 cm. long; insertion central; opening of the membranes central. This version was done by the intern without calling a member of the staff, which is against the rules of the Dispensary, but the condition of the child was critical at the time of the operation.

CASE 42. Mrs. F. Para IX. Age 35. Disp. No. 5820. No record as to former labors. Labor occurred December 27, 1905. *Diagnosis:* Scapula-læva-anterior. Pelvic measurements: IS, 26 cm.; IC, 31 cm.; BiTro.,

35 cm.; Ext. Conj., 22 cm. The membranes ruptured spontaneously in the first stage, and the liquor amnii was clear. The elbow prolapsed soon after and four hours later, the cord came down. When I arrived, the heart tones of the fetus were heard but faintly, and the cord was pulsating feebly. The uterine contractions were severe. The os being dilated, I performed a version. There was considerable difficulty in extracting the child, but a living baby was finally delivered. The babe was a girl, weighed ten and a half pounds, and was 51 cm. long. The cord was 87 cm. in length; eccentric insertion; opening of the membranes lateral. This was a favorable case, as the large pelvis, the presentation, and prolapse of the arm aided in preventing compression of the cord until the time of version. The fetus was only moderately asphyxiated.

CASE 43. Mrs. P. Para I. Age 28. Disp. No. 6583. Labor occurred October 21, 1905. *Diagnosis:* Occipito-dextra-anterior. Pelvic measurements: IS, 24 cm.; IC, 26 cm.; BiTro., 30.5 cm.; Ext. Conj., 18.5 cm. In the first stage, the pains were weak, and from five to eight minutes apart. The fetal heart tones were regular, and 130 beats a minute. The membranes ruptured spontaneously with the escape of clear liquor amnii. The presenting part was not engaged. The cord prolapsed five inches from the cervix. Later in this stage, the fetal heart tones became irregular, and varied from 85 to 140. Three hours after the escape of the liquor amnii, manual dilatation of the cervix was followed by version, but the baby was delivered still-born. The cord was 48 cm. long; insertion marginal; opening of membranes lateral. Here the fetus began to suffer as soon as the liquor amnii escaped. The pelvis was slightly justo-minor in character.

CASE 44. Mrs. C. Para I. Age 23. Disp. No. 6606. Labor occurred October 29, 1905. *Diagnosis:* Occipito-dextra-anterior. Pelvic measurements: IS, 26 cm.; IC, 27 cm.; BiTro., 30 cm.; Ext. Conj., 19.5 cm. The presenting part was high and movable. Progress was slow. After the cervix was dilated, the pains became stronger and the membranes ruptured spontaneously, with fresh meconium in the liquor amnii. The cord was prolapsed four inches below the cervix. The fetal heart tones were now 90, and irregular. The patient was placed in the Trendelenburg position and the head held back by the hand. I arrived soon after and found the head movable, and lying in the transverse diameter of the inlet, which was flat and rachitic. As the cord was pulsating feebly, version was attempted, but the contraction ring was so firm that turning was dangerous if not impossible. The baby was delivered by the axis-traction forceps, but was dead. The cord was 76 cm. long; insertion central; opening in the membranes lateral. The delivery was postponed too late in this case. A high forcep operation in a rachitic pelvis offers little chance for a living child, still, as the cord was pulsating, it was thought best to give the child the benefit of the doubt.

CASE 45. Mrs. K. Para III. Age 24. Disp. No. 6896. This patient has had two miscarriages. Labor occurred February 3, 1906. *Diagnosis:* Occipito-dextra-anterior. Pelvic measurements: IS, 26

cm.; IC, 27 cm.; BiTro., 31 cm.; Ext. Conj., 20 cm. In the first stage of labor, the pains were strong, occurring every ten minutes. The fetal heart tones were 146 and regular. The membranes ruptured spontaneously, and the cord was found prolapsed six inches below the cervix. The patient was placed in the Trendelenburg position, and an effort made to replace the cord, but without avail. Upon my arrival, I found the head movable in a mild, rachitic inlet. The partially dilated cervix was dilated by the Edgar-Bonnaire method, and an easy podalic version performed. The extraction was somewhat difficult, but a living baby was delivered. He weighed eight pounds and measured 50 cm. The cord was 59 cm. long and the insertion was central. The Trendelenburg position, and the forcing back of the head manually, were responsible for preserving the child until a version and extraction could be accomplished.

CASE 46. Mrs. G. Para II. Age 27. Disp. No. 7433. Previous labors were normal. *Diagnosis:* Sacro-dextra-anterior. Labor occurred August 29, 1906. Pelvic measurements: IS, 25 cm.; IC, 29 cm.; BiTro., 32 cm.; Ext. Conj., 20 cm. The fetal heart tones were not heard in the first stage, which lasted thirty-three hours. The membranes had ruptured before the arrival of the attendants, and a pulseless cord prolapsed externally. The liquor amnii was stained with meconium. The mother was getting exhausted in the second stage, and I extracted the breech, doing a craniotomy on the after-coming head. The cord was 40 cm. long; insertion marginal; opening of the membranes nearly marginal. This baby was doubtless killed by pressure, before the membranes ruptured, as no heart tones could be heard for several hours previous to the escape of the waters. The placenta was implanted in the lower uterine segment.

CASE 47. Mrs. B. Para VI. Age 26. Disp. No. 7473. Previous labors normal. Time of labor, August 13, 1906. *Diagnosis:* Occipito-leva-anterior. Pelvic measurements: IS, 22 cm.; IC, 24 cm.; BiTro., 28 cm.; Ext. Conj., 17 cm.; Circum., 82 cm. The interne was called in the second stage. The uterine contractions were severe, but the fetal heart was inaudible. The membranes had ruptured spontaneously and fresh meconium had been coming away for hours. The cord had prolapsed in front of the head and was pulseless. A spontaneous delivery was indicated and a dead, male infant, was soon born. He weighed eight and a third pounds, and was 52 cm. long. The cord was 60 cm. long; insertion eccentric. Labor lasted eleven hours and forty minutes. This was a flat, justo-minor pelvis, and the head required considerable moulding to pass through the birth canal.

CASE 48. Mrs. G. Para VI. Age 30. Disp. No. 7596. Previous labors normal. Time of labor September 18, 1906. *Diagnosis:* Occipito-leva-posterior. During the first stage, the fetal heart was 160 and regular. The membranes ruptured spontaneously and fresh meconium was present. The cord prolapsed when the cervix admitted three fingers. The patient was chloroformed to the surgical degree, the cervix dilated manually and a version performed. The

CASE.	AGE.	PARA.	HISTORY OF FORMER LABORS.	CONDITION OF CHILD IN FIRST STAGE OF LABOR.	CONDITION OF CHILD IN SECOND STAGE OF LABOR.	PRE-MATURE RUPTURE OF THE MEMBRANES.	CONDITION OF THE LIQUOR AMNII.	DIAGNOSIS.	CONDITION OF CHILD AT BIRTH.	SEX.
I	29	I	.....	.....	Poor.	No.	Meconium.	O. L. A.	Alive.	M.
II	33	V	Last instrumental.	Normal.	Poor.	Yes.	.....	O. D. P.	Dead.	M.
III	27	III	Two prolepses.	Normal.	Normal.	No.	Clear.	O. L. A.	Alive.	F.
IV	35	X	.....	.....	Poor.	No.	.....	.....	Alive.	F.
V	31	V	.....	Normal.	Poor.	No.	Meconium.	O. L. A.	Alive.	F.
VI	20	I	.....	.....	Poor.	.....	.....	Breech.	Dead.	F.
VII	26	III	.....	Normal.	Normal.	No.	.....	O. L. A.	Alive.	F.
VIII	38	VIII	.....	Normal.	Poor.	.....	Clear.	M. L. A.	Alive.	M.
IX	27	III	First Labor — Forceps.	.....	Fair.	Yes.	Clear.	O. D. A.	Alive.	M.
X	40	XI	First child dead.	Normal.	Bad.	Yes.	.....	O. D. P.	Dead.	F.
XI	35	VIII	Normal.	Dead.	Dead.	No.	Meconium.	O. L. A.	Dead.	M.
XII	32	V	1 Prolapse. 2 Version.	Normal.	Poor.	No.	Clear.	O. L. A.	Died in 2 days.	M.
XIII	43	XII	Normal.	Normal.	Bad.	Yes.	Clear.	O. D. A.	Alive.	F.
XIV	30	VI	Hard, tedious.	Poor.	Poor.	No.	Meconium.	Sc. L. A.	Alive.	F.
XV	28	II	Last child dead.	Normal.	Poor.	No.	Meconium.	Post-parietal.	Alive.	M.
XVI	32	IV	.....	Fair.	Poor.	Yes.	Clear.	O. D. A.	Alive.	M.
XVII	38	X	Long, painful.	Normal.	Fair.	Yes.	Meconium.	O. D. A.	Alive.	F.
XVIII	34	VI	Easy.	Weak.	Poor.	No.	.....	Sc. L. A.	Dead.	M.
XIX	24	IV	First operative.	Normal.	Poor.	No.	.....	Sc. D. A.	Alive.	M.
XX	25	III	.....	.....	Dead.	.....	Meconium.	D. L. A.	Dead.	M.
XXI	31	VI	Normal.	Normal.	Poor.	No.	.....	Sc. D. P.	Dead.	M.
XXII	30	VII	Two still-births.	Poor.	Bad.	No.	Meconium.	O. D. A.	Dead.	M.
XXIII	35	VII	Normal.	Normal.	Fair.	.....	.....	O. D. A.	Alive.	M.
XXIV	.....	I	.....	.....	.....	.....	Face.	Dead.	Dead.	M.
XXV	27	VIII	Normal.	Normal.	Bad.	No.	Meconium.	S. L. A.	Dead.	M.
XXVI	28	IV	First instrumental.	.....	Bad.	.....	.....	Head.	Dead.	M.
XXVII	28	IV	Normal.	Normal.	.....	No.	.....	O. D. A.	Dead.	M.
XXVIII	30	III	Normal.	Normal.	Better.	Yes.	.....	O. L. A.	Alive.	F.
XXIX	26	VIII	Normal.	Normal.	Dead.	.....	Clear.	O. L. A.	Dead.	F.
XXX	36	III	.....	Normal.	Dead.	No.	Clear.	O. D. A.	Dead.	F.
XXXI	32	XI	Normal.	Dead.	Dead.	No.	Meconium.	O. D. A.	Dead.	F.
XXXII	30	III	Normal.	Normal.	Dead.	No.	Clear.	O. L. A.	Alive.	M.
XXXIII	33	III	Both operative.	Normal.	Normal.	No.	Clear.	O. L. T.	Dead.	F.
XXXIV	29	II	Normal.	Normal.	Normal.	.....	.....	O. L. A.	Alive.	F.
XXXV	27	III	Normal.	Normal.	Bad.	Yes.	Meconium.	Sc. D. A.	Dead.	F.
XXXVI	33	VII	Normal.	Normal.	Bad.	No.	Clear.	O. L. A.	Alive.	F.
XXXVII	35	V	Normal.	.....	Normal.	No.	.....	O. D. P.	Alive.	F.
XXXVIII	21	II	.....	.....	Normal.	No.	.....	O. D. P.	Alive.	M.
XXXIX	33	VI	One cross-birth.	Normal.	Bad.	Yes.	Meconium.	O. L. A.	Dead.	F.
XL	38	VIII	.....	Normal.	Bad.	Yes.	Clear.	Sc. L. A.	Dead.	F.
XLI	31	V	Normal.	.....	Weak.	No.	Meconium.	O. L. P.	Dead.	M.
XLII	38	IX	.....	.....	Bad.	.....	Clear.	Sc. L. A.	Alive.	F.
XLIII	28	I	.....	Normal.	Bad.	Yes.	Clear.	O. D. A.	Dead.	F.
XLIV	23	I	.....	Bad.	Bad.	No.	Meconium.	O. D. A.	Dead.	F.
XLV	24	III	Normal.	Normal.	.....	Yes.	.....	O. D. A.	Alive.	M.
XLVI	27	II	Normal.	Dead.	Dead.	.....	Meconium.	S. D. A.	Dead.	M.
XLVII	26	VI	Normal.	Normal.	.....	Yes.	Meconium.	O. L. A.	Dead.	M.
XLVIII	30	VI	Normal.	Normal.	Normal.	Yes.	Clear.	O. L. P.	Alive.	F.
XLIX	28	II	Cross-birth.	Normal.	Normal.	Yes.	Clear.	O. L. A.	Alive.	F.
L	26	IV	Normal.	Normal.	Normal.	Yes.	Clear.	O. D. P.	Alive.	F.
LI	30	III	Normal.	Poor.	Poor.	Yes.	Meconium.	O. D. A.	Alive.	F.
LII	27	III	.....	Normal.	Normal.	No.	Clear.	Sc. D. P.	Alive.	F.
LIII	27	IV	One cross-birth.	Normal.	Normal.	No.	.....	O. L. A.	Alive.	F.

mother was allowed to come out partially from the anesthetic and then extraction was done. The baby girl was alive, weighed seven pounds, and was 46 cm. long. The cord was 95 cm. long; insertion central; opening of the membranes central. The early interference in this case, at the first sign of danger, was justified by the result obtained.

The three following cases were treated by the method of injecting normal salt-solution

into the uterine cavity to take the place of the lost liquor amnii.

CASE 49. Mrs. A. Para II. Age 28. Her former labor was a transverse presentation. Pelvic measurements: IS, 26 cm.; IC, 28 cm.; BiTro., 30 cm.; Ext. Conj., 18 cm.; Circum., 90 cm.; CV, 10.5 cm.; CD, 12 cm.; BiSch., 11 cm. Labor occurred June 1, 1906. During the first stage, the fore-lying cord was palpated in front of the head. The head was movable above the inlet

CASES OF PROLAPSUS FUNIS.

WEIGHT POUNDS.	MATURE.	LENGTH	LENGTH OF CORD.	INSERTION.	OPENING OF MEMBRANES	PELVIC DEFORMITY.	COMPLICATIONS.	TREATMENT.
6.5	Yes.	..	58	Eccentric.	Lateral.	.....	.....	Forceps.
8.3	Yes.	50	60	Central.	.....	Flat.	.....	Reposition. Version.
8	Yes.	52	60	Eccentric.	Lateral.	Normal.	Hydramnion.	Version.
8	Yes.	..	50	.....	.....	Justo-minor.	.....	Version.
7	No.	47	72	Marginal.	.....	Flat.	.....	Normal labor.
7.75	Yes.	52	70	Marginal.	Lateral.	.....	Prolapse foot.	Tren. position. Extraction.
7.5	Yes.	50	52	.....	Lateral.	Normal.	.....	Version.
6	Yes.	54	51	Lateral.	Lateral.	Normal.	.....	Normal labor.
0.25	Yes.	..	112	.....	Lateral.	.....	Hydramnion.	Forceps.
7	Yes.	54	79	Eccentric.	Lateral.	Normal.	.....	Braxton-Hick's Version.
8	Yes.	52	72	Eccentric.	Lateral.	Justo-minor.	.....	Normal labor.
0	Yes.	50	48	Eccentric.	Lateral.	Normal.	.....	Tren. position. Version.
0	No.	48	53	.....	Marginal.	Justo-minor.	Placenta prævia.	Normal labor.
0	No.	48	40	Eccentric.	Lateral.	.....	Prolapse of hand.	Version.
7	No.	48	53	Lateral.	.....	Flat.	Post. Par. Bone Pres.	Tren. position. Version.
7.5	Yes.	51	66	Eccentric.	Lateral.	Normal.	Prolapse arm.	Forceps.
8.5	Yes.	50	72	Central.	.....	Normal.	.....	Tren. position. Version.
8	Yes.	50	58	Eccentric.	Marginal.	Normal.	Placenta prævia.	Version.
9	No.	42	85	Eccentric.	Lateral.	Flat.	Cross-birth.	Version.
8.5	Yes.	58	86	Central.	Lateral.	.....	.....	Normal labor.
Large	Yes.	..	..	.....	.....	Normal.	Hydramnion.	Embryotomy.
10	Yes.	57	74	.....	.....	Flat.	Ant. par. bone pres.	Embryotomy.
8.5	Yes.	49	Long	Lateral.	Lateral.	Justo-minor.	Hydramnion.	Knee-chest. Reposition. Forceps.
..	.....	..	..	.....	.....	.....	Face pres.	Craniotomy.
8	Yes.	54	60	Eccentric.	.....	Normal.	Breech.	Extraction.
6	No.	48	61	Central.	.....	Normal.	.....	Tren. position. Normal labor.
10	Yes.	50	84	Central.	.....	Normal.	Hydramnion.	Tren. position. Version.
5.25	No.	48	55	Eccentric.	.....	Normal.	Prolapse foot.	Version.
10	Yes.	57	140	Central.	Lateral.	.....	.....	Normal labor.
9.25	Yes.	51	68	Eccentric.	Central.	Normal.	.....	Craniotomy.
10.5	Yes.	55	50	Central.	Central.	Justo-major.	.....	Normal labor.
6.75	No.	46	68	Central.	Lateral.	Justo-major.	.....	Knee-chest position. Reposition.
9.75	Yes.	52	50	Central.	Central.	Flat.	Pelvic deformity.	Version. Craniotomy.
8	Yes.	48	61	Central.	Lateral.	Flat.	Pelvic deformity.	Knee-chest position. Version.
6	Yes.	51	50	Lateral.	Lateral.	Normal.	Cross-birth.	Version.
8	Yes.	50	65	Eccentric.	Lateral.	.....	.....	Version.
9	No.	48	66	Central.	Lateral.	.....	Prolapse hand.	Tren. position. Version.
6.25	No.	47	42	Central.	Lateral.	Justo-minor.	Pelvic deformity.	Knee-chest pos. Normal labor.
5	No.	47	76	.....	.....	Normal.	Prolapse arm.	Version.
7	Yes.	50	..	.....	.....	Justo-major.	Cross-birth.	Version.
7	Yes.	52	110	Central.	Central.	Normal.	.....	Manual Reposition. Version.
10.5	Yes.	54	87	Eccentric.	Lateral.	Normal.	Prolapse elbow.	Version.
6.25	Yes.	40	48	Marginal.	Lateral.	Justo-minor.	.....	Manual Dilatation. Version.
7.5	Yes.	51	79	Central.	Lateral.	.....	.....	Tren. position. High forceps.
8	Yes.	50	59	Central.	.....	Rachitic.	.....	Tren. position. Version.
.....	.....	..	40	Marginal.	Marginal.	Normal.	Breech	Extraction. Craniotomy.
8.33	Yes.	52	65	Eccentric.	.....	Flat. Justo-minor.	.....	Normal labor.
7	No.	46	65	Central.	Central.	.....	.....	Manual Dilatation. Version.
8	Yes.	52	69	Central.	Lateral.	Flat.	.....	Version.
8	No.	47	84	Lateral.	Lateral.	Normal.	.....	Version.
8	Yes.	52	68	Eccentric.	Lateral.	Flat.	.....	Version.
9	Yes.	52	67	Central.	Lateral.	Normal.	Cross-birth.	Version.
8	No.	48	69	Marginal.	Lateral.	Justo-minor.	1/2 Prolapse of hand.	Version

and the diagnosis was occipito-lava-anterior. As the cord came down on the right and anterior portion of the pelvis, the patient was placed on the left side, with several pillows beneath her hips. A Karl Braun metreurynter was placed next to the cervix, and filled nearly full of a weak lysol solution. These measures were taken to prevent the premature rupture of the membranes. The pains were quite severe and the patient was very nervous. The fetal heart beat 130 times a minute, and was regular. The heart tones were auscul-

tated every half hour. During one of the severe pains, the membranes ruptured and the bag was expelled. The cord had prolapsed some four inches below the cervix and was pulsating strongly. The head was still mobile. Nearly a pint of clear liquor amnii escaped as the patient rolled off the pillows. She was immediately placed in the Trendelenburg position, using the inverted kitchen chair as a support. The bag was then sterilized, while a little chloroform was given to overcome the expulsive pains. Before the introduction of

the apparatus, the head was forced upward, and I was able to get the lowest loop of the cord nearly four inches above the external os. The bag was now inserted through the cervix, which at this time admitted three fingers. After filling, about a pint of the normal salt-solution was slowly injected into the uterine cavity. But little force was used. The fetal heart, at the time of the rupture, had increased to 150 beats a minute, and was still regular, though not so vigorous. The introduction of the salt-solution took nearly five minutes and as some of it leaked out, nearly a pint and a half was used altogether. The fetal heart soon after was beating 134 times a minute and the patient was allowed to come out from under the influence of the anesthetic. The pains soon became strong but the patient was not allowed to bear down. As the salt-solution leaked out, more of the lysol solution was forced into the bag to compensate for the increasing dilatation of the cervix. The bag remained in the cervix for two hours and fifteen minutes. At this time the cervix was practically dilated, and a version and extraction was performed. The lowest loop of the cord was found just above the child's chin. A living child was delivered. There was slight asphyxia. After the delivery of the child, a moderate amount of the salt solution escaped. The baby was a girl, weighed eight pounds and was 52 cm. long. The cord measured 69 cm.; insertion central; opening of the membranes lateral.

CASE 50. Mrs. O. Para IV. Age 26. Former labors normal. Labor occurred July 19, 1906. *Diagnosis:* Occipito-dextra-posterior. Pelvic measurements: IS, 26 cm.; IC, 29 cm.; BiTro., 30 cm.; Ext. Conj., 18 cm.; Circum., 92 cm.; CD, 12.5 cm.; CV, 10 cm.; BiSch., 10 cm. The head was high and movable. The baby was slightly premature, about eight and a half months. During the first internal examination, the cervix was found to be effaced and the os dilated to admit two fingers. The membranes appeared very soft and thin to the palpating finger, and this condition was found postpartum. Some question arose as to whether the pulsation, palpable at the os uteri, was due to a velamentous insertion or a fore-lying cord and in endeavoring to examine further, the membranes ruptured and a loop of the cord came down into the vagina. The liquor amnii was clear and a little over a pint was lost. The fetal heart tones before the rupture were 150 and regular, but were poorly transmitted because of the thickness of the abdominal walls. The patient was placed immediately in the Trendelenburg position on the bed, and the head pushed out of the inlet. The cord was pushed back into the cervix and as far up as possible. The pains were weak. Anesthesia was not necessary. The bag was introduced above the internal os uteri, and nearly a pint and a half of saline solution injected. It was necessary to introduce the fluid slowly, as otherwise the uterine contraction would interfere. Shortly after the apparatus was in place, the pains became strong and lasted from three to five minutes, and I concluded that I had forced in too much fluid. I then released about ten ounces and the character of the pains immediately changed. About eight ounces of the solution leaked out, but this was re-

placed by further injection. The fetal heart varied from 140 to 160 beats per minute, but was regular throughout the entire period of labor. The pains resembled those of normal first stage labor pains, and were fairly severe in intensity. In three hours and five minutes, the salt-solution escaped freely, and the bag was on the point of being expelled. As preparations for version had been in readiness, chloroform was administered, and the internal hand came in contact with the cord, at the level of the ear, and in a position where it would otherwise be subjected to pressure, had there been no fluid in the uterine cavity. A version was done and a living child extracted. It was not asphyxiated. The cord measured 84 cm.; insertion lateral; opening of membranes lateral. The rent was six inches from the placental margin. The interesting points in this case were the effect of the varying amounts of fluid in the uterine cavity on the character of the pains. Another point was the location of a loop of the cord alongside the head, and yet not pressed upon, because of the presence of the salt-solution.

CASE 51. Mrs. S. Para III. Age 30. Previous labors normal. Pelvic measurements: IS, 26 cm.; IC, 28 cm.; BiTro., 30 cm.; Ext. Conj., 18 cm.; Circum., 90 cm.; CD, 12.5 cm.; CV, 10.5 cm.; BiSch., 11 cm. *Diagnosis:* Occipito-dextra-anterior. Labor occurred August 30, 1906. I was called to this case because of a prolapse of the cord in the first stage of labor. The cervix was effaced and the os uteri admitted three fingers. The heart tones numbered 100 and were irregular. There was some old meconium in the liquor amnii. The head was movable above the pelvic inlet. The pains were weak and occurred every five to ten minutes. The cord had prolapsed about five inches and was pulsating. The patient was placed in the Trendelenburg position and the cord was pushed back of the presenting part. The bag was then introduced into the cervix and a pint of solution was injected. The quality of the fetal pulse did not improve. After waiting half an hour, the pulse dropped down to 90 and was still irregular. There was considerable leakage. The pains were weak and the progress of labor slow. The bag was now removed and examination showed the cord to lie between the head and uterine wall. The head was then pushed over into the right iliac fossa, and a scapula-dextra-anterior position secured. The character of the fetal pulse improved greatly after this, and within fifteen minutes was beating 130 times a minute. The bag was re-introduced, and the salt solution passed in again. On account of the leakage, pieces of wet cotton were packed around the tubing in the vagina. From this time until the cervix was dilated, about four hours, the pulse varied from 130 and 140, and was fairly regular. When the bag was expelled, I turned and extracted a living baby. It was asphyxiated and required twenty minutes to revive it. The cord was 68 cm. long; insertion eccentric; opening of the membranes lateral. It is my belief that the failure of the bag to work in the first instance was due to a deep laceration of the right side of the cervix that served as an exit for the salt solution. The same difficulty was experienced after the cross birth was substi-

tuted, but the cord was in less danger from compression. Nearly three quarts of salt solution were injected into the uterus in this case to make up for the loss by leakage.

Since writing the above article, two other cases have been treated in the Dispensary service as follows:

CASE 52. Mrs. F. Para III. Age 27. Previous labors normal. Pelvic measurements: IS, 26 cm.; IC, 28 cm.; BiTro., 30 cm.; Ext. Conj., 19 cm.; Circum., 88 cm.; CV, 10 cm.; BiSch., 10.5 cm. At the time of the arrival of the intern, the pains were severe and frequent. The heart tones were 140 and regular. Small parts were felt on both sides of the median line of the abdomen. The cervix was dilated to admit five fingers, and the fore-lying cord was felt in the intact membranes. The presenting part was high above the inlet. An enema was given to empty the rectum and sigmoid, and while this was operating the membranes ruptured. The cord prolapsed about four inches and was pulsating strongly. Posture was not used in this case by the intern. When I arrived, one and a half hours after the liquor amnii escaped, the fetus lay in the scapula-dextra-posterior position, the right hand had prolapsed, and the cord had fallen down between the symphysis pubis and the fetal abdomen. During the examination, the pulsations suddenly ceased, and I immediately turned and extracted a living baby. There was no asphyxia. The head passed through the pelvis in the transverse diameter. The placenta was located on the left and posterior wall of the uterus, about six inches from the margin of the rent in the membranes. The baby, a girl, weighed nine pounds and was 52 cm. long. The cord was 65 cm. in length; insertion central. The utero-vaginal tract was tamponed for a moderate postpartum hemorrhage.

CASE 53. Mrs. P. Para IV. Age 27. Conf. No. 8046. There is a history of one transverse presentation, where the child was delivered by version and extraction. The other labors were normal. Labor occurred March 2, 1907. *Diagnosis*, Occipito-dextra-anterior. Pelvic measurements: IS, 24 cm.; IC, 28 cm.; BiTro., 33 cm.; Ext. Conj., 19 cm.; Circum., 97 cm. The fetal heart was 148, and regular in the first stage. The uterine contractions were weak. An internal examination made by the intern in the second stage, to determine the cause of delay, showed the cord and both hands prolapsed below the head. The cord was pulsating normally. The head was movable and not engaged. No treatment was employed pending my arrival, as the presence of both arms was considered good protection against pressure. Frequent auscultation of the fetal heart was made. I found the conditions practically unchanged at the time of my arrival at the house, and immediately performed a podalic version. The child was alive and in two minutes was crying vigorously. There was some difficulty in pushing the head up out of the lower uterine segment, but not of such an extent as to warrant the double manual or Broessa's method. The little girl weighed eight pounds, was 48 cm. long, and was at full term. The

cord was 66 cm. long, and the insertion was marginal. The rent in the membranes measured five inches from the placental edge. The time of rupture of the membranes could not be ascertained, nor the condition of the liquor amnii. There was no liquor amnii remaining in the uterine cavity when the version was performed.

This case was a favorable one, the pelvis was of good size and no difficulty was experienced in the extraction. The presence of both arms alongside the head, and the cord lying between them, served as an ideal guard even when the amniotic fluid had entirely escaped. To this natural safeguard, owing to the late diagnosis, must be credited the successful outcome of the case. The mother had a chill and sudden rise of temperature to 104° F. on the third day, but this was relieved by a brisk cathartic, and the administration of ergot and hydrastis.

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