**Observations based upon a study of 139 cases of induction of labor with the modified Champetier de Ribes bag / by George L. Brodhead.**

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# Observations Based Upon a Study of 139 Cases of Induction of Labor With the Modified Champetier De Ribes Bag

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ing a rubber plunger, but the ordinary Davidson syringe may be used. The glass syringes are of two sizes, two and one-half and four and one-half ounces, and, easily sterilized by boiling, have proven generally useful. When the bag has been completely filled, the stem is clamped and tied. As a rule no traction is made upon the bag, but if it is desired that the dilation be performed quickly, traction is made at intervals of ten to fifteen minutes.

The bag will soften and dilate the cervix, and if, when the first bag slips through the cervix, labor has not yet begun, a larger bag is introduced. Labor usually commences within a few hours after the introduction of the first or second bag. In some few instances the cervix can be dilated almost completely with the bags, without provoking hard expulsive contractions, but in these patients, the membranes may be ruptured, and if necessary, the delivery completed by forceps or version.

CAUSES OF INDUCTION.

| | |
|---|---|
| Contracted pelvis, | 41 |
| Toxemia, including albuminuria, nephritis and eclampsia, | 27 |
| Pelvis normal, large child, | 19 |
| Pelvis normal, patient overdue, | 15 |
| Pelvis normal patient at term, anxious to get through, | 13 |
| Previous history of uterine inertia, with instrumental delivery, | 11 |
| Patient at term membranes ruptured many hours or days before, | 4 |
| Hydramnion, insomnia and discomfort, | 3 |
| To avoid possible death of fœtus in utero, | 3 |
| Placenta previa, | 1 |
| Chronic endocarditis, general debility, | 1 |
| Dead fetus, general debility, | 1 |
| Total, | 139 |

*Size of Bags Used.*—In the entire series of 139 cases, 198 bags were used, including the use of the bag on eighteen occasions for the purpose of accelerating a slow labor. No. 1 bag was used in four cases; No. 2 in forty three; No. 3 in 103; No. 4 in forty-five,

and No. 5 in three cases. It will be noticed that bags No. 2 and 3 were used 146 times out of the total of 198, or 73 per cent.

*Frequency of Rupture of the Membranes on Introduction of the Bag.*—From the total number of 139 cases, we must subtract four in which the membranes had already ruptured, and one in which the time of rupture was not known, leaving 134 cases. In introducing 193 bags in these cases, the membranes were accidentally ruptured in six instances, or 3 per cent., giving a very small percentage of premature rupture of the membranes.

## NUMBER OF BAGS NECESSARY TO INDUCE LABOR.

I. First let us study the thirty-three cases of induction of labor in primiparæ in private work.

In seventeen of these, only one bag was required, or 51.5 per cent.

In eleven, two bags were required, or 33.3 per cent.

In two, three bags were required, or 6 per cent.

In three, labor was not induced by the bag, = 10 per cent.

In other words, labor was induced in approximately 85 per cent. of the primiparæ in private work, by the introduction of not more than two bags. In one of the three cases in which the bags were not successful, the cervix was dilated up to four fingers by means of two bags, then as there was no pain, an attempt was made to introduce a bougie, the membranes being accidentally ruptured in so doing. Labor began in about two hours, and the patient was delivered normally after a five-hour labor. In this case, the use of the bags undoubtedly greatly shortened the labor, although pains were not induced. In another case, two bags dilated the cervix up to three fingers, but no pain followed the bags for a number of hours, when the membranes ruptured and labor began.

In the third case, a bag was introduced into the uterus of a patient who had eclampsia at about six and one-fourth months. Although traction was in this case, made intermittently for about eight hours, there was absolutely no effect, and the patient was delivered by version after accouchement force. The successful cases included one at the seventh month.

II. There were forty-two multiparæ in private work.

In twenty-two of these, one bag was required, or 52.3 per cent.

In thirteen, two bags were required, or 30.9 per cent.

In three, three bags were required, or 7 per cent.

In four, labor was not induced, or 9 per cent.

In other words, labor was induced in approximately 83 per cent. of the multiparæ in private work, by the use of not more than two bags. The four cases in which labor was not induced are however well worth careful study. In one, two bags fully dilated the cervix, but the uterus was inert, and version was resorted to. In another patient, two bags dilated the cervix well, but labor was completed by forceps. In another case, three bags fully dilated the cervix and then a bougie was introduced, but labor could not be induced, and the patient was delivered by forceps.

In the last of the four cases, twenty-four hours after the insertion of the bag, no pain having been induced, the cord was found presenting, making version necessary.

In three of the foregoing cases, the bag certainly accomplished a great deal of work even though the patients could not be delivered in a normal way.

The successful cases included one at six, one at seven months, and one at seven and one-half months.

III. The hospital primiparæ were fifteen in all, but the record of one is incomplete, leaving a total of fourteen.

In thirteen of these, one bag was required, or 93 per cent.

In one of these, three bags were required, or 7 per cent.

Practically all of these cases were induced by the use of one bag.

In this series were included one case at seven months, and one at seven and one-half months.

IV. The hospital multiparæ were forty-nine in number.

In forty-two of these, one bag was required, or 87 per cent.

In six, two bags were required, or 12 per cent.

In one, the bags were ineffectual.

Practically all of these cases were induced by the use of not more than two bags.

In the ineffectual case, three bags were used, but the first stage began only after rupture of the membranes many hours after the last bag had come out.

In this series, were included one case at six months, and two at seven months.

V. *Statistics of all forty-eight primiparæ.*

In thirty, one bag was required, or 64 per cent.

In eleven, two bags were required, or 23 per cent.

In three, three bags were required, or 6 per cent.

In three, bags were ineffectual in inducing labor, or 6 per cent.

In 87 per cent. of these cases, labor was induced by not more than two bags.

VI. *Statistics of all ninety-one multiparæ.*

In sixty-four, one bag was required, or 70 per cent.

In nineteen, two bags were required, or 21 per cent.

In three, three bags were required, or three per cent.

In five, labor was not induced, or 5 per cent.

In 91 per cent. of these multiparæ, not more than two bags were required to induce labor.

VII. *Statistics of all one hundred and thirty-nine cases.*

In ninety-four, one bag was required, or 68 per cent.

In thirty, two bags were required, or 22 per cent.

In six, three bags were required, or 4 per cent.

In eight, labor was not induced, or 6 per cent.

In 90 per cent. of all cases, labor was induced by the use of not more than two bags.

## USE OF ANESTHETIC IN INSERTING BAGS.

In private work, an anesthetic was used sixteen times in the introduction of one hundred and fifteen bags, or 14 per cent.

In hospital work, an anesthetic was used in seventeen out of eighty-three, or 20 per cent.

In all cases, thirty-three, in one hundred and ninety-eight, or 16.6 per cent.

The higher percentage in hospital work was due to the necessity of using an anesthetic when demonstrating the technic before students.

## TIME REQUIRED FOR LABOR TO BEGIN.

I. *Statistics of thirty-three primiparæ in private work.*

In fifteen, labor began at once, = 45 per cent.

In five, labor began within six hours, = 18 per cent.

In four, labor began within twelve hours, = 12 per cent.

In two, labor began within twenty-four hours, = 6 per cent.

In one patient, thirty-nine hours were required, in a second, forty hours, in a third sixty hours, in a fourth seventy-two hours, and in three patients, labor was not induced. In other words, labor began at once in 45 per cent., within twelve hours in 73 per cent., and within thirty hours in 79 per cent.

II. *Statistics of forty-two multiparæ in private work.*

In nine, labor began at once, = 22 per cent.

In eleven, labor began within six hours, = 26 per cent.

In six, labor began within twelve hours, = 14 per cent.

In six, labor began within twenty-four hours, = 14 per cent.

In two patients, twenty-eight hours were required, in a third thirty-one hours, in a fourth forty-two hours, in a fifth forty-five hours, in a sixth sixty-two hours, and in four, labor was not induced. Labor began at once in 22 per cent.; within twelve hours, in 63 per cent; within thirty hours in 85 per cent.

III. *Statistics of fifteen primiparæ in hospital work.*

In eight, labor began at once, = 57 per cent.

In three, labor began within six hours, = 21 per cent.

In one, labor began within twelve hours, = 7 per cent.

In one, labor began within twenty-four hours, = 7 per cent.

In one, labor began within thirty hours, = 7 per cent.

In one, no figures were available. Labor began at once in 57 per cent.; within twelve hours in 85 per cent.; within thirty hours in 100 per cent.

IV. *Statistics of forty-nine multiparæ in hospital work.*

In eighteen, labor began at once, = 39 per cent.

In ten, labor began within six hours, = 20 per cent.

In five, labor began within twelve hours, = 10 per cent.

In seven, labor began within twenty-four hours, = 14 per cent.

Other cases required twenty-four and a half hours, twenty-seven hours, twenty-eight and three quarter hours, forty-nine hours, seventy-seven hours and one eight days thirteen hours(?).

In three cases, figures were not available. Labor began at once in 39 per cent.; within twelve hours in 71 per cent.; within thirty hours in 93 per cent.

V. *Statistics of all forty-eight primiparæ* (hospital and private).

In twenty-three, labor began at once, = 49 per cent.

In thirty-six, labor began within twelve hours, = 76 per cent.

In forty, labor began within thirty hours, = 85 per cent.

VI. *Statistics of all ninety-one multiparæ* (hospital and private).

In twenty-seven, labor began at once, = 31 per cent.

In fifty-nine, labor began within twelve hours, = 68 per cent.

In seventy-eight, labor began within thirty hours, = 89 per cent.

VII. *Statistics of all* 139 *cases.*

In fifty, labor began at once, = 37 per cent.

In ninety-five, labor began within twelve hours, = 70 per cent.

In 118, labor began within thirty hours, = 88 per cent.

VIII. *Average number of hours before beginning of labor.*

In thirty of thirty-three primiparæ (private) average was ten hours.

In thirty-eight of forty-two multiparæ (private) average was eleven hours and thirty minutes.

In fourteen of fifteen primiparæ (hospital) average was four hours and fifty-two minutes.

In forty-five of forty-nine multiparæ (hospital) average was nine hours and four minutes.

Average in all primiparæ = eight hours and twenty-two minutes.

Average in all multiparæ = ten hours and twenty-two minutes.

Average in all cases = nine hours and forty-one minutes.

## LENGTH OF LABOR.

I. From the total of thirty-three primiparæ in private work, four may be excluded because of the necessity of interfering with the course of labor on account of eclampsia or threatened eclampsia. (The average duration of labor in these four was ten hours forty-three minutes.) The shortest labor was five hours, the longest was sixty-six hours forty minutes.

Twenty cases of twenty-nine were delivered within twenty-four hours, or a percentage of 64.5, the average labor being fourteen hours twenty-four minutes. The remaining nine cases required twenty-four hours thirty-five minutes, twenty-five hours forty minutes, twenty-six hours ten minutes, thirty-four hours fifty minutes, fifty hours, fifty-four hours fifty minutes, fifty-seven hours fifty minutes, sixty-five hours thirty-five minutes and the last sixty-six hours forty minutes, giving an average for the nine cases of forty-five hours eleven minutes.

In one of these cases, real labor was sixteen hours twenty minutes instead of thirty-four hours fifty minutes, in another one hour and fifty minutes, instead of fifty-seven hours fifty minutes and in a third case four hours fifteen minutes instead of sixty-five hours thirty-five minutes—allowing for these deductions, the average labor was thirty hours five minutes instead of forty-five hours eleven minutes.

The average duration of labor in all primiparæ in private work was twenty-two hours twenty minutes.

Deducting 135 hours for the three cases above mentioned, the average duration of labor would be eighteen hours thirteen minutes.

II. From the total of forty-two multiparæ in private work, we shall exclude two cases in which version was done for cord presentation, thus interrupting the normal course of labor, leaving total of forty.

The shortest labor was one hour seven minutes, the longest was forty-seven hours thirty minutes.

Twenty-nine of forty cases were delivered within twenty-four hours or 72.5 per cent., the average labor being ten hours one minute (against fourteen hours twenty-four minutes in primiparæ).

The other eleven cases required twenty-five hours forty-five minutes, twenty-nine hours twenty-two minutes, thirty hours, thirty-one hours five minutes, thirty-one hours forty minutes, thirty-three hours, forty hours, forty-six hours twenty-five minutes, forty-six hours forty minutes, forty-seven hours fifteen minutes and forty-seven hours thirty minutes.

The average of these eleven is thirty-seven hours twelve minutes.

The average duration of labor in all multiparæ was seventeen hours twenty-nine minutes (against twenty-two hours twenty minutes in primiparæ).

III. There were fifteen primiparæ in hospital work. The shortest labor was six hours forty minutes, the longest seventy-nine hours fifty-two minutes (?).

Eleven of fifteen cases required less than twenty-four hours or 73 per cent. The average duration of labor for these eleven was twelve hours fifty-three minutes.

The other four cases required twenty-six hours, thirty-five hours thirty minutes, forty-two hours thirty-five minutes and seventy-nine hours fifty-two minutes(?).

The average duration for all four was forty-six hours nine minutes.

The average duration of labor for all primiparæ in hospital work was twenty-one hours forty-five minutes, practically the same as for private work.

IV. Of the forty-nine multiparæ in hospital work, the shortest labor was one hour thirty minutes and the longest was seventy-seven hours(?).

Thirty-nine of forty-nine required less than twenty-four hours or 79 per cent., the average duration of labor being nine hours nineteen minutes.

The remaining cases required twenty-six hours forty-five

minutes, twenty-seven hours, twenty-eight hours, twenty-nine hours, twenty-nine hours twenty-five minutes, thirty hours eight minutes, thirty-two hours forty-five minutes, thirty-three hours, fifty-eight hours forty minutes and seventy-seven hours(?).

The average for these ten cases was thirty-seven hours twenty-six minutes.

The average duration of labor in all hospital multiparæ was fifteen hours three minutes.

V. *In all primiparæ* (forty-eight) (hospital and private), the shortest labor was two hours fifty minutes and the longest labor was seventy-nine hours fifty-two minutes, the average duration of labor twenty-two hours nine minutes.

*In all multiparæ* (ninety-one) (hospital and private), the shortest labor was one hour seven minutes, the longest labor was seventy-seven hours,(?) the average duration of labor fifteen hours fifty-two minutes.

*In all cases*, the average duration of labor was eighteen hours two minutes.

## TERMINATION OF LABOR.

I. Private patients

| | | |
|---|---|---|
| Normal | 29 = 39 per cent. | 71 per cent. |
| Low forceps | 24 = 32 per cent. | |
| Median forceps | 12 = 16 per cent. | |
| High forceps | 3 = 4 per cent. | |
| Version | 4 = 5 per cent. | |
| Breech extraction | 2 = 2.5 per cent. | |
| Died undelivered (Eclampsia) | 1 = 1 per cent. | |
| Total | 75 | |

II. Hospital cases.

| | | |
|---|---|---|
| Normal | 39 = 61 per cent. | 70 per cent. |
| Low forceps | 6 = 9 per cent. | |
| Median forceps | 3 = 4.5 per cent. | |
| High forceps | 1 = 2 per cent. | |
| Version | 10 = 15 per cent. | |
| Craniotomy | 1 = 2 per cent. | |
| Breech extraction | 3 = 4.5 per cent. | |
| Cesarean section | 1 = 2 per cent. | |
| | 64 | |

III. *Statistics of all cases.*

| | | |
|---|---|---|
| Normal | 68 = 49 per cent. | 70 per cent. |
| Low forceps | 30 = 21 per cent. | |
| Median forceps | 15 = 11 per cent. | |
| High forceps | 4 = 3 per cent. | |
| Version | 14 = 10 per cent. | |
| Breech extraction | 5 = 3 per cent. | |
| Craniotomy | 1 = 1 per cent. | |
| Cesarean section | 1 = 1 per cent. | |
| Died undelivered | 1 = 1 per cent. | |
| | 139 | |

CHANGE OF PRESENTATION AFTER BAG INTRODUCTION

I. Private patients.

CASE I.—vi-Para, induction of labor at seven months for flat pelvis. Bag No. 3 introduced at 11 A. M., July 3, position *L. O. A.* above brim. Bag came out at 9 P. M. of the same day, examination of patient not made at that time. At 9 A. M. on the following day, the presentation was breech, and No. 4 bag was introduced. This bag came out at 8 A. M. of the next day, the first stage beginning at that time. Several hours later, position was found to be *transverse*, and the patient was delivered by podalic version at 11.45 A. M. of a 4 3/4 pound child which died two hours later of meningeal hemorrhage.

CASE II.—ii-Para, with a normal pelvis, but a history of a large child and very difficult forceps delivery at term. Induction of labor at 8 months, child being of good size (7 7/16 pounds). At the time of introduction of the No. 3 bag at 10 P. M. Jan. 4, the position was *R. O. A.* the vertex dipping in the brim. The bag came out at 8 A. M. on the following day, and a few hours later when examination was made, the position was found to be *transverse*. By external version, the vertex was easily brought over the brim of the pelvis, then the membranes were ruptured and normal delivery occurred one hour later. Fortunately, the membranes remained intact, or version for transverse position would have been necessary.

CASE III.—iii-,ii-Para; previous history of difficult delivery with slightly contracted pelvis. Induction of labor at eight and a half months, position *L. O. A.* above the brim, the first bag No. 3 being easily introduced at 10 P.M. Nov. 6. The first stage began at 2 A.M. on the following day, and the bag come out at 9 A. M. At 2.30 P. M., a No. 4 bag was introduced and this was expelled at 10 P. M. The position was now found to be *transverse*, but by external version, the vertex was easily brought over the brim in *L. O. A.* position, and then the membranes were artificially ruptured. About twelve hours later the patient was delivered of a fine child weighting 6 12/16 pounds, by the median forceps operation.

CASE IV.—ii-Para, a patient whose child had died *in utero* three days before she had reached full term in her first pregnancy.

Induction of labor at eight and one-half months with breech presentation, moderate hydramnion present. On Dec. 26, at noon a No. 3 bag was inserted, coming away at 11 P. M. Patient slept most of the night. On Dec. 27, at 11:30 A. M. the position was *transverse*, and by external version, the presentation was easily changed to *R. O. A.* after which a No. 4 bag was inserted. The labor commenced at once, and the patient was delivered normally of a 6 12/16 pound child, after a nine hour labor.

*In seventy-five private cases, the presentation was changed, therefore, in four instances, or 5 per cent.* Fortunately, the change in presentation made no difference in the outcome of these cases, but the accident must be kept constantly in mind when using the bag method.

II. Hospital Patients.

CASE I.—ii-Para at term with justominor pelvis. Position *L. O. A.* above brim. Bag No. 1 introduced at 4 P. M. Nov. 13 came away at midnight. No. 2 bag was inserted at 10 A. M. Nov. 14, came out 4 A. M. Nov. 15. During the first stage, the *presentation changed from vertex to breech* (*L. O. A.—L. S. A.*), and labor was terminated by breech extraction, the child being still-born.

CASE II.—iii-Para, induction of labor at eight and one-half months for flat pelvis. No. 3 bag introduced at 2 P. M. Feb. 2. position *R. O. A.* above brim. Between that time and 8:45 P. M. *the presentation changed to L. S. A.* The amniotic fluid was abundant and the child was small (5 12/16 pounds). The patient was delivered normally of a living child in fine condition after a labor of six hours and forty-five minutes, the presentation remaining breech.

CASE III.—ix-Para, labor induced for marginal placenta previa at eight and one-half months.

On Feb. 4, a No. 5 bag was introduced at 4:30 P. M. the position being *L. O. A.* above the brim. There was no bleeding after the insertion of the bag. At 6:30 P. M. on the following day, labor having been in progress for four hours, it was necessary to deliver because of the weak condition of the patient. The cervix admitted three fingers, and *the presentation was found to have changed to shoulder.* Version was done, and a 7 pound dead child was extracted. The heart had not been heard at any time, before or during labor.

*In sixty-four cases in hospital practice, the presentation was changed in three cases, or 4.7 per cent.* In the first of the three cases, the change of presentation was probably responsible for the loss of the child, while in the other two it made no difference.

*In 139 cases, the presentation changed in seven, a percentage of five, but in only one case was the outcome changed because of the accident.*

PROLAPSE OR PRESENTATION OF THE CORD.

*I. Private Cases.*

CASE I.—ii-Para, pelvis normal, history of uterine inertia in previous labor, with large child, difficult forceps delivery and death of child from meningeal hemorrhage.

It was decided to induce labor at eight months, and the position being *L. S. A.* an unsuccessful attempt was made to change the presentation to vertex by external manipulation. On June 17, a No. 3 bag was inserted at 9 P. M. On June 18, at 10 A. M. the cervix admitted almost four fingers, and a No. 4 bag was introduced, but this soon came out, so the membranes were ruptured. At 2.30 P. M. as there was no pain, the patient was examined preparatory to putting in a No. 5 bag. The feet and cord were found in the cervix, and replacement was attempted with the woman in the knee-chest position. This could not be done, so the cervix was dilated manually and the child was extracted. The infant weighed 5 12/16 pounds and was deeply asphyxiated, but soon cried vigorously. At the end of twenty-four hours, however, the child died, evidently of meningeal hemorrhage.

CASE II.—ii-Para, pelvis normal, child of good size, induction at term. At 10 A. M. a No. 3 bag was introduced, coming out at 9 P. M. The position during this time was *R. O. P.* above the brim. Examination at 9 A. M. of the following day revealed a vertex and cord presentation, the membranes being intact. As the cord could not be replaced by posture, version was performed by the combined method, and then, as the crevix was only about half dilated, and as there was no need of haste, the child was not extracted until five hours later. The infant weighed 7 1/2 pounds, respirations were spontaneous, and the child did well. I have seen prolapse of the cord in one other case, where the bag was used to accelerate labor, but these are the only three I have seen in a large number of cases. *In seventy-five private cases, therefore, the cord presented twice, or in 2.6 per cent.* The mortality was 50 per cent.

*II. Hospital Cases.*

CASE I.—viii-Para, labor induced at eight months for an acute exacerbation of chronic nephritis. At 3.30 P. M. the position being *R. O. P.* above, a No. 3 bag was inserted. This was expelled at 9 P. M., and a No. 4 bag was introduced. The second stage began at 12.30 A. M. and at 1 A. M. the membranes were ruptured. About 10 inches of cord prolapsed, version was performed at once, and a 6 pound child was extracted. The infant did fairly well, and left the hospital in fair condition.

CASE II.—iii-Para, labor induced at eight and one half months, for slightly contracted pelvis. The position was *L. O. A.* above, when at 4.30 P. M. a No. 1 bag was introduced. At 8 P. M. the bag came out and a No. 2 bag was inserted. A No. 3 bag was inserted at 10 A. M. of the following day and at 3.30 P. M.

a No. 4 bag was put in, but the latter was at once expelled. As there was no pain a bougie was inserted. There was no cord palpable at this time, but nevertheless the case is reported as one in which the cord prolapsed. At 4 P. M. of the following day, the membranes were artificially ruptured, and a large amount of pulseless cord prolapsed. A version was performed, and a dead child weighing 8 pounds was extracted. Whether the bags were responsible for the prolapse we cannot state definitely, but the case has been included in the number.

CASE III.—iii-Para, patient at term, induction for flat pelvis with chronic endocarditis. At 3 P. M. the position was *L. O. A.* above, and a No. 2 bag was inserted, labor beginning at once. At 2 P. M. of the following day a No. 3 bag was inserted, the membranes being accidentally ruptured in so doing. At 10 P. M. the second stage began, and the bag came out. The cord was found prolapsed and pulseless, the head wedged in the brim of the pelvis. One hour later the patient gave birth to a still-born child weighing 6 6/16 pounds.

CASE IV.—iii-Para, normal pelvis, labor induced because of large child. At 2 P. M. position was *L. O. A.* and a No. 4 bag was inserted coming out at 10.30 P. M. At 11.20 P. M. cord presentation was found, the membranes ruptured spontaneously, the cord prolapsed, and stopped pulsating before version could be performed. The child was still-born and weighed 10 8/16 pounds.

The mortality in the four cases was 75 per cent. *In the sixty-four cases then the cord prolapsed in four, a percentage of six.* Looking over the New York Post-Graduate Hospital records of 5300 cases there were found (excluding the cases here reported) fifty-eight cases of cord prolapse, approximately 1 per cent. *In all* 139 *cases, the cord presented or prolapsed in six, or* 4.3 *per cent.* Prolapse of the cord is therefore four times as frequent with the use of the bag, but it must be remembered that labor was induced in sixty-three cases for contracted pelvis, disproportion between the head and the pelvis and hydramnion and in three of the six cases of prolapse there was either disproportion or deformed pelvis, and therefore the number of cases would seem to me not large.

*Bag Introduced, Slipping above the Head.*—In this series of cases a curious accident occurred in one, resulting in no harm. Labor was induced in a iii-para, at eight months, for flat pelvis. At 12.30 P. M. the position was *L. O. A.*, and a No. 3 bag was easily introduced. One hour later the membranes ruptured spontaneously. On the following day at 3.30 P. M. the patient was examined, as there had been no labor pains. The bag was found to have slipped up into the uterus above the head. Traction upon the stem brought the bag down into the cervix, the first stage began at 4.30 P. M. and labor was completed

normally in three hours. This accident would not have taken place had the stem been tied to the vulva pad in the usual way.

MORBIDITY.

*I. Private Patients.*

CASE I.—This was one of the patients in whom the bag was ineffectual. In spite of intermittent traction, after eight hours, the cervix was still but slightly dilated, and the eclamptic patient was delivered by accouchement force and version. A slight rise of temperature was present for a few days following delivery, but recovery soon took place. The eclampsia was no doubt the cause of the temperature.

CASE II.—i-Para, normal pelvis, labor overdue. Patient had a seventeen hour labor terminated by an easy low forceps operation. For one week following the delivery the temperature ranged between 99–101° F., but there were no other symptoms and the patient felt perfectly well during this time. The cause was not discovered.

CASE III.—ii-Para, eleven-hour labor, terminated by an easy low forceps operation. Seven hours after labor the temperature rose to 100° and was apparently reactionary in character. Nine days after delivery, there was a temperature of 100, and on the twelfth day 100°. Nineteen days after delivery the temperature rose to 101°, the cause of which was threatened abscess of the breast, but in two days the temperature came to normal, and remained normal.

CASE IV.—iii-Para, labor four hours, terminated normally. During the puerperium, there were four distinct rises of temperature, with three days intervening between the elevations, during which interval the temperature and pulse were normal. The uterus was absolutely normal, and the cause of the rise of temperature was evidently in the intestinal tract. There were no symptoms whatever referable to the uterus, vagina or tubes.

From a study of these private cases, it is apparent that in only one case (No. 2), could the morbidity be ascribed to the bag, and we conclude that the morbidity in private work is practically nil.

*II. Hospital Cases.*

CASE I.—ii-Para, labor eight hours, terminated by breech extraction. On the third day there was a temperature of 100° caused apparently by the congestion of the breasts. Subsequent temperature was normal.

CASE II.—This was a case of Cesarean section where there was a slight elevation of temperature only for a few days.

CASE III.—ii-Para, labor eighteen hours, terminated normally. On the tenth day the temperature rose to 104° F., the pulse to 130. On the next day the temperature and pulse were normal and remained so thereafter.

CASE IV.—viii-Para, labor induced at eight months for chronic nephritis, the patient being in miserable general condition. For several weeks following delivery there was a slight rise of temperature each day, then the further course was normal. There were no symptoms referable to the uterus and the temperature was attributed to the poor general condition of the woman.

CASE V.—Labor induced at the seventh month for toxemia of pregnancy. One bag was used, labor started at once and was terminated normally in 1 1/2 hours. On admission to the hospital the temperature was 103°, pulse 126, respiration 30, and for one week after delivery the temperature ranged between 100–103° F., remaining normal after the first week.

CASE VI.—Labor induced for eclampsia at the seventh month. One bag was used, labor commenced at once, and the woman was delivered normally after a nine hour labor. There was temperature of 101–103° during the first week postpartum, and again with an attack of pneumonia one week later, patient finally recovering.

CASE. VII.—ii-Para, patient apparently two weeks overdue. One bag was used, labor began in two and one-fourth hours, and patient was delivered normally after a labor of six hours and fifty minutes, of a 9 pound healthy child. On the tenth day postpartum, the temperature rose to 102° F., the bowels were moved, and the subsequent temperature was normal.

CASE VIII.—15 i-Para, labor induced at eight and three-fourth months for chronic nephritis. One bag was used, labor began at once, and the patient was delivered by version of a 7 pound child which had evidently been dead some time. The temperature on the fourth evening postpartum was 104°, on the fifth 102°, the sixth 102°, then the temperature gradually came to normal, and the patient left the hospital on the twelfth day in good condition.

CASE IX.—vii-Para, labor induced at term for flat pelvis. Two bags were used, the labor was of twenty-two hours duration, and craniotomy was done, as the child was dead. The heart had been heard, however, two hours before operation. On the sixth day the temperature rose to 102.8° F. after a chill, but on the following day and subsequently the temperature was normal.

CASE X.—iv-Para, labor induced at the eighth month for severe chronic endocarditis, not compensating, and poor general condition. One bag was used, labor began seven hours later and the duration of labor was nine hours. The patient was delivered normally of a 4 11/16 pound child, deeply asphyxiated, which died on the following day. The temperature ranged between 101–103° F. for the first four days postpartum, then came to normal and remained there.

Of these ten hospital cases of temperature in the puerperium, there were only three cases (Nos. 4, 8 and 10) which should be taken into consideration concerning bag morbidity, and cases

I. In private work, the infant mortality was as follows:

| Pelvis and cause of induction | Period of gestation | Labor | Operation | Weight | Days of life | Cause of death |
|---|---|---|---|---|---|---|
| 1. Flat pelvis vi-para | 7 1/2 mo. | 3 Hours, 45 min. | Version | 4 12/16 lb. | 1 | Meningeal hemorrhage. |
| 2. Pelvis normal, i-para | Several days overdue. | 5 Hours | Normal delivery | 7 lb. | 1 | Patent foramen ovale. |
| 3. Pelvis normal, iii-para | 2 weeks overdue. | 25 Hours, 45 min. | Low forceps | 4 12/16 lb. poorly developed. | Still-birth | Poor development. |
| 4. Eclampsia, i-para | Term | 10 Hours, 30 min. | Low forceps | 3 8/16 lb. | Still-birth | Chronic nephritis, eclampsia. |
| 5. To anticipate placental degeneration, iii-para. | 8 1/2 months. | 4 hours | Low forceps | 5 12/16 lb. | 1 | Atelectasis. |
| 6. Flat pelvis, i-para | 8 1/4 months. | 22 hours, (6 hours hard.) | Low forceps | 6 11/16 lb. | 2 | Meningeal hemorrhage. |
| 7. Eclampsia, i-para | 8 mo. | 12 hours | Died undelivered | | Death *in utero*. | Eclampsia. |
| 8. Hydramnion and great discomfort, iv-para. | 8 1/4 months. | 18 hours | Median forceps | 6 8/16 lb. | Still-birth | Maldevelopment, hernia in cord, etc. |
| 9. Previous history of inertia, etc., ii-para. | 8 mo. | Duration(?) 19 hours from first bag. | Version for prolapsed cord. | 5 12/16 lb. | 1 | Deep asphyxia, meningeal hemorrhage. |
| 10. Justominor pelvis, iii-para | 8 mo. | 24 hr. | Normal delivery | 6 13/16 lb. | 2 | Deep asphyxia, meningeal hemorrhage. |

II. In hospital work the infant mortality was as follows:

| Pelvis and cause of induction | Period of gestation | Labor | Operation | Weight | Days of life | Cause of death |
|---|---|---|---|---|---|---|
| 1. Justominor pelvis, ii-para..... | Term..... | 8 hr..... | Breech extraction... | 7 lb..... | Still-birth... | Difficult Breech extraction. |
| 2. Acute nephritis, i-para..... | 8 1/2 mo..... | 10 hr..... | Normal delivery.... | 4 4/16 lb..... | 2 | Atelectasis, prematurity. |
| 3. Justominor pelvis, v-para..... | 8 1/2 mo..... | 29 hr..... | Podalic version..... | 6 8/16 lb..... | Still-birth... | Difficult Breech extraction. |
| 4. Justominor pelvis, iii-para.... | 8 1/2 mo..... | 32 hr..... | Podalic version..... | 8 lb..... | Still-birth... | Prolapsed cord. |
| 5. Chronic nephritis, xii-para.... | 7 mo..... | 5 hr..... | Median forceps..... | 4 8/16 lb..... | 3 (?)..... | General edema, prematurity. |
| 6. Toxemia of pregnancy, iii-para. | 7 mo..... | 1 1/2 hr..... | Normal delivery.... | 4 5/16 lb..... | 1 | Prematurity. |
| 7. Eclampsia, i-para..... | 7 mo..... | 9 hr, 10 min..... | Normal delivery.... | 5 4/16 lb..... | Still-birth... | Eclampsia. |
| 8. Chronic nephritis, ii-para..... | 8 mo..... | 16 hr. 55 min..... | Podalic version..... | 7 10/16 lb..... | Still-birth... | Chronic nephritis. |
| 9. Hydramnion, distress, viii-para | Term..... | 2 hr. 45 min..... | Low forceps..... | 11 12/16 lb..... | Still-birth... | Deep asphyxia, great difficulty in shoulder delivery, large child. |
| 10. Justominor pelvis, i-para.... | 8 1/2 mo..... | 26 hr..... | Podalic version..... | 5 2/16 lb..... | 3 | Moderate asphyxia, prematurity, difficult delivery. |
| 11. Chronic nephritis, xv-para... | 8 3/4 mo..... | 13 hr., 45 min..... | Podalic version..... | 7 lb..... | Still-birth... | Child had been dead for some days, cause nephritis(?). |
| 12. Justominor pelvis. Poor general condition, ii-para. | 8 1/2 mo..... | 17 hr., 25 min..... | Normal delivery (breech). | 4 15/16 lb..... | Still-birth... | Asphyxia *in utero*. |
| 13. Flat pelvis, chronic endocarditis, ii-para. | Term..... | 32 hr., 45 min..... | Normal delivery.... | 6 6/16 lb..... | Still-birth... | Prolapsed cord. |
| 14. Flat generally contracted pelvis, vii-para. | Term..... | 22 hr..... | Craniotomy..... | 6 5/16 lb..... | Still-birth... | Intrauterine asphyxia(?) (heart heard two hours before birth). |

II. Continued. In hospital work the infant mortality was as follows:

| Pelvis and cause of induction | Period of gestation | Labor | Operation | Weight | Days of life | Cause of death |
|---|---|---|---|---|---|---|
| 15. Flat generally contracted pelvis, iii-para. | Term?..... | Duration? 58 hr. from insertion of first bag. | Normal delivery.... | 4 8/16 lb..... | 1 | Deep asphyxia, prematurity? |
| 16. Albuminuria, pelvis normal, i-para. | Term..... | Duration? 36 hr. from insertion of first bag. | Normal delivery.... | 6 15/16 lb..... | 5 | Inanition. |
| 17. History of difficult deliveries, pelvis normal, iv-para. | Term..... | 17 hr., 50 min..... | Median forceps..... | 6 12/16..... | 2 | Moderate asphyxia, meningeal hemorrhage. |
| 18. Pelvis normal, patient very-nervous, iii-para. | Term..... | 30 hr..... | Low forceps..... | 5 2/16 lb..... | Still-birth... | *In utero* asphyxia. |
| 19. Pelvis normal large child, iii-para. | Term..... | Duration? 21 hr. from insertion of first bag. | Podalic version..... | 10 8/16 lb..... | Still-Birth.... | Prolapsed Cord. |
| 20. Membranes ruptured for 3 days, large child, normal pelvis, x-para. | 3 weeks beyond term. | Duration? 29 hr. from insertion of first bag. | Breech extraction, craniotomy of after-coming head. | 9 12/16 lb., (minus brains). | Still-birth... | Difficult Breech extraction. |
| 21. Severe chronic endocarditis, poor general condition, iv-para. | 8 mo..... | 9 hr., 20 min..... | Normal delivery.... | 4 11/16 lb ..... | 2 | Deep asphyxia, prematurity. |
| 22. Marginal placenta previa, ix-para. | 8 1/2 mo..... | 5 hr., 10 min..... | Podalic version..... | 7 lb..... | Still-birth..... | Hemorrhage from placenta previa, *in utero* asphyxia, (heart never heard). |

4 and 10 were in such poor condition that temperature under any circumstances was not at all surprising, as their power of resistance was very low.

### FETAL MORTALITY.

The study of these 139 cases would be incomplete without considering infant mortality.

I. In private work ten children were lost, as shown in the table on page 768.

II. In hospital work twenty-two children were lost, as shown in the tables on pages 769–770.

### SUMMARY OF INFANT MORTALITY.

*I. Private Patients.*

Among the deaths in private work we may reasonably exclude six (Nos. 2, 3, 4, 5, 7, 8), leaving four, or 5.3 per cent. mortality (including one case of prolapsed cord).

*II. Hospital Patients.*

Among these cases we may reasonably exclude ten cases (Nos. 2, 5, 6, 7, 8, 9, 11, 20, 21, 22) leaving twelve, a mortality of 20 per cent.

Subtracting from the twelve, three cases of prolapsed cord and two of difficult breech extraction we have seven, a mortality of 11 per cent., comparing unfavorably with the mortality in private work.

*Maternal Mortality.*—In private work there were three deaths among the seventy-five patients. One patient died of eclampsia fifteen hours after delivery, another died of eclampsia during labor, undelivered, and the third died of eclampsia eight hours after delivery.

In hospital work, one patient died thirty-six hours after delivery from chronic nephritis and toxemia of pregnancy.

The mortality then, in bag induction may be said to be nil.

### CONCLUSIONS.

1. For the induction of labor with the bag, sizes two and three are most useful.

2. Accidental rupture of the membranes occurs in only 3 per cent. of all cases.

3. The great value of the bag is shown by the fact that in 90 per cent. of all cases, labor was induced by the use of not more than two bags, while in nearly 70 per cent. one bag was sufficient. In only 6 per cent. of all cases was labor not induced by the bags.

4. Anæsthesia for bag introduction is usually unnecessary, as shown by the fact that in only 14 per cent. of private cases was an anesthetic used, or in 16.6 per cent. of all cases including many hospital cases in which the anesthetic was deemed advisable for clinical purposes.

5. In 37 per cent. of all cases, labor begins at the time of the introduction of the first bag, in 70 per cent. of all cases, labor commences within twelve hours after the insertion of the first bag, while in 88 per cent. of all cases, labor begins within thirty hours after the insertion of the first bag.

6. The average length of time intervening between the insertion of the bag and the onset of labor is in primiparæ eight hours and twenty-two minutes, in multiparæ ten hours and twenty-two minutes, and in all cases, nine hours and forty-one minutes.

7. In all primiparæ, the average duration of labor induced by the bag, was twenty-two hours nine minutes. In all multiparæ, the average was fifteen hours fifty-two minutes and the average in all cases was eighteen hours two minutes.

8. Forty-nine per cent. of labors induced by the bag terminated normally and 70 per cent. terminated normally or with the low-forceps operation.

9. In 5 per cent. of all cases, the presentation was changed, but in only one case was the outcome affected because of the accident.

10. In 139 cases, the cord presented or prolapsed in six, or 4.3 per cent., but it must be remembered that in sixty-three cases, labor was induced for contracted pelvis, relative disproportion or hydramnion, and that therefore the accident under any circumstances was much more likely to occur.

11. The morbidity in private work is practically nil, and in hospital work very slight.

12. The fœtal mortality in private work was about 5 per cent., in hospital work 11 per cent. This can be explained partly by the fact that private patients receive naturally more individual attention, and the results necessarily are correspondingly better.

13. The maternal mortality from the use of the bag is nil.

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