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Internal podalic version and extraction : the history, development, and modern day application

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INTERNAL PODALIC VERSION AND EXTRACTION

The History, Development and Modern Day Application

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Version is an operation through which the presentation of the fetus is artifically altered. According to whether the head or breech is made the presenting part, the operation is spoken of as cephalic or podalic version respectively. External version is when all the manipulations are made external to the abdominal wall, whereas internal version is when the entire hand is introduced into the uterine cavity. Combined version is when one hand manipulates through the abdominal wall, while two or more fingers are introduced through the cervix.

The procedure known as "version" is one of the oldest maneuvers in the history of Obstetrics. As defined by J.Whitridge Williams , podalic version is "the seizure of one or both feet by two or more fingers, and drawing them through the cervix."[1]

Internal podalic version was introduced in modern times by Parē and, until the invention of the forceps, afforded the only means of artificially delivering unmutilated babies. The value of the procedure was recognized by Louise Bourgeois, Mauriceau, and among many others by De la Motte.

From as early as the second century, even before Hippocrates' time, a physician named Soranus used podalic version. Soranus advocated the management of pregnant women based upon knowledge rather than superstition. His knowledge of the female anatomy, unique in his day, led him to introduce podalic versions in difficult labors.[2]

There have been several writers since that time who have mentioned podalic version, but the procedure seemed to fall into disfavor until the time of Ambroise Parē, who in 1550 described and successfully performed podalic version. Parē's description of podalic version seemed

to be the most original, and had its birth among the barber-surgeons of Paris. Parē's pupil and successor, Jaques Guillimeau, practiced and improved upon Parē's method and became the first known obstetrician to use podalic version in case of placenta previa.[3]

In the year 1651, William Harvey, often called the "father of British mid-wifery", published a book on Obstetrics in which he emphasized the use of podalic version in complicated cases. Also in the 17th century, Portal's "La protique des Accouchemens" in 1685 showed that version could be done with one foot.[4]

A French surgeon, Jean Louis Baudelocque, who was an outstanding figure in the history of Obstetrics during the 18th century, wrote his views on the method of version in great detail.

In 1807, Wiegand introduced external version, which has become an established procedure.

Through the years many methods and techniques of internal version and extraction have been developed, one of which is the Braxton-Hicks procedure. In 1864, Braxton-Hicks published an original monograph called "On Combined External and Internal Version". The Braxton-Hicks procedure was used mainly in placenta previa and for cephalo-pelvic disproportions.

The technique used in this method is the restricting of the intra-uterine manipulation to the introduction of two fingers through the imperfectly dilated os cervices, and bringing down one limb only. The prolapsed half-breech acts as a tampon against, and dilator of, the lower uterine segment, therefore the manuver is most commonly used for certain cases of placenta previa. Because of the difficulty of the procedure, however,

it has now been replaced for the most part by Cesarean section and by vaginal delivery.[5]

Between the years 1930 and 1942, 110 Braxton-Hicks versions were done at the Boston Lying-in Hospital. A maternal morbidity rate of 20% was found with a gross maternal mortality rate of 1.8% for the series. The gross fetal mortality rate was 79% for 57 viably babies, and the corrected rate was 73%. However, 35 of the patients had placenta previa, and this was not considered a contraindication for this method of treatment. The high fetal mortality rate was attributed mainly to the fact that all patients who were 28 weeks pregnant or more were considered to have viable infants regardless of the weights of the infants.

The most common maternal complication was found to be a febrile puerperium. The two maternal deaths were both due to eclampsia.[6]

One of the men who was responsible for a great deal of the popularity of internal podalic version and extraction was Dr. J.W. Potter, whose work in this field has been called "evolutionary". During the early 1900's, Potter became renowned for his work. Numerous articles appeared in medical journals during this period of time advocating the utilization of Potter's method. His method consisted of approximately nineteen steps. They are as follows:

1) Clean and prepare the patient in the usual manner.
2) Woman is anesthetized to the stage of surgical procedure.
3) Place in a modified Walcher position.
4) Empty bladder of all urine.
5) Vagina and soft parts are dilated by placing one finger of the gloved

hand, well lubricated with green soap, up to the cervix, then withdrawing it with a steady and continuous firm pressure.

6) Two fingers are then inserted, and then three fingers, and finally the closed fist until all the rugae and folds of the vagina are flattened out.

7) The cervix is then gently stretched with the fingers.

8) Then the outstretched hand and arm is pushed high up between the uterine wall and the membranes, and the latter are gently separated by sweeping the finger of the hand up and down.

9) The membranes are then separated by the hand.

10) The position of the baby is made out, the position of the cord ascertained, and the diameters of the pelvis approximated.

11) Both feet are now grasped between first and middle fingers of the left hand, (Potter indicates use of the left hand only, no matter what position the child is in).

12) Both feet are brought down to the vulva and delivered together.

13) After the knees are delivered, pull gently upon the anterior leg, which will rotate the fetal pelvis in the opposite direction.

14) If, at this time, the cord is tight, it is cut; but if it remains free and loose, it is not cut.

15) Both scapulae are now delivered, before either shoulder is delivered. The anterior shoulder is delivered first, with the upper arm.

16) The operator now grasps the baby with his hand over the exposed shoulder and chest and rotates the child's body so that the posterior arm comes anterior and is delivered as such.

17) The operator now determines whether there is a loop of cord around the neck, and if not able to release the cord, it is cut at this time.

18) The fingers of the left hand are now inserted into the baby's mouth and pressure is made with the right hand upon the occiput over the pubis to aid in the flexions of the baby's head.

19) No pressure from the outside should be made because outside pressure over the head before delivery of the arms has a tendency to push the head downward, allowing the arms to go up as well as extending the chin. This pressure causes the difficulties and dangers of other methods of version. The head is then finally delivered, in an extremely flexed

condition which is further assisted by lifting the body well forward and up from the perineum.

20) One cc. of Pituitrin given I.M. (deep).

Potter[7] claims that he has delivered 2900 babies by version and extraction, and that he never had a broken arm or leg of a living baby. The most common complications were related to the cord. Of a study of 920 babies delivered by internal podalic version and extraction, Potter states that he had 16 prolapsed cords, and 81 times the cord was either short or twisted around the baby in some manner. Of the 920 deliveries, two mothers died, both deaths being attributed to pre-existing conditions.

Potter performed version and extraction with the idea of shortening the second stage of labor, with the possible elimination of post partum hemorrhage, eclampsia and sepsis, and such serious after effects as chronic sub-involution, chronic metritis, and chronic adenitis. He believed his method provided for less shock to the mother, no birth injuries to the child, and little or no injuries to the maternal soft parts.

Potter performed version and extraction on a routine basis, except when podalic version could not be performed due to a markedly contracted pelvis or where there was a marked disproportion between fetus and maternal pelvis. Potter's results showed a maternal and fetal mortality and morbidity rate less than those obtained by the average obstetrician of his time. The anesthesia used in these deliveries was chloroform.[8]

Many obstetricians were amazed at Potter's results and became his students in order to learn his method of internal version and extraction. Few obstetricians believed, however, like Potter in doing version and extraction with the idea of eliminating the second stage of labor.

For doing this procedure routinely, Potter was often criticized.[9]

At the present, it is believed that internal podalic version and extraction should be attempted only after complete dilation of the cervix. If the membranes are intact, they are ruptured, and the hand is introduced into the uterus, the feet are then seized, and drawn through the cervix, the operation usually being followed by extraction.

Usually, only one foot is grasped, by placing the ankle between the index and second fingers, and the ankle is slowly drawn through the cervix, while the external hand controls and guides the movements of the head.

The choice of the foot which is to be seized is of upmost importance. If the back is directed anteriorly, the lower foot is seized in order to maintain the back of the child directed toward the symphysis. If, however, the back is posterior, the upper foot is the foot of choice since this will allow the back to rotate to the front.

Often a band of soft material is wrapped around the wrist or held loosely by an assistant in order to prevent the arm from becoming extended over the head.[10]

Potter's method of version and extraction was copied and faithfully followed by many obstetricians, but many disagreed with him as to the indications for the procedure. Few did as he did, that is, performed routine versions and extractions for normal pregnancies and deliveries. Many realized that the excellent results obtained by Potter were due partially, if not wholly, to his dexterity and skilled hands.

In 1925, H.E. Miller published an article bearing the title, "Version, Its Indications and Contraindications". He considered the following as certain general indications for podalic version: First, selected cases of

Because of recognition of the danger to both child and mother, Cesarean section has for the most part replaced version in this condition.[12]

In regard to the present day indications for version and extraction Kettel states that because of the high fetal mortality rate, and certain dangers connected with the procedure, such as rupture of the uterus and cervical tears, which have resulted in maternal deaths, and because of the high fetal mortality due commonly to anoxia and intracranial hemorrhage, combined with the increasing safety of abdomonal delivery, the indications for internal podalic version and extraction have gradually disappeared over the years. In a study conducted by Kettel in 1952, the incidence of internal podalic version was reported from the years 1926-1951, and showed an overall decrease from .9% in 1926 to .2% in 1951.[13]

According to the 1961 edition of Eastman's Obstetrics, the present day indications are now considered to be few in number. They are mainly as follows: 1) transverse lie with the cervix fully dilated and the membranes intact; 2) rarely in face or brow presentation; 3) prolapse of the umbilical cord with the cervix fully dilated; and 4) second twin, under some circumstances.[14]

There have been many complications reported in literature with the use of internal podalic version and extraction. If version is attempted when the uterus is firmly contracted around the fetus, uterine rupture may occur, also, uterine rupture can occur by exerting too much traction in the delivery of the feet. Attempting the procedure before the lower uterine segment is dilated can result in a swollen and edematous external os.

By avoiding pressure on the upper arm, arm injuries can be greatly reduced. By deliberately placing the index or middle finger on the deltoid

region of the child's arm and trying to extract the arm by sweeping the finger downward and hooking it with considerable force around the humerus nerve damage can easily occur.

By avoiding excessive traction in delivery of the aftercoming head, fracture of the clavicle and injuries to the neck and head are greatly decreased. Also, a fracture of the neck of the baby, a serious complication, can easily be avoided.[15]

In a case study done by Samuel S. Rosenfield in the year 1936, 120 consectuive cases of podalic version were studied in respect to complications. A fetal mortality rate of 3.3% was reported. One fetal death was attributed to a short umbilical cord, and the cord tore before the shoulders were delivered. Another death was attributed to a prolapsed cord. The third death was due to a massive adrenal hemmorrhage, and was considered to be a case of adrenal apoplexy by autopsy.

Four babies received fractures from the procedure, two fractures of the humerus, one of the clavicle, and one of the tibia. There was also one case of Erb's palsy.

The maternal complications in this series were third degree tears. Three mothers were reported as having received third degree tears, and all three made perfect and uneventful recoveries. There were no maternal deaths reported in this study.[16]

In a case study done by Potter, he reported no incidences of fractures or third degree tears, with a maternal morbidity rate below 3%, and a fetal mortality rate of no higher degree than deliveries done by other methods. Potter states that the most common fetal complications were related to the umbilical cord.

Potter reports that in a study of 920 patients, 34 children died in the hospital before being dismissed. One was a congenital syphilitic, and 14 died from convulsions, all being 36-72 hours of age. One died of adrenal hemorrhage, ten died of bleeding from mucous membranes, bowels, eyes, noses, etc., five deaths were unexplainable, and three children were monsters.

Two mothers died, and neither death was attributable to the procedure of version and extraction.[17]

In an analysis of 221 cases of internal version, done by both Braxton-Hicks method and Potter's method, a fetal mortality of 31% was reported. Such conditions, however, as prematurity, prolapse of the cord, and placenta previa were stated as being chiefly responsible for the high mortality rate. Twenty five percent of the fetal deaths were definitely attributed to intracranial hemorrhage. In relation to the maternal morbidity, a rate of 14% was found, with severe post-partum hemorrhage being the most common complication, followed closely by laceration of the cervix.[18]

Part II: Analysis of fifteen cases of internal Podalic version and extraction done at UNH:

Case I: The first case was a 36 year old Negro woman, whose parity was 8-0-6-7. The patient was approximately 38 weeks pregnant at the time of onset of labor. As labor progressed, vaginal and rectal examinations revealed no presenting part palpable. An x-ray was obtained, and showed the vertex floating upward out of the pelvis. The patient at this time had been in labor for over 30 hours, and a diagnosis of uterine inertia had previously been made. However, the cervix was fully dilated, and the membranes had ruptured. The patient was, at this time, taken to the delivery room where it was noticed that several loops of cord presented ahead of the head, despite abdominal pressure. At this time, version and extraction was performed. The infant was delivered to the scapulae, both arms were brought down, and the remainder of the delivery was carried out by the Weigand-Martin maneuver.

The child was found to have a fracture of the right humerus, thought to be due to inadequate relaxation of the uterus. The child's condition at birth was mentioned as being fair, and no Apgar rating was given. The weight of the child was 2150 grams. Cyclopropane and ether were the anesthetics used. The total duration of labor was listed as being 31 hours and 8 minutes. Blood loss was 200cm., and the only injury received to the mother was a 1cm. tear of the cervix. She had a normal post-partum course.

Case II: #3-78-65

This patient was a 36 year old Caucasian who was a primi-gravida.

Her gestation period was approximately 36 weeks. The patient was diagnosed as having a transverse lie of the fetus. The cervix became completely dilated, and the membranes at this time were artificially ruptured. The patient was then taken to the delivery room, where, under general anesthesia of cyclopropane and ether, internal podalic version and extraction of a 1820 gm. male was performed. A medio-lateral episiotomy was performed prior to delivery. Fifteen minutes after delivery of the placenta, the patient went into shock. Blood pressure was unobtainable at this time, and blood loss was estimated at 400-500 ccs. The patient was immediately given Vasoxyl, both I.V. and I.M., 10 units of Pitocin I.M., and also Methergine I.M. One unit of blood was also started at this time. The blood pressure responded, but was quite labile. The patient began having shaking chills of increasing severity, and the blood transfusion was immediately stopped. At this time, Wyamine was given, and again the blood pressure responded well. The patient, however, was bleeding freely from the uterus, and a sample of blood was taken which failed to clot. Four units of fibrinogen were given along with 2 units of rematched blood. With this therapy, the bleeding stopped, and the blood pressure became stable. Total blood loss was estimated at 1500cc's. This was a case of amniotic fluid embolism.

The child did not show any signs of mechanical injury or trauma, but did not breathe spontaneously and required resuscitation. The Apgar was recorded as 5 at 1 minute.

Case III: D, RL - #3-72-71

The 3rd case was a 22 year old Caucasian, with a parity of 2-1-0-1,

and gestation period of 31 weeks at the time of onset of labor. A diagnosis of transverse lie was made. The patient was fully dilated, and her membranes had ruptured prior to being taken to the delivery room. Internal Podalic version and extraction was performed, with the child being delivered as a single footling. The right leg was delivered first. The Mauriceau-Smellie-Veit maneuver was employed in extraction. The anesthesia used was Fluothane.

The infant was depressed and immediate intubation and resuscitation was employed. The Apgar rating at 1 minute was 2. The infant received no injuries, and weighed 1815 grams.

Case IV: #22258

This patient was a 31 year old Caucasian, whose parity was 5-0-1-5, and who had a gestation period of 42 weeks prior to onset of labor with a twin pregnancy. The patient was taken to the delivery room fully dilated and after membranes had ruptured. Internal podalic version and extraction was performed on the second twin. The mother was given cyclopropane and ether. Both feet were grasped by inserting the hand into the uterus, and the infant then delivered by breech extraction.

The second twin weighed 2482 grams, and was given an Apgar rating of 6 after 1 minute. The infant did not receive any injuries noticeable at delivery.

The mother's blood loss was less than 400 cc's., and she received a first degree laceration of the cervix as her only complication. The post-partum examination was normal.

Case V: #3-77-93

This patient was a 22 year old Caucasian who was a primagravida. Her gestation period was 28 weeks. A transverse lie with the vertex in the left lower quadrant was diagnosed, and because of the prematurity of the child, version and extraction was elected. The cervix was fully dilated, and the membranes were artificially ruptured. The patient was taken to the delivery room and given cyclopropane as a general anesthetic. The operator's hand was inserted into the uterus, and both feet grasped. The infant was then delivered by total breech extraction. The infant weighed 1332 grams, with an Apgar rating of 5 at 1 minute after delivery. The infant's face was asymmetrical and quite ecchymotic at the time of delivery.

The mother did not have any complications, was dismissed with a normal post-partum examination. There were no cervical tears from delivery.

Case VI: #3-82-49

This patient was a 28 year old Mexican with a parity of 4-2-0-6, and a gestation period of 32 weeks. The infant had been dead for three weeks.

The left acromian was in the anterior position as seen by x-ray, and no presenting part was palpable. The patient became fully dilated, and was taken to the delivery room where the mambranes were artificially ruptured and Fluothane was given. Internal podalic version was performed by grasping one foot and pulling it through the cervix. The cervix contracted down around the neck so tight that the M-S-V maneuver failed to produce delivery, and the infant was delivered by Piper forceps.

The maternal blood loss was listed at 450 cc's., without any cervical tears. The mother had a normal post-partum course.

The infant weighed 1707 grams and was stillborm. There had been no audible heart sounds or any fetal motion for three weeks prior to the onset of labor.

Case VII: #1-55-85

This patient was a 25 year old Caucasian with a parity of 3-0-1-3 and a gestation period of 36 weeks.

This woman had twins, the first being a vertex presentation, and the second requiring podalic version and extraction. The second was delivered as a double footling breech. The type of anesthesia used was not recorded.

The mother received no cervical tears and did not bleed excessively, but developed a endometritis post-partum due to premature rupture of the membranes.

The infant weighed 2580 grams, and had an Apgar rating of 7 at 1 minute. Resuscitation, however, was necessary because the second twin did not breathe spontaneously.

Case VIII: #1-32-45

This patient was a 28 year old Caucasian with a parity of 6-0-0-6, and a gestation period of 38 weeks.

Her second twin was found to be a transverse lie, and internal podalic version and extraction was performed on the infant with the use of cyclopropane and ether as the anesthetic for the mother. One foot was grasped and brought through the cervix, and a complete breech extraction was performed.

The mother had no complications, and was dismissed with a normal post-partum examination.

The second twin weighed 3135 grams, and received an Apgar rating of 3 at 1 minute. Resuscitation and intubation was necessary to revive the infant. The infant received no injuries from the procedure.

Case IX: #4-42-84

This patient was a 30 year old Caucasian, with a parity of 3-2-0-4, and a gestation period of 37 weeks.

The cervix was found to be completely dilated, and an oblique fetal position with the head near the right costal margin and breech at the left iliac crest was also found. Because of previous vaginal bleeding, a "double set-up" examination was done. Internal podalic version and extraction was performed with the use of Fluothane and nitrous oxide as anesthetics. There were no cervical tears or excessive blood loss, and the post-partum examination was regarded as normal.

The infant weighed 2850 grams, and did not cry spontaneously, requiring intubation and resuscitation. The Apgar rating at 1 minute was 8. The infant received no injuries from delivery.

Case X: #2-96-81

This patient was a 22 year old Caucasian with a parity of 2-0-0-2, and a gestation period of 44 weeks. The fetus was known to be dead for 2 weeks. This patient had Rh negative type O blood. The transverse lie was diagnosed, and with a fully dilated cervix and ruptured membranes, the patient was taken to the delivery room and given cyclopropane and ether.

The right foot was grasped and brought through the cervix, followed by the left foot. Complete breech extraction was then performed.

The mother did not suffer any injuries or complications. The infant weighed 3444 grams, and was a stillbirth. There was no evidence of fetal heart tones or movement two weeks prior to the onset of labor.

Case XI: #26884

This patient was a 19 year old Caucasian with a parity of 2-0-1-2, and a gestation period of approximately 28-30 weeks.

Internal podalic version and extraction was performed upon the second twin with the use of a pudendal block as the anesthetic.

The second membrane was artificially ruptured, a hand was inserted into the uterus, grasping one foot and pulling it through the cervix. The infant was then delivered as a single footling, employing the M-S-V maneuver.

Although there were no cervical tears reported, a blood loss of about 500ccs. was estimated. A LML episiotomy was performed prior to delivery. The mother had a normal post partum course.

The infant weighed 1370 grams, and received no injuries, breathed and cried spontaneously.

Case XII: #3-52-80

This patient was an 18 year old Caucasian whose parity was 0-1-0-1, and who had been pregnant for 28 weeks. The indication for internal podalic version and extraction was a transverse lie. The cervix was fully dilated, and the membranes had ruptured spontaneously three days prior to admittance to the hospital.

A RML episiotomy was made, and internal podalic version and complete breech extraction was done with the use of the MSV maneuver and cyclopropane and ether as anesthetia.

There were no complications from the procedure, and the post-partum course was normal.

The infant weighed 1025 grams, received an Apgar rating of 1 at 1 minute, and was very slow to respond. Intubation and resuscitation was necessary.

Case XIII: #3-66-57

This patient was a 25 year old, para 5-0-1-5, who was 37 weeks pregnant. On vaginal examination, a transverse lie was diagnosed with no presenting part palpable. The cervix was completely dilated and the patient was given general anesthesia of cyclopropane and ether. The membranes were then artificially ruptured. Internal podalic version and extraction was then done, the infant being delivered as a double footling with the use of M-S-V maneuver.

A LML episiotomy was done prior to delivery, and there was no report of any cervical tears. The mother was reported to have had a normal post-partum course.

The infant weighed 2230 grams, and received an Apgar rating of 4 after 1 minute. In spite of the low Apgar, the child breathed spontaneously and did not require any resuscitation.

Case XIV: #4-18-64

This patient was a 26 year old Caucasian, para 2-0-0-2 with a gestation

period of 25 weeks and a known twin pregnancy. The anesthetic employed was a pudendal block, and internal podalic version and extraction was performed on the second twin, who was in a transverse lie. A midline episiotomy was done, without any cervical tears or complications. A normal post-partum course was reported.

Neither of the twins survived, the second weighing only 860 grams. No Apgar rating was given on either of the twins. Neither twin breathed nor cried, and resuscitation of both failed.

Case XV: # 1-55-85

This patient was a 26 year old Negro para 1-2-1-3, who had a gestation period of 30 weeks. With the use of a pudendal block, one hand was inserted into the uterus and internal podalic version and extraction was accomplished by grasping both feet and bringing them down through the uterus, followed by complete breech extraction employing the M-S-V maneuver. A LML episiotomy was done prior to delivery.

This also was a second twin, and the diagnosis was reported to be a transverse lie. No maternal complications were reported.

The infant weighed 1345 grams, and had an Apgar rating of 2 at 1 minute. The infant breathed and cried spontaneously and received no injuries.

DISCUSSION

The material studied included fifteen cases of the procedure, internal podalic version and extraction, which were performed at the University of Nebraska Hospital over a period of three years, from 1958-1961. The ages of the patients varied from 16 to 36. There was only one primagravida included among the patients, and the gravidity went as high as 14. The duration of gestation periods ranged from 25 weeks to 44 weeks. In only one case did the infant weigh less than 1000 grams, this being the one in which gestation period was only 25 weeks.

The indications for internal podalic version and extraction were generally classified into two groups: transverse lie and second twin. Nine of the cases were transverse lie and six were second twins.

The duration of labor varied widely, ranging from two hours and 15 minutes to 31 hours and 8 minutes. The average duration of labor, however, was only approximately $6\frac{1}{2}$ hours, which includes a case of inertia of the uterus that had a labor duration of 31 hours and 8 minutes.

The membranes were known to be intact at the time of delivery in only 6 of the 15 cases reviewed. In the remaining cases, rupture had occurred from 2 weeks to several minutes before delivery.

The maternal complications of delivery were few, and of minor degree, excepting one case. In this particular case, the blood loss mounted to about 1500 cc's. Immediately after delivery of the placenta, this patient went into secondary shock with bleeding occurring from the uterus. Laboratory fibrinogen levels, however, were found to be lowered, and after

4 units of fibrinogen were administered, the patient's bleeding stopped, stabilizing the blood pressure.

The average blood loss was found to be 400 cc's., including the case of the secondary shock when 1500 cc's. of blood were lost. Eliminating the case of hemmorrhagic shock, the blood loss would average 325 cc's.

Episiotomies were done in all but three cases, the most common being medio-lateral, either left or right. Only one midline episiotomy was done. There were only two cases of cervical lacerations, both occurring in cases where episiotomies were not done, and both being first degree in nature. There were no second or third degree cervical tears reported. Thirteen of the fifteen cases were reported to have had normal post-partum periods, with normal examinations at the time of dismissal from the hospital. One of the abnormal post-partum courses was previously mentioned, which was the episode of shock. The other was a case of endometritis due to premature rupture of the membranes, which occurred approximately two weeks prior to admittance and delivery. There were no maternal deaths.

There were fifteen infants involved in this study. The weights varied from 860 grams to 3444 grams, the average weight being 2010 grams. According to William's Obstetrics, infants weighing between 1000 and 2500 grams are considered to be premature, and infants weighing from 500 to 1000 grams are considered to be immature. Infants weighing less than 500 grams, then, are abortions. It is interesting to note that only four infants of the fifteen weighed enough to be considered mature, that is, over 2500 grams. Ten of the infants weighed between 1000-2500 grams, therefore being classified as premature. The infant that weighed 860 grams was classified as being immature.

Three infants were lost, and all three were non-viable at the time of delivery. The first to be considered weighed, as mentioned before, 860 grams, and had a gestation period of only 25 weeks. This infant was the second of twins, neither of the infants having shown any signs of life after delivery. The Apgar rating was, of course, 0. The second infant to be studied was also a stillborn, weighing 1707 grams. There had been no heart rate or fetal motion detected for over two weeks prior to the onset of labor. Again, there was no Apgar rating.

The third was also stillborn and weighed 3444 grams. No Apgar rating was given. Again, in this case, there were no audible heart sounds or fetal motion prior to onset of labor.

The exact causes of death in the latter two cases was not known, but can be assumed not to be related to the method of delivery since both had been thought to have been dead prior to the onset of labor.

The remaining twelve infants were all alive and sent to the nursery after delivery. Six of the living infants did not breathe or cry spontaneously and needed intubation and resuscitation. Three of these six weighed more than 2500 grams, and therefore were considered to be mature infants. Four of these six infant's mothers had received cyclopropane with or without ether as an anesthetic, while the other two received Fluothane and nitrous oxide. All of the infants delivered under general anesthesia showed low Apgar ratings, although all did not require intubation and resuscitation.

The type of anesthetic used most commonly was cyclopropane and ether, and were used in nine of the cases. Fluothane was used three times, and pudendal block with Xylocaine was used three times. Eliminating the

three stillborn cases, the average Apgar rating at one minute after delivery of the infants delivered with the use of cyclopropane and ether was slightly over 4. With Fluothane, the ratings were 2-5, and with the pudendal, 4-5 for the three infants. Two of the three infants delivered with use of pudendal block breathed and cried spontaneously, while the third was the non-viable fetus.

One of the infants received a fracture of the right humerus, which was thought to be due to inadequate relaxation of the uterus. The anesthetic used here was cyclopropane and ether. Another infant was born with an assymetrical face and was quite ecchymotic. Both of these injuries were attributed to the method of delivery.

In a study of 23 cases of transverse lie delivered by Cesarean section at the University of Nebraska Hospital, 16 of the babies were discharged alive, three died before labor, two died in the hospital within 24 hours after delivery, one died during labor, and one died between 24 hours and 6 days after delivery. The weights of these infants varied from less than 400 grams to more than 3500 grams.

It is interesting to note that seven of the 23 infants delivered by Cesarean section were lost, or grossly a 30-5 % mortality rate, whereas only three of fifteen of the infants delivered by internal podalic version and extraction were lost, or grossly 20%. Only four of the fifteen infants delivered by podalic version weighed enough to be considered mature, while 13 of the 23 infants delivered by Cesarean section weighed enough to be considered mature.

SUMMARY TABLES

Indications for Version

Indications	Number	Maternal Deaths	Fetal Deaths
1. Transverse lie	9	0	1
2. Second twin	6	0	2
*			
6			

Duration of Labor

Hours	All Cases	Primiparas	Multiparas
6			
12 hours or less	14	1	13
more than 12 hrs.	1	0	1

Term of Gestation

weeks	25-30	30-35	35-40	40-45
no. of cases	4	3	6	2

CONCLUSIONS

The procedure of internal podalic version and extraction was used as early as the second century in an effort to provide a means for the management of difficult deliveries.

Throughout the years the indications have varied, as well as the results and specific complications. The present day indications have previously been mentioned.

Potter obtained remarkable results, and many tried to follow his technique, but few did as well. Perhaps the key to his success was that he consistently used chloroform as an anesthetic, and thereby was provided good relaxation, as well as the fact that he was a skillful operator. Although he was successful in doing this procedure many times, it was popular opinion then, as now, that this should not be done routinely as Potter advocated.

There are certain criteria that must be met before the procedure of internal podalic version and extraction may be done. Firstly, and most logically, is that of the operator being reasonably skillful and experienced. Secondly, there must be no evidence of cephalo-pelvic disproportions, and the head must be displaceable. Thirdly, the cervix must be completely effaced and dilated. Of prime importance relating to the actual procedure is the fact that one must have adequate anesthesia. Also, the use of posterior lateral and not median episiotomies will result in fewer complications.

The two main indications of internal podalic version are transverse lie with a small baby and a second twin.

I feel that internal podalic version and extraction has a definite place in the practice of Obstetrics, but only in the hands of an experienced operator and only when the specific criteria, which are necessary, are met.

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