CLEVELAND
Medical Gazette
VOL. XII. | AUGUST, 1897. | No. 10.

Original Articles.

INJURIES RECEIVED BY THE CHILD DURING BIRTH, AND THEIR PREVENTION.

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It is with considerable hesitation that I present this paper, not only because this is my first attendance at the meetings of your society, but also because of the difficulty experienced in obtaining accurate information on many matters pertaining to the subject chosen.

For the mother, the risks of labor have been reduced by antiseptic precautions to a minimum. Her unborn child, however, receives far too little attention, its life being sacrificed because of a lack of watchfulness on the part of the attending physician, or the ignorance of the midwife, or because the mother's failing strength or inability to deliver herself leads to radical efforts that her life may be saved, where an early appreciation of the situation would save the child's life also. It is with the hope of starting more discussion in behalf of the child that I present this paper, trusting that it may lead to investigations as to the relation between difficult labor and causes of death whenever opportunity offers. There are very few institutions that practise making autopsies on still-born children or those dying soon after birth, and in private practice it is generally impossible to obtain the

consent of the parents, so that statistics are very meager. Most investigators have met with this difficulty and much to my disappointment I found that Cleveland institutions do not make such autopsies. I shall quote some statistics of those who have been able to collect series of autopsies, and I believe they will be very suggestive of what will be found when a large series of cases can be made.

According to Winckel, ten per cent. of all children born die before the eleventh day, seven-tenths per cent. dying during labor, and three and three-tenths per cent. from injuries received at the time of labor. The statistics of Julius Eröss differ somewhat from these, though he does not include premature births. Examining nearly 1,500,000 births in 16 large cities of Europe, he found a mortality of ten per cent. at the end of four weeks. Of these, 54.24 per cent. were due to congenital debility. What Eröss meant to include under the term "congenital debility" I do not know, but suppose cases which are reported as dying the first few days from "convulsions," "weakness," "cramps," "asphyxia," "premature birth," "cyanosis," and "atalectasis." He found one still-birth to every 28.5 deliveries, a mortality of nearly four per cent.

Dr. A. Brothers, of New York, in his valuable essay on this subject, which has been a great help to me, has quoted many statistics of others, and gives the following results of his own investigations: In a series of 201 still-births, he found that 53, or 26 per cent., were due to protracted labor or asphyxia, and the same number from compression of the cord. In 99 children, born alive, 60 died from prematurity and congenital feebleness, 18 per cent. died in three days after being resuscitated from asphyxia, and seven per cent. from convulsions due to hemorrhages. In 47 autopsies, the majority disclosed the fact that there had been obstructions in either mother or child, though definite relations between labor and causes of death could not always be established.

I have here a chart showing the causes and numbers of deaths, for each cause, of children under one month of age, in Cleveland, during 1896. I shall not weary you with reading it, but only give a few totals. During this

period there were 888 deaths reported and 48 causes. In 1896 there were 8,927 births reported, showing a mortality of 9.94 per cent., practically the same as that reported by Eröss. Eröss found one still-birth to every 28.5 deliveries. During the past year there has been a still-birth to every 23.1 deliveries, a mortality of 4.3 per cent. A large number of births may make the average approach that of Eröss. Comparing with Winckel's figures, I find a mortality of 7.67 per cent. in eleven days. During the first day there were 134 deaths due to causes as follows: "convulsions," 16; "weakness," 58; "premature," 26; "cramps," 9; "marasmus," 10 (this last I should think belonged under "weakness"); "asphyxia," 5; "cyan-

A CHART SHOWING THE NUMBERS AND CAUSES OF DEATHS OF CHILDREN DYING IN CLEVELAND DURING 1896, AND UNDER ONE MONTH OF AGE.

DISEASES.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Stillborn,	386																															386
Convulsions,		16	12	4	5	5	6	6	5	5	6	4	1	2	15			1	2		1	7						6		6	115
Weakness,		58	4	5	2	2	3	5	1		1	1	2	1	8		1					4						2		4	104
Premature,		26	4	1	1	2		2	1						3	1						1									42
Cramps,		9	4	6	2		3	1	2			4		1	4		1	1				1			1		1	1		3	45
Marasmus,		10		2	1	1	1		2		3	1	1	2	10	1	1				1	13			1			7		11	69
Asphyxia,		5																													5
Cyanosis,		2																													2
Atalectasis,		3																													3
Difficult Labor,		3	1																												4
Hemorrhage,		2																	1												3
Spina Bifida,					1			1							1							3									6
Ichthyosis,								1																				1			2
Suppression of Urine								1																							1
Intestinal Obstruc.,			1															2													1
Entero Colitis,															1	1		2				2						1		1	8
Cholera Infantum,						1		3			1	1	1		5							2				1		1			16
Inflam. of Bowels,						1		1			1											1									4
Diarrhea,																				1											1
Gastritis,																					1										1
Jaundice,						1		1																							2
Tonsilitis,																						1									1
Bronchitis,								1	1						2			1				1						1	1		2	10
Bronchial Pneum.,										1	1				5			2				2						5		2	18
Pleuritis,																					1										1
Meningitis,																						1									1
Melena Neonatorum,				1																											1
Congenital Malform.				1			1																								2
Congestion of Brain,				1		1																									2
Lung Trouble,			1								1																				2
Croup,							1																								1
Laryng. Stridulus,						1		1																							2
Erysipelas,								1																							1
Tetanus,						2	1	3																							6
Rupture,						1																									1
Heart Disease,												1																			1
Anaemia,															1																1
Pertussus,															2																2
Indigestion,															1																1
Asthma,																	1														1
Pyaemia,																				1		1									2
Whooping Cough,																						1								3	4
Imperforate Rectum,																						1									1
Gangrene,																						1									1
Omphalitis,																						1									1
Gastro Enteritis,																														1	1
Heart Failure,																														1	1
Winter Cholera,																														2	2
	386	164	27	21	12	17	19	27	14	5	14	12	6	6	58	3	4	7	3	2	4	44	0	0	2	1	1	1	25	0	36	888

osis," 2; "atalectasis," 3; "difficult labor," 3; and "hemorrhages," 2. Considering the causes, we would be safe in saying that at least three-fourths of the deaths on the first day were directly dependent on the labor. On the second day there were 27 deaths. The first five causes mentioned were the most prominent up to eight days and, indeed, throughout the first month of life.

In studying these statistics, I believe we can say that 65 per cent. are dependent on congenital debility as a cause, and in the statistics, after the first day, only the first five causes are considered. I further believe that very many of these deaths could have been prevented. I know that these statistics are not accurate, but they are as nearly so as we can estimate from the few autopsies that are being made.

Some deaths, and injuries perhaps, are due to diseases in the mother or child acting before, during, or soon after labor. These, however, I will not consider, but take only those injuries clearly dependent on the labor. The slightest of these is caput succedaneum, and, though it rarely takes an unfavorable course, may be associated with some intracranial injury, when a more serious outcome is to be expected. More severe and more likely to cause trouble is cephalhematoma. This may appear after a severe or easy labor and cannot be prevented. It usually absorbs within a few days and rarely suppurates. Unless it is connected with internal hemorrhage, it seldom proves fatal. Hematoma of the sternomastoid muscle and facial paralysis from pressure of the forceps seldom prove serious, though the torticollis following the former may be more or less permanent. A careless application of force may cause a more lasting paralysis, when, by making traction in the axilla, the brachial plexus is injured, while in version an arm or leg may be fractured also. The two conditions most disastrous to the child are asphyxia and intracranial hemorrhage, for if they do not result fatally, they, and especially the latter, very frequently cause permanent injury to the brain.

It has seemed to me best to enumerate first the conditions which will lead to asphyxia and hemorrhage. These all act by obstructing the circulation, either placen-

tal or fetal, whether the obstruction is directly applied, as to the cord, or indirectly from continuous pressure to the head through prolonged labor or abnormally severe pains in a shorter labor. A full bladder or impaction of feces may prolong labor very materially and serve as really a very effective obstruction to its termination till removed. Premature rupture of the waters, hypertrophy of the cervix, cicatricial tissue or a new growth acts in the same way. Contraction of the cervix around the neck of the child prolongs the second stage, and with after-coming head often proves fatal. In this connection I wish to condemn the practice of some who administer ergot to promote pains. It is a dangerous practice at any time during labor, and is especially so to the child. The violent pains caused by it interfere very markedly with the placental circulation. Brothers quotes from another that, in 30 cases where ergot was given, there were 20 fetal deaths, and where the fetal heart-beats were watched they soon fell to 100 and then began to intermit. This high mortality may not always occur, but it is a warning that should be heeded. A rigid perineum or exhausted uterus are two other causes of prolonged labor, but the one which too seldom receives attention is pelvic deformity. Granting that, as some claim, the American women seldom have deformities of the pelvis, still we have thousands of foreigners coming to our shores in whom we know pelvic contractions exist to quite an extensive degree. Since general practitioners, who do most of the obstetrical work, do not measure pelves, we are not in a position to assert positively that deformities are rare.

I do not refer to the deformities that are easily recognized, but to those of a lesser degree, which, also, may act as a troublesome obstruction to the progress of labor. Such deformities are estimated to exist in from 75 to 145 out of every 1,000 cases. This is frequent enough to demand attention, for Playfair says one in every five cases of slightly contracted pelves will result in a still-birth. Lusk quotes statistics showing 53 fetal deaths in 407 cases of slightly contracted pelves in which birth was spontaneous. Where the contractions are sufficient to indent the child's head, Schroeder says 50 per cent. die, during,

or shortly after birth. Contracted pelves are a source of danger, also, in that they are a frequent cause of abnormal positions and prolapse of the cord, the latter condition having been found to cause death in from 37 to 53 per cent. of cases.

A prolonged pregnancy resulting in an advanced stage of ossification of the bones of the head, a hydrocephalic head, twins, and abnormal positions, are causes, existing in the child, of protracted labor.

To take up now the results of these obstructions, we find that asphyxia is one of the most prominent. It is seen in three grades: The first, where mucus exists in the air passages, is usually easily remedied; the second and third, known as "sthenic" and "asthenic," are caused by too much blood pressure, as from prolonged and difficult labor, and by too little blood where the placental circulation is interfered with. It is most important to recognize the variety because the proper treatment depends on this.

Dr. J. M. Taylor quotes statistics showing that 40 per cent. of the children suffering from injuries received at labor are first-born and have had asphyxia. But it is not in the asphyxia itself that all fatalities arise, but in the complications resulting from it. According to the author just quoted, these may be "congestion, effusion, thrombosis, extravasation, destruction of membranes and cystic degeneration." Such results are not surprising when we consider the delicate nature of the fetal brain and its membranes. Virchow and others have demonstrated the fragility of the blood vessels and the ease with which they are injured. It is further demonstrated in cases of death from hemorrhage following asphyxia where there has been no injury to the cranium.

Intracranial hemorrhages, another result of obstructed labor, have been found to be meningeal, in origin, in the majority of cases. Dr. Little, of England, was the first to suggest, and Dr. Sarah McNutt, of this county, the first to demonstrate the relation between these hemorrhages and labor. Dr. McNutt reported ten cases on which autopsies were held, showing the presence of hemorrhage. Seven of these were vertex presentations and three were breech. She concluded from these that

the hemorrhage more usually occurs at the base of the brain in vertex and at the convexity in breech presentations. In breech presentations convulsions occurred. Spencer was able to examine critically 130 out of 185 cases and found 85 in which hemorrhage or congestion was present. The hemorrhages may vary from a general distribution of blood over the surface of the brain to localized clots, either large or small, the presence of these depending on the length of life after the hemorrhage occurred. Where the hemorrhage does not terminate fatally, it usually injures the brain to such an extent that either cerebral palsy or idiocy, or both, result.

Cruveilhier claimed that one-third of the deaths during parturition were due to meningeal hemorrhages, and without doubt many of the deaths within the first few hours or days after birth from "convulsions," "weakness" and "cramps" are due to the same cause. This can only be inferred, for enough investigation has not been made to make positive statements, though comparison of symptoms in cases where no autopsy is made with those in cases where autopsies are made seems to justify the inference. Osler says that while only a limited number of cases of infantile hemiplegia are congenital, the large proportion of cases of spastic diplegia result from injuries received at birth. Sachs' and Peterson's investigations resulted in the same way. Dercum says that the fact that most of these cases are found in first-born is confirmation of the fact that birth traumata are a large etiological factor. Gowers studied a large series of cases in which the doubtful cases were thrown out. He says that difficult labor causes the hemorrhages injuring the brain. In about one-fifth of the cases it is due to the aftercoming head, in which the symptoms are easily understood. But the same symptoms follow vertex presentations. Some also occur where the labor is rapid and premature. He also says that where convulsions, rigidity and paralysis occur, meningeal hemorrhage will be found.

It is not my intention, nor is there time, to take up the symptoms and pathology of these conditions. By merely stating some of the results of investigations, I hope the importance of the subject has been emphasized, and yet, in approaching the end of the paper, I realize I

am falling far short of the mark set at the beginning.

There are a few points in the matter of prevention of these injuries which are most important and too frequently neglected. I want in closing to speak of these and urge that more attention be given to the mother before labor begins and to child as well as mother during labor.

The routine measurement of pelves by all practitioners will save many lives, not so much because wide deviations from the normal will be disclosed, as that it will call attention to the slighter ones which would otherwise be overlooked. The knowledge that such deviations are present will lead to a more careful observation of the progress of a labor and a preparation to act intelligently when the child's life is threatened because the labor has been prolonged by the obstruction. This, however, is a subject for an entire paper and cannot be further considered at this time.

Equal with pelvimetry in importance, if not more important, is the study of the fetal heart. It is remarkable how generally it is neglected. How can a labor be conducted properly when the child's condition is not considered? Over and over again has it been remarked to me by different ones that they never pay any attention to the fetal heart. Is it any wonder that children are born dead, are asphyxiated, or have intracranial hemorrhage, when no effort is made to discover whether the child is living, dying, or dead? The fetal heart is the only indicator we have to tell us how the child is enduring the strain put upon it by the labor, and this is not always easy to find. This very difficulty should lead to a more systematic study of each case. Oftentimes it is experienced because of a lack of knowledge of the relation of the child's body to the mother and because of too little patience. A careful palpation will aid greatly in determining how the child lies, and where the heart sounds will probably be found. Should they be found to be approaching 100 or exceeding 160 it should be a signal to interfere.

There are many cases in which the second stage of labor may be very slow where no real obstruction exists. Such labors may result disastrously to the child because of severe and long continued pressure to the child's head. When such pressure begins to interfere with the child's

circulation, forceps should be applied. It is a wrong impression that their use is the cause of most injuries. In careless and unskilled hands they may do untold harm, but otherwise they are a great life-saving measure. Dr. J. M. Taylor, who has already been quoted, published the opinions of many prominent obstetricians and neurologists on this subject. With scarcely an exception they were agreed that greater damage results from the conditions making the forceps necessary than from their use. A notable exception was Dr. Joseph Price, who claims that bad results to the child are due to the unskillful use of instruments. This position will not be supported by facts, however.

I do not claim that the use of these measures will save the lives of all the children. Many are due to diseases which will not and cannot be affected by such treatment. Again, the most careful application of every means known will sometimes fail, and no one must be too hasty in passing judgment where injuries or death have resulted. But the fact still remains that many injuries and deaths are caused by overlooking just these means of safety that I have mentioned, and till not only they but every other appropriate means are systematically adopted in every case of labor, we can expect just such results as we have now.

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DISCUSSION.

DR. R. E. SKEEL, of Cleveland: Certainly Dr. Clark has given us a very valuable paper, and the statistics and conclusions he has drawn with regard to the damage to the child are as complete, I believe, as it is possible to obtain with the statistics at hand, because, as he said, they are very limited. The important thing is not what are the injuries, because they do occur, but how to prevent them. How can these various troubles,—asphyxia, intracranial hemorrhage, paralysis,—be prevented? As he said, very much depends upon the proper management of the labor itself. The paper is too full to discuss at length. In the first place, with regard to prolongation of labor, it has been my experience, and I think if we should all examine carefully during the first, or at the completion of the first stage of labor, to distinguish the position in which the head lay with regard to the pelvis, we would all find that a very common cause of prolonged labor is a posterior position of the occiput. Only a year or so ago one of the students called me to a case in which the head did not engage. Apparently everything was all right. The woman had had five children without a particle of difficulty at any time. Examining her pelvis I found the true conjugate was shortened about half an inch. There had been no difficulty with her previous labors. The whole trouble was that the child lay in the posterior position, the occiput was posterior, and so soon as it was rotated labor was completed without difficulty. So I think the position of the child is of great importance in consideration of the reason why labor is prolonged; as great, indeed, as are the ordinary pelvic deformities.

Granting that a marked pelvic deformity can always be determined beforehand, I think it is very difficult, indeed, to tell when we have a normal pelvis. The majority, of course, are agreed as to the size, except the length of the true conjugate. There is a variation as to the measurement of the true conjugate pelvis between German and American authors. Lusk will give us exactly four inches as the true conjugate diameter of the pelvis, while the German authorities, Winckel and Schroeder, will give us four and a half inches. So it is

pretty hard to tell exactly. The question arises in my mind every time I measure a pelvis, how large that head is going to be. It strikes me more forcibly than the size of the pelvis. I think the thing we have to study is the relation between head and pelvis in each individual case, provided there is no such marked deviation as to lead us to expect serious difficulty.

Another thing was the damage which is produced so frequently by version. It is one of the things that has followed me as Dr. Knowlton said some results followed him. In having a contraction of the cervix about the neck of the child after the body was born, and having a difficult time getting the head flexed, the arms getting up in spite of all that could be done. This is in private practice. I know I have lost many more children by doing version than with forceps. I believe that with the advantage we have to-day with the axis-traction forceps very many cases which were formerly subjects for version are to-day subjects for axis-traction. In many cases of slightly flattened pelves, with the patient in proper position, the hips elevated to such an extent that the body of the child lies in a direct axis of the uterus, children could be delivered by axis-traction forceps which formerly were delivered by version. Then we shall not have so much difficulty with the head, so many broken arms in attempts to pull down. With one hand upon the abdomen it is, many times, almost impossible to keep the hands from going up and the chin from extending. We shall save a good many children that would otherwise get into serious difficulty if version is resorted to.

Dr. Clark spoke of ergot. In closing this discussion, I will say I tried ergot and will never do so again. I think the dangers of ergot are very marked. Somewhat earlier, when I was somewhat fearful about using the forceps, I gave ergot once or twice for the sake of stimulating the labor pains. But if one will give ergot a few times and witness the tetanic contractions I do not think they will feel like giving ergot a great deal, although I do believe at the present time authors are falling back and say a few drops of ergot may be given to stimulate pains. Notwithstanding, I think forceps are safer, if skillfully used, than ergot.

DR. DUTTON, of Cleveland: In regard to ergot, I stand just here, from my own personal experience as well as from the testimony of others: I never give anything that will contract the uterus. My first experience was in giving ergot, following Churchill, in my early practice. I am quite certain that with my present knowledge I should have brought into the world from that mother by the use of forceps a fully developed and living child, and as fully certain that my ignorance was the cause of the death of that child. In other words, I gave such an amount of ergot—no more than the books teach—as to produce a constant contraction with no yielding of the uterus at all, contractions so powerful and tremendous as to squeeze the child to death. The child was born asphyxiated. I believe it is perfectly safe and perfectly proper to give a few drops of ergot, not a medicinal dose, not enough to produce powerful contraction, but enough when you have a relaxed uterus to compensate in a measure for the relaxation. I do not believe there is the least bit of danger connected with that. I have done that over and over again with satisfaction to the mother and advantage to the child. I would only do that, however, in cases of great nervous weakness, or rather where there was not power enough on the part of the uterine fibers to produce a natural contraction. And there certainly can be no harm in giving a small quantity of ergot in that condition, for the reason that when the uterus is in that condition no harm can come to the child. To give ergot to hasten labor when there is power of the uterus to expel the child is simply child murder.

In regard to the measurements of the pelvis, I may be a hundred years behind the age, but from my side the obstacles are so great that I believe it is absolutely impossible to get at the precise figures upon measurements of the pelvis beforehand. It can not be done, and it is nonsense, in my view, to say (with all due respect to the opinion of the writer) that it can be done. I think I shall be sustained by the experience and practice of the men who are known in the profession, when I say that it is an absolute impossibility in the majority of cases to ascertain these very nice measurements.

I want to emphasize what Dr. Skeel said with refer-

ence to posterior position of the head; that it occurs much more frequently than the books say. I want to say in connection with it that in a great many of those cases instead of starting the forceps better let the case alone. With patience and careful manipulation and observation you will often find, even where you have delayed labor from posterior occipital presentation, that ultimately revolution takes place and the child is born in the natural way. I must stop here because this is so pregnant a subject that we shall have labor delayed until the rest of the program will be thrust out. I am glad to give way to observations from others on this subject.

DR. HANSON, of Cleveland: I wish to say a word upon the remark by a gentleman regarding the administration of ergot during labor. If I am capable of observing the action of the drug I think it is continuous, and if given in a dose to have any effect it will produce uterine contraction. I do not believe you can give ergot in such quantity as to produce normal contraction. Consequently I do not see where ergot can aid us in these cases.

DR. DUTTON: I think if the doctor will observe ergot he will see the stimulant will be limited in the length of time it will act. While the tendency of ergot is to produce a continuous contraction, I will ask him if he could give ergot enough to produce continuous contraction for 12 hours, 24 hours, 48 hours. I think I know from absolute experience and observation that small doses of ergot will stimulate the uterus to contract, and will produce a contraction which will last through the ordinary length of a pain. We know the time will come when relaxation will take place, even with the largest doses. I believe I know it will take place just in proportion to the size of the dose. It does not look to me at all marvelous.

DR. CLARK: I do not know that I have anything special to add. I am very glad Dr. Skeel referred to the reduction of the occipital position, because all along I could make only general statements. I believe that this, of all positions of vertex presentation, will cause more danger to mother and child than any other one position, and I wanted to ask Dr. Dutton how long he was going to wait for those revolutions to take place. In that position of the child it is most difficult to find the fetal heart.

If the occiput has rotated into the sacrum it is almost impossible. But we should recognize one point right away. We should take more pains in our examinations and should not be satisfied in finding out that the occiput is right or left. Get some idea as to how the head does lie. Study that sagittal suture. Then you will be in better position to recognize an abnormal position if it comes, and you will recognize it sooner if the occiput is rotating into the sacrum. But I have over and over again been able to rotate the head before it has gotten wedged down against the sacrum. But supposing you find it there, how long are you going to wait? You cannot perhaps get the fetal heart, and so cannot ascertain its condition, and especially if you have found the occiput wedged down, I should advise to deliver with forceps immediately. I would not take the responsibility of letting the case go on.

As to the subject of pelvimetry, I recognize as well as any one that the question of the size of the child's head has a great deal to do with it. It is one of the difficult things to estimate. Early in labor if we be careful with pressure over the abdomen downwards we may be able to find accurately whether the head will enter the brim, even a little, and if it does not our suspicions should be very much aroused as to some pelvic deformity. Of course you can not estimate in any one pelvis to the tenth of a centimeter. I think we have to admit that the Germans are authority in the matter of pelvimetry as well as in general obstetrics. Taking the pelvimetry with them is just as usual as taking the pulse rate. Of course the stature of the woman will influence somewhat the size of the pelvis, to just what extent it is difficult to say. I cannot go into that part of it now as I shall in another paper, but I believe we can come to very accurate results in spite of what Dr. Dutton says; and I think that if he would study carefully some of those fearfully difficult cases of his he would find the head stuck at the brim, and if he had found that was so he would perhaps have been able to anticipate things he did not see until afterwards. I know I can, and I have not been practising anywhere near so long as Dr. Dutton and others here.

THE PRESIDENT: I think this paper and discussion have demonstrated, besides some other things, the breadth

of the subject of pediatrics. There are so many things that bear on the infant that one must immediately reach out to the various branches of medicine and surgery when we come to look after the welfare of the child.