

## RESEARCH ARTICLE

# Birth Asphyxia and Birth Injuries in Viable Term Neonates: Obstetrician's Role

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## ABSTRACT

**Aims and objectives:** To identify and analyze the causes of birth asphyxia and birth injuries in viable term neonates.

**Materials and methods:** The neonatal intensive care unit (NICU) admissions of all viable term neonates for birth asphyxia and birth injuries were analyzed between July 1, 2016 and June 30, 2018 in a tertiary care hospital. Those cases where the patient was referred in a state of emergency and was promptly taken up for emergency lower segment cesarian section (LSCS) were excluded. Only those cases, both registered and referred, where a vaginal trial was attempted were considered. The reasons why delivery was not expedited were analyzed to understand if birth asphyxia and birth injuries are preventable in viable term neonates.

**Results:** Birth asphyxia and birth injuries are largely avoidable unless the patient has come in a state of acute emergency and the patient has been promptly taken up for emergency LSCS. The reasons for birth asphyxia and birth injuries in a viable term neonates are—the inability of the attending consultant (i) to decide when the induction of labor has failed, (ii) when not to attempt instrumental delivery and (iii) when to abandon further trial of labor.

**Conclusion:** Birth asphyxia and birth injuries in viable term neonates should ideally never happen. Proper assessment before induction of labor and instrumental delivery is essential and every fetal heart deceleration recorded has to be taken seriously, though every heart deceleration need not be ominous. This will go a long way in preventing NICU admissions and suboptimal outcomes in viable term neonates and the ignominy of having to face litigation.

**Keywords:** Birth asphyxia, Birth injuries, Cephalopelvic disproportion, Emergency lower segment cesarian section, Fetal heart declarations, Vaginal birth after cesarian section.

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## INTRODUCTION

Holding regular perinatal mortality meetings is important for both obstetricians and pediatricians, to identify loopholes and deficiencies in services and decision making.<sup>1</sup> Unfortunately, many avoidable suboptimal outcomes tend to get justified under the pretext of—'the patient was brought in a state of acute emergency' or, something like 'there were many comorbid risk factors like intrauterine growth restriction (IUGR), severe pregnancy-induced hypertension (PIH), diabetes, etc.' Justified and unavoidable indications for NICU admission include congenital anomalies, low birth weight, prematurity including iatrogenic prematurity due to preterm induction of labor for severe PIH, IUGR, etc.<sup>2</sup> Neonates may also be shifted to NICU for observation, which is justified in cases of transient tachypnea of newborn, baby of diabetic mother for sugar monitoring, isoimmunization provided the antenatal anti-D prophylaxis was given appropriately and the delivery initiated before significant isoimmunization occurred, and in cases of meconium stained liquor provided the delivery was expedited as soon as the presence of meconium was noted following adjustable-rate mortgage (ARM) performed at the appropriate time.<sup>2</sup>

However, when a term viable neonate with no congenital anomalies is shifted to NICU for birth asphyxia or birth injuries, sustained during LSCS or instrumental delivery, the only justification for the obstetrician is that the patient was brought in a state of emergency and the delivery was promptly accomplished without any further delay. But when a viable term neonate has shifted to the NICU for birth asphyxia or birth injuries after having been in labor room or antenatal ward for a couple of hours before delivery, then it is very difficult for the obstetrician to justify the suboptimal outcome. The usual reasons given by the attending consultant are—there was good to pick up despite fetal heart decelerations', 'the patient was fully dilated and the station was +2 and the baby was quickly delivered by ventouse', 'taking up for emergency LSCS in the second stage would have been risky', 'can LSCS be done for every fetal heart deceleration?', 'the patient was a case of severe PIH/IUGR was

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in disseminated intravascular coagulation (DIC) had deranged LFT etc.', 'the anesthesia and operative risks would have been very high' etc.

So, the crux of the matter, the moot question is what really constitutes fetal distress? Many, seniors question the indication of LSCS and if fetal distress was really present, more so when the baby outcome is good, calling it 'the obstetrician's distress', and that adequate trial was not given. So, what is the threshold, to conclude that there is fetal distress and the emergency LSCS is inevitable for a good outcome?

## AIMS AND OBJECTIVES

To identify and analyze the cause of birth asphyxia and birth injuries in viable term neonates.

## MATERIALS AND METHODS

The NICU admissions of all term neonates for birth asphyxia and birth injuries were analyzed between July 1, 2016 and June 30, 2018 in a tertiary care hospital. Those cases where the patient was referred in a state of emergency and was promptly taken up for LSCS were excluded. Only those cases both registered and referred, where a vaginal trial was attempted were considered. The reasons why delivery was not expedited were analyzed to understand if birth asphyxia and birth injuries are preventable.

## RESULTS

Birth asphyxia and birth injuries in viable term neonates are largely avoidable unless the patient has come in a state of acute emergency and has been promptly taken up for emergency LSCS. Fortunately, the number of suboptimal outcomes was small compared to a total number of deliveries during the same period. Determining the numbers and percentages was not the purpose of the study.

The reasons for birth asphyxia and birth injuries are the inability of the attending consultant to decide (i) when the induction of labor has failed, (ii) when not to attempt instrumental delivery and, (iii) when to abandon further trial of labor.

## DISCUSSION

The problems in performing an audit are many. In tertiary institutes, a good number of deliveries are of referred patients, and the number varies every month. It can range from 30% to sometimes more than 70%. The places from where the patient gets referred also vary. Sometimes, there is a surge of referrals for a seasonal condition like dengue, but the number of referrals from a hospital which

has a memorandum of understanding (MoU) with our institute is roughly constant. The NICU also receives a lot of admissions of neonates born elsewhere.

There is a unit system in the labor room with a different unit and a different consultant on duty each day. There is no fixed day of the week allotted to any consultant. The number of duties and the days of the week (weekday or weekend) also vary month to month among consultants. There is a wide subjective variation in the assessment and management, unit to unit and also among consultants within each unit. So therefore, some attending consultants would prefer doing an LSCS for term primigravida with breech or transverse lie as soon as the patient arrives in the labor room, or for dystocia if the progress of labor has been unsatisfactory despite timely ARM and oxytocin augmentation, on grounds that there is nothing to be gained by further delay. However, some attending consultants would prefer to handover such cases on grounds that the emergency is not a category I or category II and that the LSCS can be done as an elective procedure in the morning, as opposed to an emergency procedure which is known to have greater morbidity.<sup>3</sup>

Another confounding issue is what is the cause of fetal distress and should the appearance of a single fetal heart deceleration be an indication for an emergency LSCS. Nowadays, with continuous fetal heart monitoring in labor, fetal heart decelerations are picked up in large numbers. But whether continuous fetal heart monitoring should be done even in low-risk patients is contentious and has not shown to eliminate suboptimal outcomes.<sup>4</sup> Therefore, the reasons for suboptimal outcomes could be one or many and there may also be one or more attributes factors.

In our analysis we found, the following were the causes (in descending order the most common to least common) of birth asphyxia and birth injuries the avoidable causes of NICU admissions in viable term neonates.

### Induction of Labor

It is but natural that an obstetrician would like to deliver every patient who has been following up with him/her and patients also expect the same. The concept of elective induction of labor at 39 weeks is now increasingly being followed.<sup>5</sup> It is a common practice to selectively induce a patient at term keeping the consultant's and the patient's convenience and time schedule. An important predictor of successful induction is the favorability of the cervix. Inducing when the cervix is, and multiple attempts at induction increase the risk of induction failure. It also tires the patient who begins to feel claustrophobic and suffocated being separated from family for more than a day, in the labor room. A mentally exhausted mother is

less likely to have a smooth labor and chances of induction failure and dystocia will be high. The risk of ascending infection increases after the rupture of membranes, following PROM or ARM, if the delivery is not accomplished within an acceptable time frame. A neonate may appear in good health following delivery but can develop serious sepsis a few hours after birth. These factors have to be considered before induction of labor.

### **Previous Lower Segment Cesarean Section**

Though vaginal birth after cesarian section (VBAC) is an established practice, the events of the previous labor and the indication of previous LSCS have to be kept in mind. Those women who were taken up for emergency LSCS in the advanced/second stage of labor are less likely to have a successful VBAC. Also, the expected birth weight of the baby has to be kept in mind. Having a bigger birth weight baby is a significant but an overlooked parameter while planning VBAC. And when a case of previous LSCS is induced with an unfavorable cervix, the chances of successful VBAC are lower and maternal and fetal complications higher as compared to VBAC with spontaneous onset labor.

It should be kept in mind that not all women with previous LSCS will have classical signs of scar dehiscence-tenderness over the scar, fetal distress, and bladder tenesmus during trial.<sup>6</sup> Presence of meconium, non-progress, and arrest of descent despite good labor pains should alert the attending consultant about the possibility of impending scar dehiscence.

Many patients of previous LSCS wish to have an elective repeat LSCS so that a concurrent tubal ligation can be done in the same procedure. It is the author's experience, and many patients change their mind during trial and request for cesarian delivery. The mindset that vaginal delivery is always superior to LSCS has to be calibrated with the fact that the anesthesia has improved over the years and can be given safely to high-risk patients. Should injuries occur during LSCS, the repair can be done without the delays involved in shifting the patient to the operation theatre since the patient is already under anesthesia. Should there be difficulty in delivery, like in cases of deeply engaged head or a hydramnios and malpresentation, general anesthesia can be given to relax the muscles further, and the incision can be extended to convert a Pfannenstiel incision into a Maylard incision. Internal iliac artery ligation and obstetric hysterectomy, if required can also be done should there be postpartum hemorrhage (PPH) without further delay, which can be life-threatening. Taking the patient to operation theatre for shoulder dystocia, PPH following vaginal delivery, and in an advanced state of

obstructed labor will only increase the morbidity and is impossible to justify.

### **Cephalopelvic Disproportion**

It is a dictum that every primipara should be given a trial unless contraindicated since minor degrees of cephalopelvic disproportion can be overcome by good uterine contractions and favorable attitude of the fetus. However, one must keep in mind that the total number of women with android, anthropoid and platypelloid pelvis is significant.<sup>7</sup> Many young and middle-aged women have osteopenia which is an under appreciated condition. One must assess the pelvis for sloping walls, whether ischial spines are everted or inverted, evaluate the narrowness of the subpubic arch and the width of the transverse diameter of the outlet, with relation to the size of the fetal head. Presence of a fully dilated cervix with a station at zero by itself has no relation to the adequacy of the pelvis. Also, a previously successful vaginal delivery does not mean that there cannot be a cephalopelvic disproportion in present pregnancy.

Applying ventouse prematurely or outlet forceps without confirming if it is the vertex or the huge caput which is low down can be disastrous. Pulling a baby down in the presence of an incompletely rotated head can lead to maternal and fetal injuries which can be permanent and increase the chances of shoulder dystocia.

### **Presence of Comorbid Conditions**

Presence of conditions like severe PIH, diabetes, heart disease, liver disease increase the operative and anesthesia risks and a vaginal delivery would be preferred, but the risks of the vaginal trial should also be kept in mind.

Eclampsia makes the patient drowsy due to magnesium sulfate or otherwise, and the patient may not be able to bear down.

In cases of severe preeclampsia, the decision when to terminate the pregnancy is important. Prolonging the pregnancy after premonitory symptoms have appeared or when significant thrombocytopenia, liver function tests (LFT) changes, severe IUGR have appeared or when blood pressure is uncontrolled despite two or three antihypertensive agents being given at the highest dose is highly discouraged even if the fetus is premature. Maternal risks of continuing pregnancy are unacceptable. The argument that uterus is the best incubator is flawed in such cases. The neonate is better off being delivered after 48 hours of steroid administration; it is better to keep in the neonate in a predictable NICU environment than an unpredictable uterine environment where sudden eclampsia, abruption, disseminated intravascular coagulation (DIC) can be life-threatening for the mother and neonate.<sup>8,9</sup> Also, induction of labor and vaginal trial are discouraged

when the fetus has severe IUGR and is already hypoxic, where NICU admission is certain. Almost all cases end up as emergency LSCS deliveries for fetal distress which becomes apparent after uterine contractions begin. The whole exercise of trying for vaginal delivery is pointless in such cases, and it only adds to the stress and increased treatment expenses.

Sugar monitoring in diabetics through labor is a must and can be annoying for the patient. Presence of IUGR and macrosomia need not be overt in cases of diabetic pregnancy. Should all well controlled diabetic mothers be offered, vaginal trial in absence of risk factors is debatable. Factors like maternal age, low future fertility potential, the presence of diabetes with retinopathy, nephropathy, etc. should also be kept in mind.

The DIC and presence of coagulopathy are not indications for LSCS, but a neat and clean LSCS would be preferable to a difficult vaginal delivery which increases the chances of atonic and traumatic PPH and vulval hematomas.

As per the observations of the corresponding author, the following are the causes of fetal distress encountered during his emergency duties or in patients handed over to him by the attending consultants of the previous shift.

- Tight loop(s) of cord around the neck is very common. A true knot is rare but has been encountered twice during the above period. It can be disastrous to apply ventouse or forceps in such cases. One has to keep this possibility in mind before attempting instrumental delivery.
- Occipitoposterior position. This may not be evident on per vaginal examination if the cervix is not sufficiently dilated or if significant caput is present.
- Deep transverse arrest. This can also be missed on per vaginal examination if significant caput is present.
- Constriction ring leading to dystocia
- Unicornuate uterus which was not revealed because the patient had no 1st trimester ultrasound scan.
- Scar dehiscence in patients of previous LSCS. This is very common, and many patients had no typical signs of scar dehiscence.
- Retroplacental clot and abruption can be concealed and asymptomatic. It is detected following delivery after examining the placenta.

But very often no cause is found. Probably there could be head or cord compression due to minor degrees of cephalopelvic disproportion, or mild IUGR which resulted in fetal distress when augmentation of labor was done with oxytocin. A baby weighing more than 2.5 kg but less than 3 kg could be a case of IUGR. If the patient's previous baby weighed more than 3 kg at birth, then this could be a clue that IUGR might be present in present pregnancy if the expected fetal weight at term is less than 3 kg.

In all cases where the patient was taken up for emergency LSCS after being induced and/or after considerable trial, the attending consultant must question his/her decision—did they err in their findings or make a correct assessment? Was the cervix really favorable for an elective induction? Was the presence of cephalopelvic disproportion or presence of mild IUGR overlooked?

### Medicolegal Implications

Young obstetricians must understand that giving intravenous soda bicarb, nasal oxygen, lateral position, etc. are temporary measures. The cure for fetal distress is the removal of the fetus from the hypoxic uterine environment by the quickest possible route which is by LSCS or by instrumental delivery provided the criteria of instrumental delivery are met with.

One must keep in mind that the mother/the couple may have spent a lot of money, time and efforts in trying to conceive, and irrespective of whether the mother is young or elderly, irrespective of whether she is a primipara or has living issues, she may never conceive again. The cost of keeping the baby in NICU on a ventilator has to be kept in mind, which is almost always more than the cost of delivery.

At the molecular level, neurons undergo irreversible damage if hypoxia lasts for more than 10 minutes.<sup>10</sup> Presence of 'minor' decelerations or 'good pick up' is untenable if the delivery was not expedited.

Therefore, the attending consultant must keep in mind that it is possible to justify an LSCS when the outcome is good. But it is impossible to justify a suboptimal outcome after vaginal delivery or LSCS—if attempts at vaginal delivery were made in a viable term neonate. Why was not LSCS done much earlier, or why was vaginal delivery attempted at all will always be asked in such cases. It will be impossible for an obstetrician to defend himself in the court of law in the event of birth asphyxia and birth injuries in a viable term neonate.

Apart from the points mentioned in the medical literature, an obstetrician must also keep factors like time required to shift the patient from the labor room to operation theater, time required for patient counseling and obtaining consent, time required to arrange for blood products, patient's blood group and the number of blood units available, etc. These depend on the type of set up. And one must make a realistic assessment of one's capabilities, and also not take the availability of colleagues for granted.

### CONCLUSION

Birth asphyxia and birth injuries in viable term neonates should ideally never happen. Proper assessment before induction of labor and instrumental delivery is essential

and every fetal heart deceleration recorded has to be taken seriously, though every heart deceleration need not be ominous. Fetal heart decelerations are seen during imminent vaginal delivery, following epidural anesthesia and top up postural changes and quite frequently due to incorrect placement of the probe. Nevertheless, the attending obstetrician must evaluate every fetal heart deceleration and assess the progress of labor before labeling the deceleration as innocuous. This will go a long way in preventing NICU admissions and suboptimal outcomes in viable term neonates and the ignominy of having to face litigation.

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