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| **News du jour** | **CS for Fetal Distress  -- A Practical Approach** |
| **OBG****Management****1997** |  |

Synopsis and excerpts from an article published in the November 1997 edition of *OBG Management* which explores three aspects of Cesareans performed for fetal distress -

Does the 30-minute rule make sense?

Steps to take before operating

A model form for documentation

The article was written by Dr. Chauban, assistant professor of ob-gyn at the Medical College of Georgia and and Dr. Nancy Hendrix, 4th year resident in ob-gyn

[This study is excellent at raising questions in the context of "conflicting" data  For instance, one would assume that CS done within the 30 minute rule would produce better results while those which took longer than 30 minute would have poorer outcomes. This research documents that the reverse was true. However a design flaw in this article keeps us from being provided with any hard answers. I look forward to additional research that addresses and hopefully resolves these questions.]

Fast-track for Overview, Conclusions & Techniques

For Hospital-based Obstetrics

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| [Overview](http://docs.google.com/obg98cs-2.htm#Overview)[Conclusions](http://docs.google.com/obg98cs-2.htm#Outcome)[Numbers](http://docs.google.com/obg98cs-2.htm#NUMBERS) - CS/FD 1970-93Identifying at-risk fetus[Intrauterine](http://docs.google.com/obg98cs-2.htm#(IUR)) Resuscitation[DIT and 30 minute rule](http://docs.google.com/obg98cs-2.htm#DIT%20and%2030-minute%20Rule)/ACOG[Stats for DIT](http://docs.google.com/obg98cs-2.htm#Stats%20for%20DIT) - tertiary care institutions[Rational](http://docs.google.com/obg98cs-2.htm#30-minute%20rule) for 30 min rule[Evidence-based](http://docs.google.com/obg98cs-2.htm#Evidence-based) Outcome[Design Flaw](http://docs.google.com/obg98cs-2.htm#design%20flaw) - muddied waters[Charting and Prudence](http://docs.google.com/obg98cs-2.htm#Importance)[Summary](http://docs.google.com/obg98cs-2.htm#Summary)    |  |
| [Commentary](http://docs.google.com/Comm98obg%20feDiss.htm) for Midwifery Practitioners |  |

Overview from perspective of Community-based  Midwifery

Many aspects of this article are not germane to community-based practitioners of midwifery. However, the  "Decision to Incision Time" (DIT) is an issue that frequently arises in conversations about the "safety" of "out of hospital" births. Many within the obstetrical profession believe that it is substandard care or (even irresponsible) to provide birth services in circumstances in which it would take longer than 30 minutes to perform a Cesarean.  In their mind that eliminates both free-standing birth centers and home-based care from any consideration.  ACOG's position the "home birth is the earliest form of child abuse" reflects this opinion.

An additional controversy has recently arisen within the medical community as a few physicians began promoting an even shorter decision to incision time. For instance, they espouse the idea that labor after a previous Cesarean should only be offered or permitted in hospitals staffed to permit a DIT of less than 17 minutes\*. Therefore they contend that VBAC should only be attempted in a tertiary or Level III hospital. Should uterine rupture occur, this is the time that it takes for the distressed fetus to develop metabolic acidosis. Newer research asserts that hypoxia/anoxia itself does not cause permanent brain damage in and of  itself  but  is the precursor to cumulative and toxic effect of acidosis. This establishes a "physiological "window" of 17 minutes -- a time based on biology rather than staffing needs of institutions.

[\*It takes approximately 17 minutes of anoxia to reach a level of acidosis which permanently compromises the fetus, as fetuses have twice the number of red blood cells which means twice the O2 carrying capacity and higher O2 plasma concentrations. In addition, they have a protective mechanism similar to the mammalian diving reflex of whales and dolphins, which slows the heart rate and metabolism in response to pressure on the cranial bones (such as occurs from head compression) and/or reduced oxygen saturation, caused by classical stressors of labor. This means more than twice the time we land-living air-breathers have before permanent damage occurs \*\* and may well *mean that we need to revise our idea of fetal distress*, both to make our diagnosis more rigorous and once established, to make our response time shorter.)

Obviously providers of home-based birth services can't "guarantee"  a DIT of less than 17 minutes  and maybe not even 30 minutes (although calling ahead to alert the surgical team can usually bring about surgical intervention in about half and hour). *What does this "DIT" controversy mean in relationship to domicilairy midwifery?*

For instance, how frequent is severe fetal distress? Can vulnerable fetuses be identified early on, before becoming distressed? What if any non-surgical actions can be taken to reduce the risk or to "buy time" (intrapartum resuscitation)? How many cesareans are performed annually for fetal distress? How has that changed over the last 30 years? How many of cesareans for fetal distress are actually performed within the 30 minute window? How effective are well-timed cesareans in  preventing permanent damage? What happens if  you don't get a distressed baby out in less than 30 minutes? What are the "official" recommendation in regard to DIT?

NUMBERS

Between 1970 and 1993, cesarean surgery increased from 5.5% to 22.8%. The incidence of CS for fetal distress increased 15-fold during that time, from 0.6% (1974) to 9.2% (1991) [12]

This research suggests that neonatal outcomes do not differ significantly among infants delivered within and beyond 30 minutes of the decision to perform cesarean surgery.

Identifying the "At Risk" fetus in early labor

Simple assessments for fetal wellbeing done at the time the mother is admitted  for labor can help to triage between fetuses at low risk and those who have a significant risk for emergent cesarean. Acoustic stimulation and assessment of amniotic fluid levels both appear to have  benefit. The best outcomes (lowest incident of fetal distress) occur in babies that have a fetal heart acceleration of at least 15 bpm for at least 15 seconds and who have an amniotic fluid index greater than 5.0 cm.

For these unborn babies, the risk of surgical intervention (cs or forceps) or apgar score less than 7 was only 2%. It was 18 times higher (35%) if there was no acceleration.   ([additional information on auditory stimulation](http://docs.google.com/auditory%20test.htm)). For babies with AFI of 5.0 cm or more had fetal distress of only 1%; those with an AFI of 5.0 cm or less had an 18% rate of fetal distress.

Intrauterine resuscitation (IUR)

In most cases of emergency cesarean for fetal distress there is sufficient time to confirm fetal hypoxia and initiate intrauterine resuscitative efforts -- mainly hydration, oxygenation, change in maternal position, discontinuation of oxytocin and determination of fetal well-being by acoustic stimulation and/or fetal scalp monitoring. If auditory stimulation results in an acceleration of 15 bpm for at least 15 seconds, the the fetus is not considered to be hypoxic and labor can continue.   In the absence of acceleration, scalp pH would be determined as 1/2 of the fetuses with a non-reactive response to acoustical stimulation will NOT be acidotic.

Additional suggestions for IUR are the use of amnioinfusion and/or the use of tocolytics. With recurrent (3 in 10 minutes) moderate to severe variables decelerations or isolated bradycardia, placement of 250 to 500 ml of normal saline solution in the uterine cavity can often relieve the   non-reassuring FHT pattern and obviate the need for cesarean. Amnioinfusion can be done safely without warming the solution of using a pump.

Terbutaline 0.25 mg SQ or a 2-gram intravenous bolus of mag sulfate also can be used to improve neonatal outcome in the presence of non-reassuring FHR patterns.  Unlike amnioinfusion, tocolytics can be used if recurrent late decel or hypertonic uterine contractions (UC) are present. A randomized study indicates that Terbutaline is more effective than mag sulfate in decreasing intensity of UCs as assessed by Montevideo units. 11

DIT and 30-minute Rule

Once the decision has been made to delivery by CS the time should be noted on the chart. This is imperative because of the so-called "30-minute rule", a widely held precept derived from ACOG guidelines 12 and other sources, holding that clinicians should make the skin incision within 30 minutes of opting for surgical delivery. There is NO consensus as to when the 30-minute countdown begins. However, it is reasonable to consider the decision made when the physician informs the patient and L&D staff OR when the patient signs the consent form. Take a moment and document the time of this decision prospectively.

Stats for DIT

Although desirable in all cases of cesarean delivery for fetal distress, the decision-to-incision time is within 30 minutes in only 50 to 70 percent of cases at tertiary hospitals. Common reasons for not starting the surgery within 30 minutes include unavailability of anesthesiologists or OR staff on a 24-hours basis, difficulty in obtaining sufficient depth of anesthesia, and inaccurate chart notations regarding actual times and temporary improvement of abnormal FHR patterns. *When there is a temporary improvement in fetal wellbeing followed by a return to evident fetal distress, the clock starts all over again from the standpoint of a DIT.*

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| Decision-to-Incision times (DIT) in CS for fetal distress (total # study 424) |
| Author | Year / Location | N | DIT< 30m | DIT >30m |
| Chauhan, et al | 1997, Jackson, Miss | 117 | 61 (53%) | 56 (48%) |
| Schauberger, et. al | 1994, La Crose, Wis | 75 | 47 (63%) | 28 (27%) |
| Roemer, Heger-Romermann | 1992 Munster, Germany | 207 | 147 (71%) | 60 (29%) |

There are no data available on the rate of compliance with the 30-minute rule at community hospital. It would be surprising if there was not an even high incidence of failure to meet this DIT standard in level I and level II hospitals.

Rational for 30-minute rule

The assumption behind the 30-m rule is that neonatal outcomes are poorer when it takes more than a half-hour to initiate surgery in circumstances of fetal distress.  Logically, the longer the delay, the more damage should occur to any one fetus and a larger number of damaged babies would be expected. [Editor's note: Apparently this ACOG guideline is not predicated on specific research]

Outcome of Evidence-based Studies

The most recent study 14  retrospectively reviewed 9,137 cesareans performed over a 3 year period of  which 117 were emergency CS for possible fetal distress. In 52% of these cases the DIT was 30 minutes or less. In the remaining 48% it was longer than half and hour. The two groups were matched for maternal demographics, antepartum complications, oxytocin usage, presence of thick mec, types of abnormal FHR pattern, use of amnioinfusion, general anesthesia, mean birth weight and Apgar scores below 7 at five minutes. Three specific adverse outcomes were observed more frequently when the DIT was 30 minutes or less -- \*\*lower mean umbilical arterial pH;  pathologic acidema and higher incidence of  admission to the NICU.

\*\*For specific values, please refer to page 58 of the original article in *OBG Management,* Nov.97

Schauberger and colleagues 13 reviewed 75 cases of emergency cesareans over a 7 year period in a level III (i.e., tertiary care ) hospital. The mean DIT was 29.1 minutes, with 63% of the deliveries having a DIT under 30 minutes and the other 37% having a longer DIT. Maternal demographics and antepartum complications were similar in the two groups as were the incidence of neonatal admission to NICU (29.8 versus 17.9 percent) [editor's note -- these two values do not seem "similar" to me!]. The only significant finding was an Apgar score of less than 6 at the five minute mark occurring MORE frequently amoung those with a DIT of less than 30 minutes (23.4%) versus those with a DIT greater than 30 minutes at only 3.6%.

Outcome Conclusions

Thus both studies reached the same conclusion  -- a DIT of less than 30 minutes is desirable, however,  failure to achieve this goal is not associated with measurable negative impact on the neonatal outcomes. The authors noted the possibly that the higher incidence of adverse outcomes among cases marked by a DIT that took longer than 30 minutes may reflect  a greater proportion of catastrophic distress such as evident placental abruption or uterine rupture  (i.e., maternal hemorrhage) or other circumstances which would prompt expeditious delivery. These diagnoses would increase the likelihood that babies born to mothers in this group would experience some degree of compromise. \*\*

[\*\*editor's note on serious design flaw/incompletion in this study -- This last statement appears to negate the organic premise of the study which was to contrast DITs for *neonatal outcomes of cesareans*   *done for fetal distress. In other words, cesareans done for evident placenta previa (i.e. maternal hemorrhage) or uterine rupture, while each resulting in distress to the fetus, it should NOT generate a diagnosis of "fetal distress" and thus should be eliminated from this statistical pool.*

This leaves us with the impression that one way or another, the 30-minute rule may itself be irrelevant. The relevant possibilities are:

A) That the decisions and actions of the obstetrical staff are already pretty good at determining who does and who does NOT require a "crash" emergency CS, making the 30 minute rule unnecessary.

B) In the presence of true distress, the 17 minute window may well be the more important number -- if not done within that time frame, poorer outcomes are to be expected (and the numbers in this study provided give credence to that theory, up to a point, as it did not distinquish between outcomes less than 17 minutes from those occuring after a DIT  of 18 to 30 minutes).

If no true fetal distress exists in the first place, then longer than 30 minutes would not produce larger number of  poor neonatal outcomes (a theory also was born out by this study).

This 17 minutes is the more relevant number, it would eliminate the 30 minute rule and it replace with 17 minutes*. This which would essentially require that all childbirth occur in a tertiary facility.* Were that the case, the staff and surgical circumstances must be vastly improved as it would constitute malpractice for  those 30% to 50% of patients for whom it now takes longer than 30 minutes DIT.

If we (as parents and/or society)  are hospitalizing (and paying for!) childbirth expressly for the assurance of a "timely" emergency response to fetal distress, then such response time must fall within the 17-minute physiological window of non-lethal hypoxia and eliminate the subsequent 13 minutes of catastrophic anoxia & acidosis which occur under the current 30 minute rule. The DIT should be within 17 minutes at least 90% of the time to measure up to a reasonable standard of care.

C)  The possibility that many of the diagnoses of fetal distress are themselves in error OR that longer times actually contribute to better outcomes via IUR

If true distress had existed in these cases, *the DIT of greater than 30 minutes should have given evidence via greater number of bad outcomes. Since this wasn't the case, then perhaps many of those babies were either*   *(a) not distressed OR (b) longer periods of time permitted a natural recovery to occur &/OR intrauterine resuscitative procedures contributed to intrauterine recovery.* In that case, faster is NOT necessarily better.

Importance of Charting and the Wisdom of Prudence

Cesarean surgery for suspected fetal distress should be expeditious without being reckless. A midline incision permits more rapid approach than a Pfannerstiel incision and in theory is preferable. However the time differential is a only a minute or two for most obstetricians and is therefore not unreasonable to utilize the Pfannenstiel incision in most cases of cesarean delivery for fetal distress.

Regardless of which incision is make on the skin, the fetal scalp electrode should be left in place until the uterine incision is make.  This permits an assessment of fetal wellbeing until the last possible moment.

Upon entering the uterine cavity, the characteristics of the amniotic fluid should be noted -- scant versus copious, foul smelling versus not, or clear or bloody or mec stained -- should be noted on the chart. These attributes are important clues to the etiology of any subsequently detected fetal compromise.

After delivery the cord should be double clamped and an umbilical arterial blood sample analyzed within an hour of delivery. Acid-base determination is the only objective method of fetal well-being and so this assessment is obviously of paramount importance.

Up to 90% of newborns who under go cesareans delivery for presumed fetal distress have an umbilical pH of over 7.10 (i.e., a level which suggests that they were not biologically distressed); only 7 percent have a pathological acidemia. Umbilical arterial of   7.00 or above mitigates against birth asphxia and may protect from frivolous lawsuits.

Summary

Fetal distress significant enough to indicate cesarean delivery is uncommon. However, when it occurs, it is cause for concern and for prompt action. If /when the clinical situation and logistics permits, fetal status should be confirmed with scalp or acoustic stimulation and if necessary, scalp pH. When appropriate, intrauterine resuscitation should be attempted. Once the decision is made to proceed with CS for fetal distress, this fact should be documented in the patient's chart, the operative team informed of  the need to start the procedure within 30 minutes. If temporary improvement of the fetal heart rate tracing delays the surgery, it should be noted on the chart. Umbilical arterial blood gas analysis should be obtained if at all possible.

[**Commentary**](http://docs.google.com/Comm98obg%20feDiss.htm)**, suggestions, techniques and conclusions**

**of this study for community-based practitioners of midwifery**