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## **Once a cesarean always a cesarean**

### **Historical Notes**

Before we talk about the appropriateness of the repeat cesarean section on patients with a previous cesarean delivery, it is necessary to review some of the historical points that enabled us to perform cesarean sections and even be in the position to argue in good faith about the appropriateness or not of the procedure. In 1932 N.J. Eastman, acknowledged dean of American obstetricians at mid-century, stated that, if asked in what respect obstetrics had advanced most conspicuously during the preceding five decades, he would point to the changes in the indications, technique, and prognosis of cesarean section. The cesarean operation has spared maternal and infant lives in the millions and prevented countless cases of cerebral palsy and other birth injuries of the newborn and myriads of maternal genital fistulas. [1]

The first cesarean section in the United States, as recorded by Harris [2] was performed on a snowbank (packed hill of snow) in Nassau, New York, in 1822 by the patient herself, a 14-year-old. She survived the operation after her L-shaped abdominal incision was dressed by a Dr. Bassett, her employer, and Drs. John W. Francis and John B. Beck, who reported the case (6). The first professionally performed cesarean section in America was credited by Harris and subsequent historians [3] to Dr. John Lambert Richmond of Newtown, Ohio, and was performed in April of 1827.

Eastman presented the first 17 cesarean sections performed between 1852 and 1880 in a tabular descriptive statistical analysis. The indications for the cesarean were hydrocephalus, contracted pelvis (the most common), cervical and vaginal stricture, eclampsia, and fibromyomata uteri. Maternal mortality was more than 53% (9/17) and neonatal mortality fared better at 30% (5/17). Most of the incisions were re-approximated using 1 to 7 sutures, and the most common suture material was silver wire.

We have come a long way since then, and the once rare and reportable procedure, became the most common obstetrical operation. As the safety of the procedure improved, the number of

indications increased and the decision to perform the procedure was made more frequently by practicing obstetricians. The introduction of blood banking and the introduction and availability of antibiotics increased the safety of cesarean sections substantially and reduced the morbidity and mortality of the procedure dramatically. These advances, transformed cesarean section to the most common obstetrical major surgical procedure. With the exception of the last 20 years, most of the cesarean sections were performed using the “classical type of incision” which constitutes a midline vertical uterine incision. This type of incision is associated with a significant risk for subsequent rupture of the scar during labor and in some instances in even in the absence of labor. Because of that, all patients that underwent cesarean section once, were subjected to a repeat cesarean section with every subsequent pregnancy. When the lower segment transverse incision became more frequent, it was noted that the risk for uterine rupture in labor was not as high as with the classical type of incision. Armed with this information, researchers started exploring the safety of vaginal birth after cesarean delivery (VBAC). Significant literature was published touting the safety of VBAC when done under well-controlled conditions in the environment of a study protocol with all the safety precautions entailed in such circumstances. The safety issues addressed in most of the studies related to the risk of uterine rupture with consequent catastrophic hemorrhage and the accompanying risks to maternal health (severe anemia, diffuse intravascular coagulopathy, transfusion related risks, infection, and even maternal death). During the execution of such studies, attention was paid in careful monitoring of the quality and intensity of the uterine contractions and any form of overstimulation was avoided. In addition, fetal status was monitored with continuous electronic monitoring and these fetuses as well as their mother were under the watchful eye of every one involved in the studies under execution. This has led to “overprotective” bias, which skewed the outcomes towards normal and thus encouraged the tendency to promote VBAC further as a safe alternative to repeat cesarean section. At the same time, the American health care system experienced an explosive and unprecedented expenditure growth surpassing the critical point of 10% of gross domestic product (GDP). In current dollars, this represented close to one trillion dollars in 1987. The financial problem along with the skyrocketing number of cesarean sections (35%-50%) forced health care insurance providers to target repeat as well as primary cesarean section as the most important sector to reduce costs. At this time (mid 80’s to early 90’s), a number of fundamental changes were taking place. First, increasing utilization of newer and more expensive technology

increased the cost of all surgical procedures substantially. Second, changes in the administration of health care (insurance industry, regulation by the government, and new technology utilized for the financial management of health care distribution), introduced a new expenditure, which eclipsed by far the actual medical costs (costs involving physician and hospital payments) by a factor of 4. Third and possibly the most important is the transformation of the American society into a “lawyer’s heaven” with an exploding number of unreasonable and frivolous litigation cases. This has led to a “defensive medicine” which certainly not only did not help anyone (except for the lawyer’s bank account), but also created a new type of patient-physician relationship that has changed the way medicine is practiced forever. As a result, un-necessary expensive testing was added to the already skyrocketing health care costs. The climate was then right for the insurance industry to attempt to take advantage of the situation and with the “flag” of cost reduction it embarked into a quality destructive methodology whose only motivating factor was increased profit margins and higher retained insurance earnings while at the same time hospitals and physician practices were experiencing an ever increasing financial crisis which led to a downward spiral of cost reduction at the expense of quality. For the record, once the insurance industry took out all the available profit and devastated the health care providers (hospitals, physicians, and nurses alike) it became clear that heaving insurance companies making health care decisions is like having the fox protect the hen house. The above are very important facts that one should take in account when one tries to understand the forces behind other wise obvious changes in health care policy.

With the above in mind, it is time now to look at the medical facts clearly and without any financial bias. Assigning risk and benefit to a procedure based only on the risk and benefit associated with the procedure without any financial constrains. Certainly, at the end we will need to reconcile the financial and medical implications since for whatever we do as a society, we have to pay the financial price in addition to the social one.

Before we discuss the validity of the statement “once a cesarean always a cesarean”, we must first try to identify the risks and benefits of a cesarean delivery in the modern era. It is almost a dictum, that when a “long-time standing” belief is challenged, there is a lot of resistance (inertia) by the community members that do not like change. This is not limited or specific to medicine but to all aspects of society. However, physicians are very proud and “egotistical” and as a group, they are the most unlikely to accept change. One of the biggest reasons for that of course,

is the fact that by accepting change, one has to first admit that what he/she has been doing up to this moment, has been the wrong thing. The truth is that it was not the wrong thing but simply put, the acceptable standard that now has to be replaced. There is nothing personal about recognizing that we need to constantly change attitude towards our practice of medicine according to the societal and other life and science related changes. Right or wrong is relative to the era and to the society in which it is practiced.

## **Maternal risks and benefits**

There are risks and benefits for every action we take, medical or not. For the cesarean section, there are two individuals involved, the fetus/newborn and the mother. Traditionally, the procedure was performed when the benefits of either of the involved parties outweigh the risk to either of the fetus or the mother. Since the mother assumes most of the risk, when either the benefit of the fetus or the mother's outweigh the risks of the mother, cesarean section was justified. The original cesarean sections were performed for the benefit of the mother exclusively and the procedure was acceptable only when the probability of maternal death was higher if cesarean section was not performed. We have come a long way since then. Continuous advances in the surgical skills, operative techniques, blood banking, surgical materials, sterilization, antibiotics and prenatal health have reduced exponentially the maternal risk component of the equation. Maternal mortality was 53% in the first 17 cesarean sections reported and has been dropping ever since. However, despite the decline in maternal mortality, many obstetricians are still under the impression that cesarean section increases the risk of maternal death significantly. There is nothing further from the truth. In fact, in a short period of just 11 years (1988-1999) data from Great Britain demonstrate that the relative risk of maternal death has dropped from 8 to just over 2.[4] These numbers do not take in account the fact that most of the cesarean sections were performed under emergency conditions after a failed attempted vaginal delivery. It is unfair and unscientific to blame the procedure of the cesarean section for the maternal death when we all recognize that the labor related complications were to blame. In other words, the relative risk of maternal death in 1999 could actually be much lower and possibly closer to 1. Recent reports have seen the light of publicity and have clearly demonstrated that elective cesarean section indeed is safer than vaginal delivery when it comes to maternal mortality. [5, 6] However, we may not assume that the risk of maternal death for every subsequent elective cesarean section is

going to be the same as the first or second one. In addition, maternal morbidity from cesarean section may be increased as it relates to infection, hemorrhage, unintended injury, and secondary surgical complications. The best study that has been published and which is the only one offering a direct comparison of maternal morbidity based on method of delivery is the multicenter randomized controlled study on breech delivery.[7] The analysis of the data was based on the intended mode of delivery rather than the actual mode of delivery. This is the only way for one to allocate risk to either vaginal or cesarean deliveries. In all previous reports on the risks of the cesarean section, cesarean section was blamed for adverse outcomes, which in reality were the result of a failed attempt at vaginal delivery. Although the primary outcome in the design of this study was neonatal morbidity and mortality, the secondary outcome was maternal mortality and morbidity. Statistically, there was no difference in morbidity and mortality between the two groups. However, the only mortality that happened was in the vaginal birth group. The only statistically significant difference was the length of stay in the hospital. Cesarean section patients stayed one day longer on average. This is a strictly financial concern and a really small one to pay for the benefits realized. In an other study, elective cesarean was associated with significant reduction in maternal morbidity in comparison to instrumental vaginal delivery and cesarean after the onset of labor.[8] Therefore, with what is known to date, the myth of increased morbidity and mortality with cesarean sections is just that, a myth.

Are there any benefits to the mother from cesarean section? Cesarean section offers to patients the benefit of decreased pelvic floor trauma. Several studies have recently indicated that the incidence of urinary incontinence as well as fecal incontinence may be the direct result of trauma related to vaginal delivery. [9-12] Pelvic floor relaxation is associated with loss of sexual function in addition to the loss of control of bladder and anal sphincter functionality. Since cesarean section eliminates this kind of injury, is inherently beneficial by reducing the risk and incidence of such injuries. Some physicians may consider sexual function impairment prevention a luxury. However, the reality is that in today's society, the quality of sexual function makes or breaks a family with a number of consequences (social and financial). Marital relationships can be seriously and adversely affected by the quality of sexual relationship between the two partners. Therefore, preservation of sexual function should be considered a legitimate concern on the patient's part and weigh in the patient's decision whether she will choose to have a cesarean section.

## **Fetal and Neonatal Risks and Benefits**

There are not any serious risks for the fetus or the neonate that could prevent one from using elective cesarean section as the method of delivery. However, some minor complications that have been reported could be easily addressed and eliminated. The most significant risk is that of transient tachypnea or mild forms of RDS. This complication is the result of poor pregnancy dating and it can be easily avoided with early (first trimester) sonographic gestational age assessment and delivery after 38 completed weeks gestation. Fetal skin laceration have been a problem but fortunately very uncommon. In addition, it appears that this type of injury happens to patients who undergo cesarean section after labor. [13]

The benefits to the fetus on the other hand are significantly more important. Elective cesarean section reduces the risk of newborn encephalopathy (cerebral palsy) by approximately 83% in comparison to the vaginal delivery; odds ratio 0.17 (0.05-0.56). [14]

Elective cesarean section may prevent a significant number of fetal deaths if the delivery took place by 39 weeks of gestation. [15] It has been estimated that 1 in 500 fetuses die from 39 weeks onward while await spontaneous delivery.[16] The transmission of maternal infections (HIV, HCV, HPV) to the newborn can be eliminated or at least reduced significantly by cesarean section. [15] Vaginal birth is associated with increased risk for intrapartum fetal cranial injury.[17]

The rates of birth injuries such as fractures and nerve injuries are reduced by more than 50 percent among neonates delivered by cesarean. [18] Intrapartum fever, which has been associated with increased risk for cerebral palsy may be reduced substantially by elective cesarean section. [19]

There is an ever increasing body of evidence that cesarean section as performed today, is at least as safe as vaginal delivery assuming that it is performed according to today's quality standards.

## **Problems specific to repeat cesarean section and VBAC**

It is now time to discuss the particular risks and benefits of repeat cesarean section. One of the problems with the original studies that evaluated the safety of VBAC was the “overprotection bias” mentioned earlier in this report. An additional problem with the analysis and interpretation of the data was the fact that the complications that took place in patients undergoing cesarean

after attempted VBAC were attributed to the cesarean. This of course is inappropriate. When one separates the two and analyzes the data according to the intended method of delivery, then elective cesarean is almost as safe as the VBAC and a lot safer than cesarean after failed VBAC. [20],[21] The risk of uterine rupture is more dangerous to the fetus than to the mother due to the possibility of cord compression and subsequent neurologic damage or even death. In fact, it is well recognized that the most common indicator of uterine scar rupture is evidence of non-reassuring fetal heart rate tracing. When VBAC became a mainstream procedure, many if not all obstetricians treated the patients as if they were normal in terms of the risk of uterine rupture. In fact, the use of Oxytocin was considered safe and was used excessively in order to increase the success rate of VBAC. Like wise, patients who wanted to attempt VBAC but who were not in labor at term were induced with vaginal prostaglandins in order to increase success rates. It did not take long before the increased maternal and fetal morbidity became a concern. After we experienced in our institution 4 catastrophic neonatal complications (two intrapartum fetal deaths and two cases with severe intrapartum asphyxia with neonatal encephalopathy) I personally came in contact with a number of members of ACOG who attested to similar experiences in their institutions. Such complications are the result of a general de-sensitization to the risks of VBAC and the elimination of the “protective bias” of increased vigilance during the original safety studies. Uterine rupture in community hospitals has been reported to be much higher than the original studies. [22] Successful VBAC is associated with an increased risk (RR=5.46) for anal sphincter injury. [12] Among pregnant women who have had a cesarean section, major maternal complications (hysterectomy, uterine rupture, and operative injury) are almost twice as likely among those whose deliveries are managed with a trial of labor as among those who undergo an elective second cesarean section. [23] Induction of labor in patients with one prior cesarean is associated with higher risk for uterine rupture in comparison to those who delivered by elective repeat cesarean section without labor. The RR of induction without prostaglandin is 5 and with prostaglandin the RR is 15.6. [24]

## **Non-medical issues affecting repeat cesarean section and VBAC**

Since we have established the medical risks and benefits of the cesarean section and VBAC, it is time to analyze the non-medical issues that may affect the decision regarding the mode of

delivery in patients with a prior cesarean delivery. I would like to touch on the socioeconomic issues, the pure financial issues, and the ethical issues.

In the early to mid 1990s, there was a concerted effort to reduce the total number of cesarean sections. It was thought at the time that the best way to do this would be to reduce the number of repeat cesarean sections by increasing the number of patients who deliver by VBAC. I will present now data from the state of California involving the years 1996 through 2000. [25] These data encompass a broad spectrum of ethnicities and are rather representative of the rest of America. As a historical reference, the VBAC rate in America increased from 19% in 1989 to 28% in 1996. In the state of California, the VBAC rate in 1996 was 23% and by the year 2000 it dropped to 15% in the face of a concerted and intense campaign to increase the VBAC rate to more than 30%. This change was noted in all other states where data were available. The data analyzed were not complete enough however to allow conclusions as to the reasons for this reversal in the rates. It is appropriate to speculate that the initial enthusiasm was tempered by the increase of maternal and fetal complications that were observed when VBAC became mainstream and “casual”. In addition, the timing of the reversal in the trend of VBAC coincided with the period when the health maintenance organizations (HMOs) abandoned their aggressive policies and allowed physicians and patient more freedom in the health care decisions.

The success rate of vaginal birth after trial of labor (TOL) ranged from 50% to 80%. [26] Patients who were managed aggressively with Oxytocin induction/augmentation of labor were more likely to deliver vaginally but also were the ones more likely to experience catastrophic complications. [24] Like-wise, the use of prostaglandin for induction of labor-in order to increase the success rate of VBAC has led to catastrophic complications and increased the risk of uterine rupture by a factor of 15. In other words, if patients with a previous cesarean were left to labor naturally, the success rate would be closer to the lower end of the range, 50%. Naturally, this is the 50% of the patients who chose to proceed with a trial of labor.

On a pure financial basis, a trial of labor and VBAC becomes cost effective only when the success rate exceeds 75%. [25] Such levels of VBAC success are unattainable unless one implements aggressive management, which in turn will increase the complication rate at unacceptable levels. Therefore, we arrive at a schema oxymoron, when we insist that VBAC is cost effective and safe at the same time.

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One of the reasons that the rates of VBAC are dropping, despite intense efforts to the contrary, is the fact that studies by their inherent nature depersonalize the patient-physician relationship and reduce the patient to a statistic entity. We all understand the need for population studies and the need for statistics. However, this homogenization of management and the creation of protocols with the mentality of one-size fits all is unattainable and down-right unethical. Protocols are created to reduce errors due to mismanagement. In other words, protocols help us hide incompetence and allow incompetent physicians to continue to practice impaired medicine. It would be much better in my judgment if we spent our efforts to eliminate incompetence by means of education and if necessary, to eliminate physicians who practice consistently incompetent medicine and are unwilling or unable to improve their practice. When the obstetrician advises the patient about the risks and benefits of VBAC, he/she is faced with this particular patient and not the population. A bad outcome for the patient is a 100% probability and not the 2-3 % quoted by a particular study. In today's litigious environment it is impossible for any physician to dissociate him/her self from the consequences of one bad outcome. Practicing medicine is not a statistical exercise. It involves a lot of emotion, mutual trust or lack thereof, critical judgment, ability to recognize the unknown and unexpected, the ability to see "things unseen", and of course the "standards of care" for the particular management of the specific issue; in our case VBAC. All of the above are powerful contributors to the decision making process and no protocol or concerted effort by anyone (insurance industry, government, and health care regulatory bodies) can eliminate their influence. I trust that obstetricians are ultimately going to do the right thing for their patient and this in our case is "once a cesarean always a cesarean".

**References**

1. Packard, F.R., *History of Medicine in the United States*. 1963, New York: Hafner.
2. Shryock, R.H., *Medicine and Society in America*. 1960, New York: New York University Press.
3. Bloch, H., *American Military Medicine's Frustrating Years*. Med. Opinion & Review, 1969. **5**: p. 130-139.
4. National Institute of Clinical Excellence, S.E.H.D., *Why Mothers die 1997-1999: the confidential enquiries into maternal deaths in the UK*. 2001, RCOG: London.
5. Lucas, D.N., et al., *Urgency of caesarean section: a new classification*. J R Soc Med, 2000. **93**(7): p. 346-50.
6. Yoles, I. and S. Maschiach, *Increased maternal mortality in cesarean section as compared to vaginal delivery? Time for re-evaluation*. Am J Obstet Gynecol, 1998. **178**(S78): p. abstract.
7. Hannah, M.E., et al., *Planned caesarean section versus planned vaginal birth for breech presentation at term: a randomised multicentre trial. Term Breech Trial Collaborative Group*. Lancet, 2000. **356**(9239): p. 1375-83.
8. Allen, V.M., et al., *Maternal morbidity associated with cesarean delivery without labor compared with spontaneous onset of labor at term*. Obstet Gynecol, 2003. **102**(3): p. 477-82.
9. Faridi, A., et al., *Anal sphincter injury during vaginal delivery--an argument for cesarean section on request?* J Perinat Med, 2002. **30**(5): p. 379-87.
10. Rortveit, G., et al., *Urinary incontinence after vaginal delivery or cesarean section*. N Engl J Med, 2003. **348**(10): p. 900-7.
11. Damon, H., et al., *Fecal incontinence in females with a past history of vaginal delivery: significance of anal sphincter defects detected by ultrasound*. Dis Colon Rectum, 2002. **45**(11): p. 1445-50; discussion 1450-1.
12. Richter, H.E., et al., *Risk factors associated with anal sphincter tear: a comparison of primiparous patients, vaginal births after cesarean deliveries, and patients with previous vaginal delivery*. Am J Obstet Gynecol, 2002. **187**(5): p. 1194-8.
13. Haas, D.M. and A.W. Ayres, *Laceration injury at cesarean section*. J Matern Fetal Neonatal Med, 2002. **11**(3): p. 196-8.
14. Badawi, N., et al., *Intrapartum risk factors for newborn encephalopathy: the Western Australian case-control study*. Bmj, 1998. **317**(7172): p. 1554-8.
15. Minkoff, H. and F.A. Chervenak, *Elective primary cesarean delivery*. N Engl J Med, 2003. **348**(10): p. 946-50.
16. Feldman, G.B., *Prospective risk of stillbirth*. Obstet Gynecol, 1992. **79**: p. 547-53.
17. Towner, D., et al., *Effect of mode of delivery in nulliparous women on neonatal intracranial injury*. N Engl J Med, 1999. **341**(23): p. 1709-14.
18. McFarland, L.V., et al., *Erb/Duchenne's palsy: a consequence of fetal macrosomia and method of delivery*. Obstet Gynecol, 1986. **68**(6): p. 784-8.
19. Grether, J.K. and K.B. Nelson, *Maternal infection and cerebral palsy in infants of normal birth weight*. Jama, 1997. **278**(3): p. 207-11.

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20. Scott, T.D., R. Flora, and T.C. Deveny, *Elective repeat cesarean delivery vs trial of labor: a comparison of morbidities in a community hospital setting*. Prim. Care Update Ob Gyns, 1998. **5**(4): p. 188.
21. Hibbard, J.U., et al., *Failed vaginal birth after a cesarean section: how risky is it? I. Maternal morbidity*. Am J Obstet Gynecol, 2001. **184**(7): p. 1365-71; discussion 1371-3.
22. Blanchette, H., et al., *Is vaginal birth after cesarean safe? Experience at a community hospital*. Am J Obstet Gynecol, 2001. **184**(7): p. 1478-84; discussion 1484-7.
23. McMahon, M.J., et al., *Comparison of a trial of labor with an elective second cesarean section*. N Engl J Med, 1996. **335**(10): p. 689-95.
24. Lydon-Rochelle, M., et al., *Risk of uterine rupture during labor among women with a prior cesarean delivery*. N Engl J Med, 2001. **345**(1): p. 3-8.
25. Chung, A., et al., *Cost-effectiveness of a trial of labor after previous cesarean*. Obstet Gynecol, 2001. **97**(6): p. 932-41.
26. Weintein, D., et al., *Predictive score for vaginal birth after cesarean section*. Obstet Gynecol, 1996. **174**(1): p. 192-8.