Received Date : 05-Jul-2016

Revised Date : 19-Jul-2016

Accepted Date : 31-Jul-2016

Article type : Opinion

Corresponding author mail id: d.ellwood@griffith.edu.au

Every Caesarean Section Must Count

Short Title: Every caesarean must count

Word count: 92 (abstract), 1506 (main)

Keywords: caesarean section , optimal rate, harmful effects

Abstract: Caesarean section rates (CSR) have climbed over the last three decades but some authors have argued that there is no reason to count them, claiming that this practice may lead to inappropriate attempts to lower CSR. However, there are many adverse effects of CS and these are short, medium and long-term for both mother and baby. There is likely to be an optimal CSR which gives the best perinatal outcomes and unless each caesarean counts, and is counted, CSR will be higher than they need to be for best perinatal outcomes.

Introduction: The inexorable rise in caesarean section rates (CSR) in Australia over the last three decades, from about 15% in 1985 to 32.8% in 2013 (1,2), has led to calls for rates to be cut. Several Australian jurisdictions and hospitals have introduced programs to encourage normal birth, although with limited success. It has become

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/ajo.12525](https://doi.org/10.1111/ajo.12525)

This article is protected by copyright. All rights reserved

common practice to monitor and report CSR as a measure of birth outcomes, but more recently this practice has been questioned. Indeed, it has been argued that focusing on CSR is potentially dangerous as it encourages clinicians to modify practices to reduce CSR inappropriately. We contend that this is a fallacious argument, and are of the firm view that CSR is an essential indicator of quality of care. The only rational argument against monitoring CSR is that 'it really doesn't matter' and that there is no such thing as an unnecessary caesarean section (CS). However, there is a burgeoning body of evidence showing that continuously increasing the CSR does not lead to improvements in birth outcomes, although the optimal rate may be higher than the 10-15% first recommended by WHO, and is probably closer to 20% (3.4). There are unintended, harmful consequences of a higher CSR and the only reason to not monitor the CSR is if these harmful effects are insignificant. The evidence shows that this is clearly not the case.

Another important aspect of this debate is the conflict between the rights of women to choose their method of birth, against the population impact of a rising CSR. Harmful effects that are significant for the population when measured appropriately can always be minimized or mitigated for the individual, taking into account individual characteristics. But of course, it is fundamentally true that population statistics are made up of individuals, and it is not plausible that every practitioner can always make the correct decision for every woman based on a balance of risks and benefits. Accepting maternal choice for caesarean section implies that every woman can make a correct decision based on the balance of risks and benefits. It is only in a culture of acceptance that there is an optimal CSR that appropriate decisions will be made most of the time. And if we don't count, then how can we know that we are performing at an optimal CSR?

The harmful effects of CS can be categorized as short, medium and long-term, and affect both mothers and babies.

Short-term: The CS has intraoperative risks that include organ damage, and increased risk of blood loss more than 1000ml (5). Febrile morbidity (20%), wound infection (6%), endometritis (6%), urinary tract infection (6%), and serious infectious morbidity (1%) all occur after CS, and intra-operative antibiotics are required to

protect against these risks (6). CS also increases the risk of thromboembolic disease by 2 to 4 times (7). Population-based data suggest an absolute increased mortality risk for low-risk women from CS compared with vaginal birth, although it is difficult to confirm causation. For the neonate there is a 2-4 times risk of respiratory morbidity if born by elective CS between 37 and 39 weeks' compared with vaginal birth, and therefore a greater risk of nursery admission (8). Women who give birth by CS report lower degrees of satisfaction with their birth experience and are less likely to breastfeed. Their initial interaction with their infant is delayed and remains less compared with those who birth vaginally when they return home (9).

Medium effects: The main focus for medium-term effects is the impact on subsequent pregnancies. Adverse outcomes that are strongly associated with previous CS include delayed fertility, miscarriage, ectopic pregnancy, placental abruption and stillbirth (10). The greatest concern should be the impact of repeat CS on the formation of placenta praevia and accreta. From a very rare event 30 years ago, peripartum hysterectomy because of a morbidly adherent placenta has become a relatively common procedure. Although maternal death as a consequence is thankfully rare, this is still reported with five cases in the last national maternal mortality report (11). Increasing awareness of the risk, better imaging techniques, and the use of specialized surgical teams all reduce morbidity and mortality, but primary prevention can be achieved by reducing the unnecessary first CS. Modeling of US data suggests that a progressive rise in CSR could lead to another 130 maternal deaths annually from this problem (12). It is interesting to speculate how many women faced with this potentially life-threatening complication of pregnancy can recall if they were provided with counseling about this risk when giving 'informed consent' for their first CS. The impact of primary CS on subsequent pregnancies is clearly less of a concern in countries with low fertility rates where the first pregnancy may also be the last. This may be particularly relevant for older women (e.g. > 40 years) for whom the primary CS could be the only birth so there is no subsequent pregnancy risk. Conversely, avoiding the primary CS for a much younger woman (e.g. < 25 years) who is planning a number of future pregnancies may avoid a potentially life-threatening future risk from placenta accreta.

Other medium term effects of CS include postnatal physical and emotional recovery (13). Whilst there have been concerns raised about an association between method of birth and postnatal depression this has not been a consistent finding in all studies. However, CS is major abdominal surgery and there is a longer recovery period for most women when compared with vaginal birth. This will impact on resumption of normal activities including exercise, which may contribute to a woman's overall wellbeing.

Long-term: There are long-term effects of CS that affect both mother and baby, and some of these can be life-long. There is emerging but compelling evidence that delivery by pre-labour CS affects the development of the infant's immune system by changing the bacterial colonization of the neonatal gut (14). The importance of this microbiome effect has even led to some women choosing to inoculate their babies with vaginal secretions at birth by CS. Increased risks to the child of developing asthma, allergies, Type 1 diabetes and coeliac disease have all been reported, and these effects may be through an epigenetic mechanism. In addition birth by CS appears to increase the risk of childhood obesity (15). These concerns about life-long impacts on children born by CS raise the concern that we are producing a generation of young adults with chronic health problems caused by the way they were born.

There are also long-lasting effects on women. Previous CS is associated with a threefold increased risk of noncyclical pelvic pain, a condition that accounts for 20% of gynaecological outpatient appointments in the UK (16). A previous CS is also associated with an increased risk of infertility and a lower subsequent fertility rate (17).

Conclusions: Access to safe, timely interventions has done much to reduce adverse birth outcomes in developed countries. However, many developing countries still have a CSR which is unacceptably low, and is linked to high intra-partum stillbirth rates, as well as a preventable burden of lifelong disability caused by intra-partum asphyxia. If there were no untoward adverse consequences of CS it would be hard to argue against complete freedom of choice to birth abdominally, unless the benefits of vaginal birth were so compelling for the baby that to deny this right could be considered an abuse. But the evidence is clear that there are harmful effects of CS,

and therefore we should try to limit this intervention to those women in whom the benefits outweigh the risks. The doctrine of '*primum non nocere (first, do no harm)*' is a fundamental part of the fabric of ethical medical practice. Each CS should be done because it is medically indicated, taking into consideration the balance of benefits and risks, and women who request CS must be fully informed about all the consequences.

Only by counting the numbers performed, and comparing CSR between hospitals and clinicians, can women be reassured that the principles of best clinical practice are followed. Of course, there are reasonable arguments that populations differ, and risk profiles of their respective populations dictate higher rates for individual practitioners. But there are ways to allow for this using standardized low-risk definitions such as the selected or standard primigravida, and controlling for the common risk factors such as age and obesity. Recent data from Queensland hospitals show that the CSR for selected primigravida in larger maternity hospitals varies between 14% and 31% (18), and although there are population differences this degree of variation must reflect clinical practice.

Although many developed countries have reached CSR of over 30% it has been reported that it is possible to reduce rates safely, and reduce maternal morbidity by adopting labour management guidelines (19). Even in China, where primary CSR has reached more than 70% in some regions, there are attempts being made to reduce this, and the relaxation of the one-child policy immediately exposes women to risks of the subsequent pregnancy (20).

We contend that every CS should count, and each one must be counted so that best practice can be guaranteed for all. Although there appears to be increasing acceptance of a high CSR by clinicians, women and the media, the risks are being either ignored or minimized. It is not too late to turn back the tide and safely achieve the balance between vaginal and abdominal birth that gives optimal maternal and perinatal outcomes.

References

1. Lancaster P & Pedisich E 1993 *Caesarean births in Australia 1985-1990* Cat. No. AIHW 6847. Canberra; AIHW
2. AIHW 2015 *Australia's Mothers and Babies 2013 – in brief* Perinatal statistics series no 31. Cat. No. PER 72. Canberra; AIHW
3. Molina G, Weiser TG, Lipsitz SR, Esquivel MM, Uribe-Leitz T, Azad T, Shah N, Semrau K, Berry WR, Gawande AA, Haynes AB *Relationship between caesarean delivery rate and maternal and neonatal mortality* JAMA 2015 Dec 1; 314 (21) 2263-70
4. Betran AP, Torloni MR, Zhang J, Ye J, Mikolajczyk R, Deneux-Tharaux C, Oladapo OT, Souza JP, Tuncalp O, Vogel JP, Gulmezoglu AM *What is the optimal rate of caesarean section at population level? A systematic review of ecological studies* Reprod Health 2015
5. Bergoff T, Stenderup JK, Vedsted-Jakobsen A, Helm P, Lenstrup C *Intraoperative surgical complications during cesarean section: an observational study of the incidence and risk factors* Acta Obstet Gynecol Scand 82(3) 251-256 2003
6. Smaill FM, Gyte GM *Antibiotic prophylaxis versus no prophylaxis for preventing infection after cesarean section* Cochrane Database Syst Rev 20(1), CD007482 (2010)
7. James AH, Jamison MG, Brancizio LR, Myers ER. *Venous thromboembolism in pregnancy and the postpartum period: incidence, risk factors and mortality* Am J Obstet Gynecol 194(5), 1311-1315 (2006)

8. Hansen AK, Wisborg K, Uldbjerg, Henriksen TB *Risk of respiratory morbidity in term infants delivered by elective caesarean section: cohort study* BMJ 336(7635), 85-87 (2008)
9. Di Matteo MR, Morton SC, Lepper HS et al *Caesarean childbirth and psychosocial outcomes: a meta-analysis* Health Psychol 15(4), 303-314 (1996)
10. Kok N, Ruiter L, Hof M, Ravelli A, Mol BW, Pajkrt E, Kazemier B *Risk of maternal and neonatal complications in subsequent pregnancy after planned caesarean section in a first birth, compared with emergency caesarean section: a nationwide comparative cohort study* BJOG 2014 121 (2) 216-23
11. AIHW: Humphrey MD, Bonello MR, Chugtai A, Macalldowie A, Harris K & Chambers GM 2015 *Maternal deaths in Australia 2008-2012* Maternal deaths series no. 5 Cat no. PER 70 Canberra : AIHW
12. Solheim KN, Esakoff TF, Little SE, Cheng YW, Sparks TN, Caughey AB *The effect of cesarean delivery rates on the future incidence of placenta previa, placenta accreta, and maternal mortality* J Matern Fetal Neonatal Med 2011 24 (11) 1341-6
13. Thompson J F, Roberts C L, Currie M J, Ellwood D *The prevalence & persistence of health problems after childbirth: associations with parity and method of birth* Birth 2002 29 (2) 83-94
14. Cho CE, Norman M *Cesarean section and the development of the immune system in the offspring* Am J Obstet Gynecol 2013 208; 249-254
15. Mueller NT, Whyatt R, Hoepner L, Oberfield S et al. *Prenatal exposure to antibiotics, cesarean section and risk of childhood obesity* Int J Obesity 2015 39 665-670

16. Latthe P, Mignini L, Gray R, Hills R, Khan K *Factors predisposing women to chronic pelvic pain: systematic review* BMJ 332 (7544), 749-755 (2006)
17. Hemminki E *Long-term maternal health effects of caesarean section* J Epidemiol Community Health 45(1), 24-28 (1991)
18. *Maternal & Perinatal Mortality and Morbidity in Queensland* Queensland Maternal and Perinatal Quality Council Report 2015 Published by the State of Queensland (Queensland Health), November 2015
19. Wilson-Leedy JG, DiSilvestro AJ, Repke JT, Pauli JM *Reduction in the cesarean delivery rate after obstetric care consensus guideline implementation* Obstetrics & Gynecology 128, 1, 145-152
20. Hellerstein S, Feldman S, Duan T *Survey of obstetric care and caesarean delivery rates in Shanghai, China* Birth 2016 Mar 18. doi: 10.1111/birt.12231. [Epub ahead of print]

Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:

Ellwood, D;Oats, J

Title:

Every caesarean section must count

Date:

2016-10-01

Citation:

Ellwood, D. & Oats, J. (2016). Every caesarean section must count. AUSTRALIAN & NEW ZEALAND JOURNAL OF OBSTETRICS & GYNAECOLOGY, 56 (5), pp.450-452. <https://doi.org/10.1111/ajo.12525>.

Persistent Link:

<http://hdl.handle.net/11343/291783>