

Safe Prevention of Primary Cesarean Section in China

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New estimates of the cesarean delivery (CD) rates in China have recently been published, based on national databases totaling more than 100 million deliveries (1). Analysis of these data paints a complex and interesting picture, which is general relevant to our understanding of “appropriate” rates of primary CD. Nationally, a trend to increasing use of CD has continued in China, with an aggregate CD rate of 28.8% in 2008 rising to 34.9% in 2014. Regional and provincial rates varied widely, from 4%-63% in 2014. Over the same time frame, some of the largest urban centers (“mega-cities”) have decreased cesarean delivery rates and may be reversing this national temporal trend.

Of note, this current very large study estimates a Chinese national CD rate in 2008 that is lower than the prior 2008 estimate of 46.2% published in a World Health Organization study (2). The Chinese national CD rate from 2014 is also only slightly higher than current CDC estimates of CD rates in the USA of 32.2% (3). In the USA, maternal or fetal characteristics have not been able to explain the state variation in CD rates from 23-40% or hospital variation from 7%-70% (4). Thus, although several studies have suggested that Chinese CD rates differed mark-

edly in recent years from those in the USA, these new data suggest that both rate and regional variation may be less different than previously believed.

Risks and Benefits of Cesarean Delivery

Considering the diverse range of indications for CD, we consider their risks and benefits in 3 broad categories. At one end of a spectrum, there are clear indications for CD that would be internationally recognized to benefit mothers and babies and not depend local circumstances. Although clinically important, including such conditions as complete placenta previa, prior classical uterine incision, and uterine rupture, these indications are uncommon and do not contribute in a significant numerical way to the rates of primary CD in either China or the USA (see below). Conversely, there are more commonly encountered CD indications that might be considered elective or non-medically indicated. These indications also have a risk benefit calculation perhaps best estimated in an NIH review of the world’s literature on Cesarean Delivery on Maternal Request (5). Finally, there is a broad category of indications for CD that depend on established systems of care, clinical judgment and the preferences of the indi-

vidual practitioner.

Cesarean deliveries can save fetal and maternal lives and decrease short and long-term morbidity. However, the “perfect” CD rate that optimizes these outcomes is debated. Differences between health systems and local standard of care may result in variation in optimal clinical management strategies for mothers and babies. A recent global review estimated 19% to be the target CD rate that may optimize outcomes (6). Rates less than 7.2% have been associated with higher maternal and neonatal death rates, and very low rate can be an indicator of insufficient healthcare services. CD rates above 25% have shown no further measurable improvement in maternal or perinatal outcome. Fear of obstetric malpractice may influence CD rates in both China and the USA, but it has been hard to measure the effect because efforts to avoid negative outcomes become part of the culture and medical system.

Prevention of Primary Cesarean Delivery

The American College of Obstetrics and Gynecology has developed a document for the Safe Prevention of the Primary Cesarean Delivery (4) that addresses variation of primary CD utilization in the US health care system.

To tackle this problem in China, one cannot just translate the document but needs to adapt the approach to the local circumstances, including the indications for cesarean section in China, the medical system, and patient attributes. After evaluating the main indications for cesarean delivery, efforts to reduce rates and maintain safety may utilize strategies that categorize indications.

One Child Policy

In the era of the famous “One Child Policy” in China (1979-2015), increasingly liberal use of primary CD may have evolved as an efficient way to provide care at time when medical resources were somewhat limited (7). Despite medical literature in China suggesting higher maternal morbidity for primary cesarean delivery compared to vaginal delivery (8), parents sometimes demanded and the medical system complied with non-indicated cesarean deliveries given the high volume and increasing expectations for near perfect outcomes (7). The greatest risk of elective CD has been shown to be complications in subsequent pregnancies such as uterine rupture, placenta previa/accreta and the need for hysterectomy (5, 9). Thus, with respect to the risks of primary CD, the previous very low frequency of second pregnancies limited one of the major downside risks to this strategy.

In 2016, China introduced the “Two Child Policy”. It is estimated that more than 90 million women in China will be eligible to have a second child, many older mothers and those having had a prior, elective primary CD. This is a current emerging chal-

lenge to the providers and health care system in China (10). In addition to the surgical risks of pregnancy after elective primary CD, long term outcomes associated with elective CD such as changes in the epigenetics, microbiome, increase risks of asthma and diabetes were not considered in these reviews (11). Therefore, the recent social policy changes with the “Two Child Policy” in China will likely necessitate even more emphasis on the prevention of primary cesarean delivery.

I have had the privilege to observe delivery of obstetric services at a variety of hospitals in China in the mid 1980s and again in 2012, and have spent time analyzing several Chinese datasets on CD rates. I will outline how I think the American College of Obstetricians and Gynecologists (ACOG) Safe Prevention of the Primary Cesarean Delivery may apply to the Chinese hospitals I have observed or analyzed.

Indications for Cesarean Delivery

In the USA, the most common indications for primary CD in order of frequency were: labor dystocia (34%), abnormal or indeterminate (formerly, non-reassuring) fetal heart rate tracing (FHRT, 23%), fetal malpresentation (17%), multiple gestation (7%), and suspected fetal macrosomia (4%) (collectively accounting for 85% of primary CD (4). In contrast, our recent study of 108, 847 deliveries in China showed the top indications for primary CD in order of frequency were: CD on maternal request (CD-MR, 25%), abnormal or indeterminate FHRT (14%), labor dystocia (10%), “cephalopelvic disproportion (CPD)” diagnosed ante-

partum (8%), malpresentation (6%), and suspected macrosomia (6%) accounting for 69% of primary CD (12). This is consistent with a meta-analysis finding approximately 27% of CD in China were non-clinically indicated or CD on “maternal request” (CD-MR) (13). Thus, although the overall national rates in the USA and China for CD may be closer than previously estimated, the indications for primary CD are different and approaches to prevention will differ.

Cesarean Delivery on Maternal Request

The most common reason for primary cesarean delivery in China is the elective, non-medically indicated CD, which account for only 1%-2% of CD in the USA (8). Although often classified as CDMR, studies have shown that in China a maternal choice may reflect a perceived provider preference (14). This category is the easiest place to start to decrease CD rates and has been the first target in efforts to decrease CD rates.

There have been a variety of efforts to reduce medically unnecessary CD in China from the national government, provincial and municipal governments, and the Chinese Maternal and Health Association. These efforts are aimed to monitor CD rates, and provide provider guidelines, public education, and financial incentives or disincentives.

Some efforts to decrease CD-MR have focused on the experience of labor by addressing concerns about pain in labor and emotional support from family members, doulas, or labor nurses. There are successful programs that have made epidurals more

Table. Suggested Interventions to Decrease the Primary Cesarean Delivery Rate in China.

Indication	Percent of Primary CD* (%)	Intervention
CDMR	25-27	<ul style="list-style-type: none"> • Provide patient education • Guidelines for physicians for counseling • Increase availability of anesthesia for labor • Provide emotional support and family participation in labor
Abnormal Fetal Heart Rate	14	<ul style="list-style-type: none"> • Standardize FHR interpretation and management • Abandon routine antepartum testing of low risk women
Labor Dystocia	10	<ul style="list-style-type: none"> • Create standardized Chinese parameters or use ACOG guidelines (4) <p>First Stage</p> <p>Latent Phase-abandon hour limitations for arrest</p> <p>Active Phase, starts at 6 cm</p> <ul style="list-style-type: none"> -Definition of Active Phase Arrest -Dilation at or beyond 6 cm dilation -Rupture of membranes, -No cervical change after 4 hours of adequate contractions or at least 6 hours of oxytocin administration with inadequate uterine activity <p>Second Stage</p> <p>Arrest after at least 3 hours in nulliparous and 2 hours in primiparous women</p> <ul style="list-style-type: none"> • Adjust expectations with epidural use
Antepartum Labor Dystocia	8	<ul style="list-style-type: none"> • Abandon use of this antepartum diagnosis
Suspected Macrosomia	6	<ul style="list-style-type: none"> • Create a definition based on Chinese biometrics, considering diabetic status

CDMR, Cesarean Delivery on Maternal Request; ACOG, American Congress of Obstetricians and Gynecologists (4); *Based on recent published study (12).

available and affordable in China that could be further expanded. Traditional Chinese approaches to labor pain may be offered and communicate to laboring women that the medical system cares about their experience of pain and is addressing it. Patient education about future urinary incontinence or sexual performance based on available evidence in the literature may also help decrease the request for CDMR. With the “Two Child Policy”, now women who are pregnant for the first time may plan to

have larger families, so counseling about the risks of primary cesarean section on future pregnancies will be powerful.

Cesarean Deliveries Dependent on Clinical Management

Cesarean deliveries that are done for softer indications account for most cesarean delivery in the USA and in China. These depend on clinical judgments and systems of care. In the ACOG Safe prevention of the Primary Cesarean Delivery guideline (4), each of the top indications for cesarean

section in the USA are addressed in suggesting alternative definitions for dystocia, responses to FHR monitoring, consideration of external cephalic version for breech presentation, altering cut offs for estimated fetal weights in the definition of macrosomia, and consideration of vaginal delivery in twin gestation when the presenting twin is cephalic. Although useful, these clinical guidelines would need more than just translation into Chinese. The establishment of evidence-based national, regional or local proto-

cols or guidelines in China could similarly help reduce CD rates for labor dystocia, fetal heart rate abnormalities, malpresentation, and macrosomia.

Some of the practices I observed both clinically and in data analysis, point to specific issues in China that differ from the USA. In addition to considering the utilization of ACOG guidelines about improved and standardized fetal heart rate interpretation and management, educational programs, and protocols, there are some other issues that result from the predominant obstetric care system in China. For example, routine use of weekly antenatal non-stress tests in low risk pregnancies after 36 weeks may lead to the over diagnosis of abnormal or indeterminate fetal heart rate patterns that result in antepartum CD for non-reassuring tracings and should be abandoned in low risk pregnancies. However, as more women who are older and with medical co-morbidities now have a second antenatal pregnancy testing may be indicated for their higher risk status.

The ACOG safe prevention of primary CD document alters the definitions of arrest of labor (4). In the first stage, latent phase of labor, it recommends abandoning of the use of 20 hours in nulliparous women and 14 hours in multiparous women as an indication for cesarean delivery. In the active phase, it defines active labor as starting at 6 centimeters and arrest of labor for women more than 6 centimeters, with rupture membranes, who fail to progress despite 4 hours of adequate uterine contractions. In the second stage arrest is diagnosed after at least 3 hours of pushing in nulliparous

women and 2 hours in multiparous women and longer parameters may be appropriate, for example with epidural anesthesia. Manual rotation and operative vaginal delivery may be alternative and appropriate interventions. Many centers in China have already abandoned the Friedman curve and the ACOG suggestions above could be adopted. As the use of epidurals in China becomes more widespread, local guidelines and education may need to further address the new practice of epidurals. Additionally based on my clinical exposure and research experience the antepartum diagnosis of dystocia is common. Routine antenatal clinical pelvimetry is not a reliable predictor of need for CD in labor (15) and the diagnosis of dystocia prior to labor should be abandoned especially in the absence of macrosomia.

The definition of macrosomia used as an indication for cesarean section could be determined for the biometrics of the Chinese population based on ultrasound measured estimated fetal weight and guidelines established that adjust for diabetic status. There are a few other obstetric and maternal medical indications that I observed in China that are not internationally considered indications for CD such as cesarean section for isolated oligohydramnios without FHR changes, maternal chronic hypertension, preeclampsia and myopia. Guidelines and professional education may further alter obstetric practice in these instances.

Conclusions

In summary, although China and the USA have similar total CD

rates, the safe prevention of the primary cesarean section in China differs from the USA efforts due the differences in indications for primary CD. With the combination of the prior high percentage of elective primary CD and the new Two Child Policy in China there is unique opportunity that may make it easier to significantly decrease the primary cesarean rate in China than in the USA. Decreasing CD rates in some of China's supercities are promising. Further clarification of obstetric management guidelines for abnormal or indeterminate FHRT, labor dystocia, malpresentation, and suspected fetal macrosomia may allow further decrease in China's primary CD rate. However there will be a lag before efforts to reduce the primary CD rate will be reflected in a reduction in the overall CD due to a concomitant increase in the repeat CD rate as more women in China, many older and with a prior CD, have a second child.

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The author declares no conflicts of interest.

Citation: Susan Hellerstein. Safe Prevention of Primary Cesarean Section in China. *J Anesth Perioper Med* 2017; 4: 139-43. doi:10.24015/JAPM.2017.0031

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