Editorial

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Global approach of the cesarean section rates

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Cesarean section (CS) use has increased during the past 3 decades to a higher frequency than is thought to be optimal. The global rate of this surgery has doubled in the past 10 years to 21%, and increases annually by 4%. While in the sub-Saharan region of Africa the rate of cesarean section is 4%, some countries in Latin America the rate is almost 60%. About six million unnecessary cesareans are done each year, half of them in Brazil and China [1].

Cesarean section rates are increasing worldwide, largely due to an increase in primary cesarean delivery and decrease in vaginal birth after cesarean section. The factors contributing to this are complex, and identifying the complications and interventions are challenging. Behind the different rates there is a number of interrelated factors including advanced maternal age, increasing incidence of obesity, assisted reproductive techniques, and maternal request for non-medical reasons. The sub-optimal management of labor and the concerns about medical liability claims and litigations are increasing the number of abdominal deliveries.

Antoine and Young, authors of review article *Cesarean section 100 Years 1920–2020: the Good, the Bad and the Ugly*, published in this issue of the *Journal* review the changing indications for cesarean deliveries in the last few decades and summarize its effects on obstetrical clinical practice [2]. They give further insight to the practice of obstetrics and gynecology, where we may and need to go in the future.

History

In their historical overview the authors have successfully captured more than hundred years of surgical development of operative delivery. In 1881, Adolf Kehrer (1837–1915) in

Heidelberg and Max Saenger in Prague, independently of each other, introduced the practice of multiple layer closure of the uterus reducing the mortality rate to 28 percent. Subsequently, Munro Kerr (1868–1960) American obstetrician recommended a lower transverse uterine incision further improving the mortality. Hermann Johannes Pfannenstiel (1862–1909) German obstetrician proposed suprapubic transverse incision instead of lower median incision. A hundred years later at Misgav-Ladach Hospital in Jerusalem, Micheal Stark (1944) performed the incision of cesarean section 3 cm higher than Pfannenstiel, incision which was performed based on the Joel-Cohen method for hysterectomy. The Misgav-Ladach method reduces blood loss and requires less suture material therefore it is especially recommended in developing countries. Nowadays, the advantage of Misgav-Ladach technique (restrictive in the use of sharp instruments, preferring blunt entries) combined with precise suturing of layers, resulted in an easy and feasible operation technique with a low complication rate; however, the traditional Misgav-Ladach method is often poorly performed.

Due to the safe surgical techniques of our times, antibiotic use, facilitated access to transfusion and high standard of neonatology care, cesarean section has become the most widely used obstetrical procedure.

Short- and long-term complications

Cesarean deliveries (CD) are the most commonly performed, life-saving surgical interventions worldwide, when medically indicated. Millions of cesareans are performed annually. Although this is a safe procedure, it can also lead to both immediate and long-term health effects and complications, which may affect women, children, and future pregnancies as well [3, 4]. Prevalence of maternal mortality and morbidity is higher after CS than after vaginal birth.

In the review article by Antoine and Young a complete list of possible short- and long-term complications is shown [2]. After cesarean a scar reinforces the fact that women with previous CS should be considered to be at high risk of obstetric complications and poor outcomes for mother and newborn. In case of **intramural (intramyometrial) pregnancy** the blastocyst implants into the myometrium instead of the endometrial cavity. This shouldn't be confused with interstitial tubal pregnancy, which is a type of ectopic

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implantation. The most pronounced risk factor is previous cesarean section where the blastocyst implants in the cesarean scar (**cesarean scar pregnancy; [CSP]** or cesarean scar implantation – [CSI]). Due to the cesarean section rate increase worldwide, the alternative suture techniques and common use of detailed early ultrasound diagnosis, the incidence of CSP is also rising globally, especially in cases where isthmocele (niche) has formed. Systemic methotrexate treatment of cesarean scar pregnancy diagnosed in the first trimester of pregnancy can be successful, but surgical intervention for correction of cesarean scar defect usually cannot be prevented.

Placenta accrete spectrum (PAS), formerly known as **morbidly adherent placenta (MAP)** and/or placenta praevia can be a major cause of urgent hysterectomy due to severe bleeding (Figure 1). It refers to the range of pathologic adherence of the placenta, including placenta accrete, increta and percreta. This life-threatening pregnancy complication is challenging for the patient and the surgical team as well, when the placental tissue invades the wall of the urinary bladder [5].

In certain cases, the blood loss can be reduced with delayed hysterectomy where the placenta is not removed primarily. In this case, a repeated laparotomy is performed after 4–6 weeks of antibiotic and methotrexate therapy and the uterus can be conserved in less severe cases, preserving fertility.

Early detected MAP can be treated with local methotrexate therapy or potassium chloride injection with or without the ligation or embolization of uterine artery or hypogastric artery.

The risk of uterus rupture is three fold higher after laparoscopic myomectomy than in laparotomy. In light of

this, if the patient is planning to be pregnant in the future, laparotomy should be preferred.

Observed to expected cesarean delivery rate

A marked increase of CD rate has been observed globally, which has changed from about 6% in 1990 to 19% in 2014 worldwide [6]. National rates depend on the quality of the health system, factors related to health professionals, as well as cultural habits.

Notwithstanding this rapid increase in cesareans there is no clear evidence of improving neonatal or perinatal outcomes. While a series found 25 percent of countries underuse C-sections, 60 percent of countries were found to overuse it, which is far from those suggested by WHO [7].

Preventing primary cesarean section

The primary cesarean section has become a major driver of the overall CS rate, since it carries risk of repeat CS in future, and possible complications for the mother.

To improve perinatal outcomes, the National Institutes of Child Health and Human Development (NICHD) convened a consensus conference along with American College of Obstetricians and Gynecologists (ACOG) and the Society for Maternal-Fetal Medicine (SMFM) in 2012 [8]. After this

Figure 1: Placenta accrete spectrum (PAS). (A) Abdominal cavity with pregnant uterus (B) Fetus delivered through fundal incision, and hysterectomy was performed while placenta was left *in situ*.

conference their consensus statement discussed various approaches to reducing the rate of CD. The document, entitled, “*The Safe Prevention of the Primary Cesarean*” reviewed the possible ideas and guidelines developed for reducing of number of CD [9].

The approaches mentioned in this document included the following suggestions, which may prevent unnecessary first caesarean section:

- Revisit the definitions of different phases in 1st and 2nd stage of delivery.
- Operative vaginal delivery in the 2nd stage of labor by experienced physicians should be considered a safe alternative to CD.
- Amnion infusion for repetitive variable fetal heart rate decelerations may save the reduce the rate of CD.
- Scalp stimulation can be used as a means of accessing the fetal status.
- Impact and management of fetal malposition and malpresentation.
- The proper use of intrapartum fetal monitoring and labor induction.
- Vaginal birth after cesarean in effective method to reduce the CD rate.

Focusing on this issue, WHO established its current opinion on CS rate and range for optimal perinatal outcomes at population level and proposed a tool to monitor these rates at facility levels [9]. *The Statement on Cesarean Section Rates* released in 2018 summarizes the results of the systematic reviews and proposes the use of the Robson classification as a global standard for assessing, monitoring and comparing CS rates. The classification will allow not only for stratification of CS rates but also the assessment of rates in relation to other perinatal outcomes.

The rise in CD has been attributed to a wide range of medical and non-medical factors, and also social and maternal preferences. **Cesarean delivery on maternal request** is frequently driven by the fear of pain and complication of vaginal birth. In Hungary, cesarean delivery on maternal request is not performed as a primary indication, however “tocophobia” may be a coindication of cesarean section.

Vaginal birth after cesarean (VBAC)

The appropriate use of **vaginal birth after cesarean** (VBAC) may be an important factor to reducing the overall cesarean delivery rate [10]. However, the predictive value of successful rate for VBAC is poor. The majority of women who have Trial of Labor after Caesarian (TOLAC) have a

successful VBAC. The main issue in the management of VBAC is an appropriate counseling and monitoring the patient. Women with prior cesarean delivery or multiple repeat cesareans carry substantial health risk. VBAC is a safe and effective method of vaginal delivery for the majority of women with one or two previous low transverse uterine incisions, so the implications of VBAC are still an important mechanism to reduce the CS rate.

Future directives

Cesarean delivery rate can be a health care indicator. Many women do not have adequate access to this life-saving surgery, while in other countries there is strong evidence of its overuse [11]. The global concern about CS rates is understandable. When medically justified, it can prevent maternal and neonatal mortality and morbidity. In contrast there is no clear evidence showing benefits for those without medical indication. The associated short- and long-term complications can extend beyond the current delivery and affect future pregnancies. Optimization of CS use is essential, and a better understanding of factors that drive the overuse of this way of delivery, may help the universal and optimal access to CS for all women [1].

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