

# Maternal request: a reason for rising rates of cesarean section?

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## Abstract

**Objective** The rising rate of cesarean sections (CS), especially those on maternal request, is an important obstetric care issue. The aim of this two-point cross-sectional study was to evaluate the prevalence of CS and their indications.

**Methods** We performed a retrospective chart review of the indications of all CS performed at a tertiary care clinic in Switzerland in 2002 and 2008. Chi-square, Student's *t* and Mann–Whitney *U* tests were performed to identify significant differences.

**Results** The number of CS rose from 23.3% (371 out of 1,594 total live births) in 2002 to 27.5% (513 out of 1,866) in 2008 ( $p = 0.005$ ). Of all deliveries, the rate of CS on maternal request and, among these, especially those requested after previous CS, increased significantly (2.1 vs. 5.1% and 0.3 vs. 1.2%, respectively). The number of CS due to previous traumatic birth experience nearly doubled (0.7 vs. 1.2%, not significant). Maternal and fetal

complications were rare but not negligible in the subset of low-risk patients requesting CS.

**Conclusions** The study demonstrated a significant increase in CS on maternal request, especially in case of previous CS. The findings of this study support the need for specific counseling strategies for women requesting delivery by CS.

**Keywords** Cesarean section · Maternal request · Traumatic birth experience

## Introduction

Over the past 50 years, the rate of cesarean section (CS) showed a tenfold increase, reaching around 30% in Western Europe, USA, and Australia [1–3]. In Switzerland, the upward trajectory has continued, and the rate increased from 29.2% in 2004 to 33% in 2008 [4]. This trend can be partially explained by changes in obstetric management such as mode of delivery in breech presentation [5] or trial of labor after CS [6, 7]. The risk–benefit evaluation of planned vaginal birth versus planned CS remains difficult due to many factors. Results from intention to treat analyses show that there is no difference in the maternal composite morbidity measurements between women having planned CS or planned vaginal birth (random effects model: pooled RR 1.93 95% CI 0.91, 4.07) [8]. Nevertheless, there is an increased risk of complications during a subsequent pregnancy and delivery after previous CS [9, 10]. Therefore, various international societies, including FIGO, recommend against CS on maternal request [11].

Cesarean sections on maternal request are thought to contribute to the current high rate of CS [12]. A recent review by Mazzoni et al. [13] including over 19,000

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women worldwide showed a preference for delivery by CS in 15.6%. Fear of childbirth or traumatic previous birth experience is so far the most prevalent reason expressed by women demanding an elective CS without medical indication [4, 14].

To which degree a pregnant woman's wish is decisive, however, is still a matter of debate. Prior studies showed that CS were sometimes categorized as CS on maternal request, even if performed in obstetric high-risk patients [11, 15, 16]. Fear of childbirth and fear of substandard care during vaginal delivery were sometimes interpreted as the wish for CS [17]. Furthermore, Potter et al. [12] could demonstrate that in Brazil, the rate of CS was 72% in private patients and 31% in public patients even if 70–80% of women in both groups would have preferred a vaginal delivery. Therefore, to truly quantify the problem of CS on demand, categorizing CS according to their indications is of utmost importance. Even if the well-established categories developed by Robson et al. [18] are easy to apply, they are not suitable for evaluating CS on maternal request as they do not focus on indications.

The aim of this cross-sectional study was to compare the prevalence of CS and their indications within two time periods and to assess the need for further investigation.

Our objectives were to identify CS performed upon maternal request in general, to focus on CS due to previous traumatic birth experience in particular, and to investigate for changes in their prevalence. To obtain a suitable subdivision for analysis, a special system of categories of indications for CS was devised and employed. Furthermore, we wanted to assess maternal and neonatal complications of CS on maternal request performed in low-risk situations.

## Methods

### Design

We performed a cross sectional study to retrospectively evaluate the indications of all CS performed at a tertiary care clinic in Switzerland in 2002 and 2008. All cases of CS were included. Approval for this study was obtained from the local ethical board.

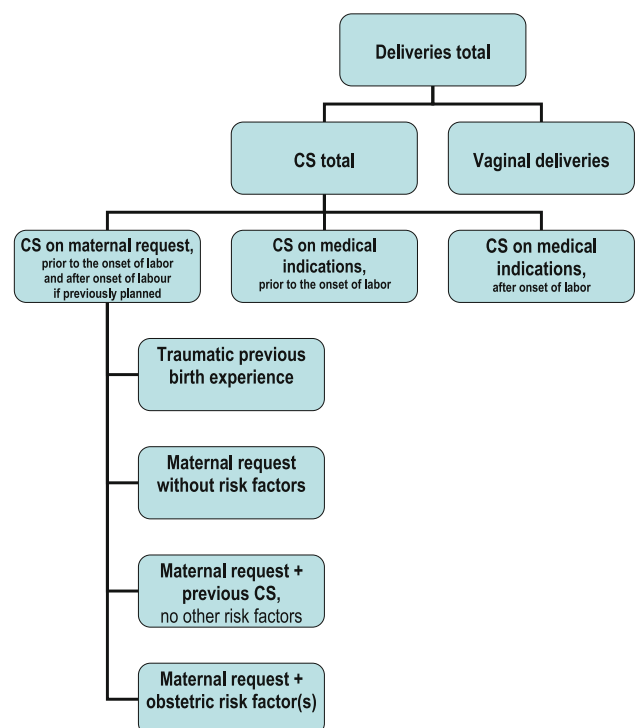
### Data collection

Patient's characteristics (age, parity, gestational age, weight, underlying health issues) and indication for CS were collected by reviewing the operative reports and the patient medical records, if necessary (e.g. indication not clearly stated in the operative report). For the subset of all patients undergoing a CS on maternal request in 2008, an

additional thorough evaluation of peripartur complications and underlying health conditions was performed by review of the patients' charts (diagnosis of complications mentioned in patient's charts, transfer of mother or baby to intensive care unit, medical or surgical treatment exceeding postpartum routines, estimated blood loss, APGAR scores, pH of umbilical cord blood).

### Categorization of CS

Cesarean sections were categorized according to the various obstetrical and other indications as shown in Fig. 1. As counseling in case of maternal request for delivery by CS depends on the patient's obstetrical risk profile, the category "maternal request and obstetric risk factor(s)" was introduced, including patients with underlying health conditions (e.g. epilepsy, psychiatric illnesses) or history of obstetric complications during previous birth (e.g. placental retention, postpartum hemorrhage (PPH), neonatal complications). "Maternal request and previous CS" was introduced as a separate category as it represents a specific group. Only those patients for whom "traumatic birth experience" was explicitly cited as the indication were assigned to the corresponding category, and only low risk patients without any medical indication were categorized as "maternal request without risk factors". According to institutional and international guidelines, CS



**Fig. 1** Categories of indications for CS as employed for the study

in case of breech presentation, pregnancies after two or more previous CS, and repeat CS within 16 months of the present pregnancy were categorized as CS by medical indication.

All CS performed for medical reasons after onset of labor, which was defined as regular contractions and/or rupture of membranes and/or cervical dilatation (>3 cm), were grouped as “medically indicated secondary CS after onset of labor”.

#### Data analysis

Besides descriptive statistics, Chi-square tests, Student’s *t* tests and Mann–Whitney *U* tests were performed as appropriate to identify significant differences between 2002 and 2008 regarding the categories of indications and the characteristics of patients in the various subgroups of CS on demand. A *p* value <0.05 was considered statistically significant. Data were analyzed using SPSS version 19.

**Table 1** Comparison of patient characteristics between 2002 and 2008 in means (±SD)

*n.s.* not significant

<sup>a</sup> Subcategories (see Fig. 1) mentioned only when differences reach statistical significance

<sup>b</sup> All subcategories without statistical significant difference

	2002	2008	<i>p</i>
Age (years) <sup>a</sup>	31.1 (±5.5)	32.5 (±5.7)	<0.001
Traumatic previous birth experience	29.9 (±4.5)	33.4 (±4.2)	0.04
Medical indications (before onset of labor)	31.4 (±4.7)	33.3 (±5.7)	0.02
Parity <sup>b</sup>	0.6 (±1.0)	0.6 (±0.8)	<i>n.s.</i>
Gestational age (days) <sup>a</sup>	267.9 (±23.0)	267.2 (±22.2)	<i>n.s.</i>
Breech presentation	269.1 (±9.2)	272.6 (±4.5)	0.03
CS on medical indication after onset of labor	276.0 (±19.0)	271.3 (±25.2)	0.03
BMI <sup>a</sup>	27.3 (±4.1)	28.7 (±5.0)	<i>n.s.</i>
Traumatic previous birth experience	27.5 (±3.7)	30.8 (±3.8)	0.05

**Table 2** CS by indication in the year 2002 and 2008 in numbers and percentages of all deliveries (Chi-square test)

	2002		2008		<i>p</i>
Total deliveries	1,594	100%	1,866	100%	
Total CS	371	23.3%	513	27.5%	0.005
CS on maternal request prior to the onset of labor and after onset of labor if previously planned	34	2.1%	96	5.1%	<0.001
Maternal request without risk factors	8	0.5%	18	1.0%	<i>n.s.</i>
Maternal request + traumatic previous birth experience	11	0.7%	23	1.2%	<i>n.s.</i>
Maternal request + previous CS (no other risk factors)	5	0.3%	23	1.2%	0.005
Maternal request + obstetric risk factor(s)	10	0.6%	32	1.7%	0.006
CS with medical indication prior to and after onset of labor	337	21.1%	417	22.3%	<i>n.s.</i>
Breech presentation	47	3.0%	59	3.2%	<i>n.s.</i>
Two or more previous CS	8	0.5%	12	0.6%	<i>n.s.</i>
Twin pregnancies	14	0.9%	16	0.9%	<i>n.s.</i>
Failure of induction of labor	9	0.6%	8	0.4%	<i>n.s.</i>
Other medical indications prior to onset of labor (fetal malformations, underlying maternal health issues, ...)	75	4.7%	87	4.7%	<i>n.s.</i>
Medical indications after onset of labor (fetal distress, dystocia, etc.)	184	11.5%	235	12.6%	<i>n.s.</i>

## Results

### Prevalence 2002 and 2008

There were a total of 1,594 deliveries in 2002 and 1,866 deliveries in 2008. The rate of CS rose during this time from 371 (23.3%) to 513 (27.5%) (*p* = 0.005). All cases of CS were included in data collection and calculation.

Cesarean sections performed in 2002 and 2008 were compared with regard to indications and patient characteristics such as age, parity, gestational age, and body mass index (BMI). The results are presented in Table 1.

Table 2 shows the absolute numbers and percentages for the various categories of CS. The rate of women delivering by CS on maternal request more than doubled from 2.1% of all deliveries in 2002 to 5.1% in 2008 (*p* < 0.01), and the number of women reporting previous traumatic birth experience leading to the wish for a delivery by planned cesarean section rose from 11 in 2002 to 23 in 2008. These were 3.0 and 4.5% of all CS, respectively (*n.s.*), and 0.7

**Table 3** Complications in c-sections on maternal request ( $n = 96$ ) 2008

Complications	Number	Percentage
Mother		
Major adhesions mentioned in operative report	23	24
Postpartum hemorrhage (PPH) >1,000 ml, of whom	3	3.1
PPH in repeat CS	2	2.1
Transfer to intensive care unit due to PPH	1	1.0
Hysterectomy due to PPH	1	1.0
Curettage during childbed	3	3.9
Newborn		
Admission to neonatal care unit,	7	7.2
Due to: respiratory distress syndrome	2	2.1
Hyperbilirubinemia	2	2.1
Morbus Hirschsprung (vomiting and absent meconium)	1	1.0
unilateral agenesis of kidney and suspicion of heart malformation	1	1.0
withdrawal symptoms due to prior known maternal substance abuse	1	1.0

and 1.2% of all deliveries, respectively (n.s.). There was a more than fourfold increase in the category “maternal request and previous CS” and a threefold increase in “maternal request and obstetric risk factor(s)” ( $p < 0.01$ , respectively).

In 57.3% of CS qualifying as CS on maternal request in 2008 ( $n = 96$ ), “risk factors” were mentioned. The most prevalent risk factors besides previous cesarean section were other earlier uterine surgery (not considered to be an indication by itself; 10.4%), gestational diabetes (7.3%), estimated fetal weight above the 95th percentile based on ultrasound findings (5.2%), musculoskeletal pain (lumbago, pelvic pain) during pregnancy (5.2%), epilepsy (1.0%), depression (1.0%), and drug abuse (1.0%).

#### Assessment of complications

We examined the complications occurring in the category “cesarean on maternal request,” which was comprised of women presumably of low medical risk, in 2008 (see Table 3). In these 96 women, each complication occurred in less than 5% of the cases.

#### Discussion

This cross-sectional two-point prevalence study showed a significant increase of CS between 2002 and 2008 from 23.3 to 27.5%. This increase was mainly due to an increasing rate of CS on request after previous CS and in case of concomitant obstetrical risk factors. The rate of women reporting previous traumatic birth experience leading to a CS doubled, even if this increase did not reach statistical significance.

The higher rate of CS at our center in 2008 is consistent with the overall rate in Switzerland (33% in 2008). It lies at the upper range of the considerably variable rates of CS worldwide [4]. There is some evidence suggesting that changes in cultural, maternal, socio-economical, and medico-legal factors as well as medical factors and patient autonomy have contributed to the worldwide increase of CS [19–21].

In our study, “CS on maternal request after previous CS” and “CS on maternal request and obstetric risk factor(s)” showed the greatest increases from 2002 to 2008. This supports our belief that obstetricians may be more likely to support maternal request for CS in case of previous CS or concomitant obstetric risk factors. It might further reflect the patients’ opinion of CS being the safer mode of delivery, insecurity of the provider towards vaginal birth after CS, and a lack of specific counseling. It also suggests that the rising rate of CS on request may be influenced in part by an increasing rate of pregnant women with obstetric risk factors.

Some pregnant women are concerned about giving birth and express fear during pregnancy when asked about the impending delivery [3, 22, 23]. In multiparous women, this might be due to traumatic previous vaginal or CS birth experiences. In fact, in a survey of 201 pregnant women in Switzerland, a negative birth experience could be identified as predictive for a CS on request [14]. In our study, traumatic previous birth experience was the indication for a quarter of all CS on demand. There was an increase in CS after traumatic birth experience from 2002 to 2008, even if this did not reach statistical significance.

Patients with CS on maternal request can be considered as low-risk patients. However, CS is a major surgical intervention and presents risks for complications [24, 25].

Even if complications such as PPH or admission to the NICU were rare in this subset, there were nevertheless some serious consequences. One patient underwent hysterectomy due to otherwise uncontrollable PPH. The higher risk of maternal complications, especially regarding blood loss, hysterectomy, and pain due to CS in general as well as elective CS in particular has been noted in several studies [25, 26].

There is also evidence for higher neonatal risks due to elective CS.

De Luca et al. [25] showed in their cohort study ( $n = 56,549$ ) a significantly higher rate of mortality (relative risk of 2.1) and respiratory morbidity (relative risk of 1.8) comparing infants born by elective CS with those born via vaginal delivery. Two otherwise healthy and term-born neonates in our study were admitted to the NICU because of primary respiratory distress syndrome. Considering that women requesting CS were not in need of CS from a medical standpoint, these complications cannot be neglected.

### Limitations

This study was aimed at illuminating the different indications for CS on maternal request. We therefore categorized CS on demand based on their distinct indications. The term “maternal request” was based on the physician’s documented indication, and could therefore be subjective. As this approach was new, the comparison between our study and other studies assessing the prevalence of CS is difficult. Our proposition of categories for indications of CS allows, however, a more distinct identification of the true CS on maternal request and therefore may serve as a basis for prospective detailed evaluations of this issue. As data analysis was performed retrospectively, the correct number of CS for maternal request might be under- or over-reported.

Furthermore, differences in patients’ characteristics such as maternal age within the two populations in 2002 and 2008 might have influenced the rising CS rate. It was beyond the scope of this study to analyze the reasons behind the rising number of deliveries by CS in Switzerland, even though this is an important question which needs to be answered in order to meet the needs of our patients.

As major birth-related complications are fortunately rare, the subgroup of women with complications after CS performed due to maternal request is small, and we therefore had to restrict this part of our study to a descriptive approach.

### Conclusions

Our study showed a significant increase in CS on maternal request, especially in case of concomitant obstetrical risk factors and previous CS. The number of women

undergoing CS due to previous traumatic birth experience has risen as well.

The extensive somatic and psychosocial implications, especially regarding traumatic birth experience, require further evaluation to better understand why some women request delivery by CS, and to optimize obstetric care with the aim of better meeting these pregnant women’s needs. The findings of this study support not only the importance of well-executed informed consent based on detailed information about risks and benefit of both vaginal and cesarean deliveries but also the need for specific counseling strategies for all women requesting a CS.

**Conflict of interest** We, the authors, declare that we have no conflicts of interest.

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