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## Birth after cesarean section

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**Background:**

### Summary

The number of incoming expectant women who have previously experienced cesarean section has increased. This work sought to find the frequency and connections between vaginal deliveries, cesarean sections, and iterative cesarean sections from 2004 to 2008.

**Material/Methods:**

In all, 828 women with previous cesarean sections were included. From this group, 8282 vaginal deliveries were performed. During these years, 828 women had a history of the cesarean section; in these women, iterative cesarean sections were indicated. To evaluate knowledge of educational material designed for women being prepared for the iterative delivery, we used information compiled on experience from 2002 to 2003; the same approach was used to evaluate the nursing process on interventions and diagnoses of cesarean sections.

**Results:**

From 2004 to 2008, 11 279 deliveries were performed in the Perinatalogical Center in České Budějovice; this was significant ( $P < .001$ ). The same result was obtained in the relation for the total number of deliveries and those performed by the iterative cesarean section. The number of iterative cesarean sections in women who had already experienced the cesarean section (828) and delivered by cesarean section again is 620. Other data were not significant. Only 2 to 3 pregnancies next to the first cesarean section were statistically significant in 2004 and 2005.

**Conclusions:**

If a trial of labor after cesarean does not proceed to vaginal birth, the woman will need support and encouragement to express feelings about another cesarean birth.

**key words:**

birth • previous cesarean section • vaginal birth • midwife • nursing diagnosis • nursing intervention

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## BACKGROUND

During the past 10 years a worldwide increase in women delivering by cesarean section (CS) has been observed [1–4]. There are several reasons for this trend, including medical, social, as well as psychological reasons. Any woman who has previously had a cesarean section is at risk regarding her future pregnancies (another C-section). The method of delivering a woman with a history of a cesarean section and midwifery has specific features.

The aim this work was to establish the frequency of cesarean sections and iterative cesarean sections in the period of interest; the relation between vaginal deliveries and cesarean sections; the relation between vaginal deliveries and iterative cesarean sections; the development of these relations over the years; the indications for and the modes of performing the iterative cesarean sections; the age structure of women, on which the iterative cesarean section was performed; the relations between the parity, pregnancy week, and fetal position in the indication for the iterative cesarean section; the frequency of applications for sterilization; the definition of the midwifery diagnoses, midwifery procedures, and midwifery education aimed at expectant mothers with a history of the cesarean section; the level of education in women in which the cesarean section was indicated; the level of information midwives have about the nursing process of women in which the iterative cesarean section was indicated.

### Hypothesis

The number of repeat cesarean deliveries increases proportionally with the increase in the number of cesarean sections as a whole [1,2]. Based on the data from literature, 10% to 30% of women apply for sterilization during elective repeat cesarean delivery [5–7]. Based on data from literature, the rate of vaginal birth after cesarean section is about 20% [8]. The educational activity provided by the midwife reduces the stress of women before elective repeat cesarean delivery [8–10].

## MATERIAL AND METHODS

The research was carried out in a retrospective and quantitative manner. It was based on a secondary analysis of the documentation from the Perinatology Center of České Budějovice Hospital between 1/1/2004 and 12/31/2008. We followed several cesarean sections performed, the number of pregnant women admitted with a history of cesarean section, the indications for repeat cesarean section, the method of performing iterative cesarean sections, age, parity, week of pregnancy and sterilization during repeat cesarean section. Based on experience from 2002–2003, an educational nursing program was compiled for mothers who delivered by iterative cesarean section. A nursing process aimed at problems of iterative cesarean sections was defined. The method of education of the expectant mother was also considered (8, 9, 10). These processes were furthermore monitored.

### The midwife in the period before delivery

In the outpatient department, it is necessary to treat the pregnant women who have previously had a cesarean section as

patients at risk, which means specific duties of the midwife based on the standard of care and on the midwifery diagnosis in light of the abovementioned fact.

This outpatient care before delivery is individualized to the needs of the woman.

The midwife acquires information by personal anamnesis, but also bases on the anamnesis on the course of the previous pregnancy, delivery, and postdelivery. She also determines further circumstances occurring from the time of the last delivery, which could affect the expected delivery.

### The midwife during delivery

The midwife admitting a pregnant woman with a history of a cesarean section also provides, in addition to the general scope, histories of the last and present pregnancy and performs a secondary analysis of the documentation from the preceding delivery completed by cesarean section (carried out at the same institution). She writes an informed consent with the hospitalization in cooperation with the pregnant woman. The midwife must also try to determine the method of performing the last cesarean section and determine whether or not there were previous operations on the uterus or known congenital anomalies of the uterus. She informs the woman of the possibility of sterilization in the case of a repeat cesarean delivery [5–7]. If the woman desires sterilization, then the midwife provides the administrative requirements of the application while adhering to legal conditions.

After that, she helps the physician complete a detailed examination at the time of admission, including a sonographic examination before, which she provides the cardiographic record. This examination at admission should result in a decision by the physician whether the delivery will be conducted by elective repeat cesarean section or vaginal delivery can be considered [11]. Psychological support of the woman is also important. If a vaginal delivery is decided, then the midwife will focus her interest on intensive monitoring of the condition of the fetus and the expectant woman [12–15]. A continuous and nonprotracted course of delivery is also of importance. The midwife must be familiar with the manifestations of a threatening rupture of the uterus [11,16–21]. If slight manifestations of any pathological obstetric condition occur, she should immediately inform the physician conducting the delivery to avoid any time delay. This can be of decisive importance for the fate of the fetus and delivering woman in acute critical cases.

### Midwife in the period postdelivery

In this period, the midwife monitors symptoms of infection, bleeding from the birth canal, blood pressure and pulse, while evaluating pain. She also monitors findings on the abdominal wall. The midwife, according to assessment, evaluates the status of the woman in labor. Subsequently, the midwife specifies the nursing diagnoses with priorities.

### *Nursing diagnosis: Deficient knowledge [8–10]*

Absence or deficiency of cognitive information related to a repeat cesarean section [7].

### Nursing intervention

Observe the client's ability and readiness to learn (eg, mental acuity, ability to see or hear, no existing pain, emotional readiness, and absence of language or cultural barriers) and previous knowledge. Assess barriers to learning (eg, perceived change in lifestyle, financial concerns, cultural patterns, and lack of acceptance by peers or coworkers). Involve clients in writing specific outcomes for the teaching session, such as identifying what is most important to learn from their viewpoint and lifestyle. Determine the client's understanding of common medical terminology, such as "cesarean section delivery," "emesis," and "palpation." Evaluate the readability of the material in pamphlets or written instructions. Use visual aids, such as diagrams, pictures, videotapes, audiotapes, and interactive internet Web sites. Provide preadmission self-instruction materials to prepare the client for post-operative exercises [14]. Assess the willingness of the family to incorporate new information, immunizations, medical and dental care, and diet and behavior modifications in support of the client. Evaluate the client's learning through return demonstrations, verbalizations, or the application of skills to new situations.

### Nursing diagnosis: Fear

Response to perceived threat that is consciously recognized as a danger.

Nursing intervention: Assess the source of fear with the client. Discuss situation with the client and help distinguish between real and imagined threats to well-being. If the client's fear is a reasonable response, empathize with the client. Avoid false reassurances and be truthful. Reassure clients that seeking help is both a sign of strength and a step toward resolution of the problem. If possible, remove the source of the client's fear with accurate and appropriate amounts of information. Stay with clients when they express fear; provide verbal and nonverbal (touch and hug with permission and if culturally acceptable) reassurances of safety if safety is within control. The nurse's presence and touch demonstrate caring and diminish the intensity of feelings such as fear. Explain all activities, procedures (in advance when possible), and issues that involve the client; use non-medical terms and calm, slow speech; and verify the client's understanding. Explore coping skills used previously by the client to deal with fear; reinforce these skills and explore other outlets. Provide backrubs and massage for clients to decrease anxiety.

### Nursing diagnosis: Impaired comfort

State in which an individual experiences an uncomfortable sensation in response to a noxious stimulus. Unpleasant sensation of being physically ill at ease that may be localized or generalized, but is not described in terms of tissue damage.

### Nursing intervention

Assess client needs holistically. Physical discomfort often coexists with and is exacerbated by emotional and spiritual discomfort; therefore, addressing nonphysical needs can improve the client's perception of physical comfort. The nurse's therapeutic approach and demeanor can have

a profound impact on the perception of comfort. Consult with the physician for medication to reduce discomforting symptoms, such as aching. Limit potentially uncomfortable interventions. Implement only when clearly needed and include the impetus for or timing of discontinuation in the plan of care. Tailor uncomfortable interventions to individual client needs or responses to therapy. Be aware of current research on alternatives to uncomfortable therapies that may benefit specific client groups or subgroups.

### Nursing diagnosis: Risk for infection

At increased risk for being invaded by pathogenic organisms.

### Nursing intervention

Observe and report signs of infection, such as redness, warmth, discharge, and increased body temperature. Assess temperature of neutropenic clients every 4 hours; report a single temperature of greater than 38.5°C or 3 temperatures of greater than 38°C in 24 hours. Note and report laboratory values (eg, WBC count and differential, serum protein, serum albumin, and cultures). Assess skin for color, moisture, texture, and turgor (elasticity). Keep accurate, ongoing documentation of changes. Carefully wash and pat dry skin, including skinfold areas. Use hydration and moisturize all at-risk surfaces. Use appropriate "hand hygiene" (i.e., hand washing or use of alcohol-based hand rubs). When using an alcohol-based hand rub, apply the product to the palm of 1 hand and rub the hands together, covering all surfaces of hands and fingers until the hands are dry. Note that the volume needed to reduce the number of bacteria on the hands varies by product. Follow standard precautions and wear gloves during any contact with blood, mucous membranes, nonintact skin, or any body substance except sweat. Use goggles, gloves, and gowns when appropriate.

The descriptive statistics and chi-squared test were used for the evaluation of results, and the Fischer exact test was employed in one case.

## RESULTS

In the period of interest, 11279 women delivered their children in the Perinatology Center. A total of 2997 cesarean sections (27%) were carried out; the percentage of cesarean sections increased from 22.0% in 2004 to 29.9% in 2008.

Table 1 summarizes the most-important indications for implementing repeat cesarean section over the 5-year period studied. Results are predicated on indications in literature [5,12,14,16]. The most-frequent indication for the performance of repeat cesarean section is threatening rupture of the uterus (Table 1). In the study of the frequency of the first and repeat cesarean sections related to the frequency of vaginal deliveries in particular years, statistically significant differences were found at a significance level of  $P < .0001$  (Table 2A,B).

In particular years, the ratio varied between numbers of vaginal deliveries, first cesarean sections and repeat cesarean sections in terms of the number of admitted women who previously experienced the first cesarean section (828) and number of women among them (620) on which the repeated cesarean section was performed (Tables 3, 4).

**Table 1.** Most frequent indications for repeat cesarean delivery (620).

Indication	Number	%
Other primary indication	68	10.97
Fetal distress	63	10.16
History of 2 cesarean sections	51	8.23
Disproportion between the fetus and pelvis	31	5.00
Breech presentation	26	4.19
Previous cervico-corporeal section	25	4.03
Large fetus (macrosomia)	13	2.10
Other abnormal presentation of fetus	12	1.94
Gemini	10	1.61
Cervico-corporeal dystocia	10	1.61
Combined indications	10	1.61
Pre-eclampsia	9	1.45
Other indications*	40	6.45

\* Placenta abruption, previous T-section, premature delivery, congenital anomalies of uterus, history of enucleation of sterile myoma, bleeding from delivery ways, hepatopathy, fetus with IUGR, history of hysterotomy abortion.

**Table 2A.** Relation between primary cesarean sections and frequency of vaginal deliveries.

Total number of deliveries	Vaginal delivery		CS*	
	Number	%	Number	%
11279	8282	73.43	2997	26.57
Statistics	$P < .0001$		$P < .0001$	

\* Complicated with forceps in 2%, uncomplicated.

**Table 2B.** Women admitted with history of cesarean section (828) and deliveries by iterative cesarean section (620).

Number admitted after 1 <sup>st</sup> CS		CS*	
Number	%	Number	%
828	Jul-34	620	5-May
$P < .0001$		$P < .0001$	

\* Among 828.

**Table 3.** Ratio of performed primary cesarean sections and iterative cesarean sections to the number of vaginal deliveries in particular years.

Year	Number of vaginal deliveries	CS		Statistics	Admitted after 1 <sup>st</sup> CS	Statistics	Number of ICS	Statistics
		Number	%					
2004	1596	450	22	$P = .0021$	141	NS	97	NS
2005	1613	557	25	NS	141	NS	107	NS
2006	1633	562	25	$P = .0096$	156	NS	124	NS
2007	1748	706	28	NS	176	NS	127	NS
2008	1692	722	29	NS	214	$P = .0085$	165	$P = .0045$
<b>Total of</b>	<b>8282</b>	<b>2997</b>	–	–	<b>828</b>	–	<b>620</b>	–

\* Among 828.

Table 5 shows that the approach by Geppert. was most frequently used in repeat cesarean sections. There is an obvious decrease in numbers of vaginal deliveries and repeat cesarean sections. This course does not correspond to experience of the other authors.

Table 6 shows weeks in which the repeat cesarean section was performed in. The outline of the age structure of women delivering by repeat cesarean section is summarized in Table 7. For the relation between parity and repeat cesarean section in particular years, see Table 8. The differences were statistically significant as to the second parity and third parity in 2004 and 2005. No relation was demonstrated in further years. The Fischer exact test was used.

The number of sterilizations performed is shown in Table 9. It corresponds to data from literature. Table 10 shows

**Table 4.** Number of performed iterative cesarean sections in the group of 828 women reporting history of iterative cesarean sections.

Year	Admitted after 1 <sup>st</sup> CS	ICS	%	Statistics
2004	141	97	69	–
2005	141	107	75	–
2006	156	124	79	–
2007	176	127	72	–
2008	214	165	77	–
<b>Total of</b>	<b>828</b>	<b>620</b>	<b>75</b>	<b>NS</b>

**Table 5.** Modes of performance of delivery in 828 women reporting history of iterative cesarean sections.

Year	CS total of	Mode of performance (828)									
		Gepprt.		Cerv. section		T section		Vaginal		Forceps	
		Number	%	Number	%	Number	%	Number	%	Number	%
2004	97 (68%)	93	66	4	3	0	0	43	30	1	1
2005	107 (75%)	101	72	6	4	0	0	34	24	0	0
2006	124 (79%)	121	77	3	2	0	0	31	20	1	1
2007	127 (72%)	124	70	3	2	0	0	48	27	1	1
2008	165 (77%)	159	74	4	2	2	1	46	21	3	2

**Table 6.** Week of delivery in the group of 828 women reporting history of iterative cesarean sections.

Year	Week of delivery									
	Up to 28	Up to 32	Up to 36	37	38	39	40	41	42	
2004	3	3	16	18	21	34	34	12	0	
2005	3	4	12	12	22	38	40	10	0	
2006	2	6	15	10	30	49	33	10	1	
2007	2	6	22	23	39	35	37	12	0	
2008	2	5	28	25	49	56	38	11	0	
Statistics	NS	NS	NS	NS	NS	NS	NS	NS	NS	

**Table 7.** Age of mothers indicated for iterative cesarean section.

Year	Age of woman					
	Up to 25	Statistics	26–30	Statistics	31+	Statistics
2004	13	NS	47	NS	45	NS
2005	8	NS	43	NS	54	NS
2006	11	NS	44	NS	61	NS
2007	8	NS	55	NS	69	NS
2008	15	NS	40	NS	107	NS
Total of	55	–	229	–	336	–

results from a questionnaire in women with repeat cesarean section concerning information acquired during education from midwives. Table 11 offers the level of knowledge in midwives who actively participated in repeat cesarean sections.

The educational program and the scope of the nursing process were compiled in 2003 and 2004.

Rupture of the uterus is the most frequent possible danger in repeat cesarean sections. Attention should thus be focused on this danger when performing these deliveries.

Cesarean sections were previously performed in 828 women (7.3%). Repeat Cesarean sections were carried out in 620 women (75.1%). Vaginal deliveries were performed in 208 women (25.0%); among them, vaginal deliveries were completed with forceps in 6 women (3%).

For modes of the performance of iterative deliveries see Table 5. Among 620 women with repeat cesarean sections, 200 women requested sterilization (32.2%), including 164 (82%) women during the second cesarean section, and 36 (18%) women during the third cesarean section (Table 9).

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**Table 8.** Relation between parity and indications for iterative cesarean section.

Year	Parity		Statistics
	2	3+	
2004	86	11	$P=0.003$
2005	73	34	$P=0.0149$
2006	101	23	NS
2007	105	22	NS
2008	133	32	NS

**Table 9.** Number of sterilizations performed in association with iterative cesarean section.

Year	Sterilization		
	1 <sup>st</sup> ICS	2 <sup>nd</sup> ICS	3 <sup>rd</sup> ICS
2004	34	30	4
2005	39	34	5
2006	43	35	9
2007	36	26	10
2008	48	40	8
<b>Total of</b>	<b>200 (32.25%)</b>	<b>164 (26.45%)</b>	<b>36 (5.81%)</b>

**Table 10.** Level of knowledge concerning educational intervention in mothers who experienced iterative cesarean section (512).

Question	Answer				No information	
	Positive		Negative		Number	%
	Number	%	Number	%		
Were you satisfied with information in period before delivery?	315	61.52	35	6.84	162	31.64
Were you informed about the course of the delivery?	468	91.41	25	4.88	19	3.71
Were you informed about the course of your condition after the delivery?	487	95.12	20	3.91	5	0.97

**Table 11.** Level of knowledge of nursing process in midwives participating in iterative cesarean section (72).

Question	Answer			
	Positive		Negative	
	Number	%	Number	%
Were you acquainted with the scope of nursing intervention?	62	86.11	10	13.89
Were you acquainted with approaches to elimination of fear in patients?	57	79.17	15	20.83
Were you acquainted with methods of solution in terms of risk of infections?	62	86.11	10	13.89

## DISCUSSION

The frequency of cesarean sections in the Perinatology Center in České Budějovice is no different from other data found in literature. Methods of performing subsequent deliveries after a cesarean section also show no differences. Frequencies of cesarean sections and iterative cesarean sections are summarized in Tables 2–5. Trends that are in agreement with literature can be observed again. The age structure of women corresponds to the general fertile population, and we did not find any deviation from the standard situation. We demonstrated a statistically significant relation between indications for the iterative delivery and second and third deliveries, but this was an expected result. Rupture of the uterus is the most-frequent possible danger in repeat cesarean sections. Attention should thus be focused on this danger when performing these deliveries. The number of sterilizations in our group again corresponds with data from

literature, but there is a relatively considerable proportion of women refusing sterilization after the first iterative delivery [5–7]. This is obviously associated, for example, with their fear of the fate of existing children or possible change in their partner relationship.

The methods of performing a delivery after a previous cesarean section are actually specific [22].

Indications for a repeated cesarean section are of primary importance. They are frequently affected by the fear that the uterus wall will rupture, as shown in the Table (Table 1). The Table shows that threatening rupture of the uterus is the most-frequent reason for the indication for the iterative section, which is in agreement with literature [16,18–21].

Given the increasing number of iterative cesarean sections and the nonsystematic approach to this problem, particularly

in the sense of the holistic attitude, we decided to compile an educational program and nursing standard based on literature and our own experience. We verified these documents in 2003 and 2004 and started using them in following years.

In preventive consulting rooms, the pregnant woman should be informed about the increased probability of a cesarean section, that is, about the more-frequent indications for this approach. In addition to the regular duties associated with the usual preparation for performing delivery by cesarean section, midwives in the maternity ward should pay particular attention to the intensity and frequency of contractions and to the monitoring of the abdominal wall, pulse frequency, blood pressure, and general condition. Cardiocotographic monitoring is important. A holistic attitude should be emphasized. In the prenatal period, there is the highest risk of the uterus wall rupturing and local or total infection. Psychological support of the patient is sometimes needed if sterilization has been carried out. This comprehensive attitude, which is based on experience from past years, is very effective. There were no complaints concerning the implemented sterilization. No rupture of the uterus wall was experienced. No total infection occurred in association with repeated cesarean sections. Nursing standards were compiled for women with repeated cesarean sections. Steps of nursing procedures for women with repeated cesarean sections were executed.

According to data shown in the questionnaire attached (Tables 10, 11), the occurrence of stress situations was reduced and the general level of information of the delivering women was increased, particularly in the field of possible sterilization, and neither complaints nor medical complications were encountered.

## CONCLUSIONS

Authors report on the frequency of repeat cesarean sections at the Perinatology Center in České Budějovice. The first part is mostly concerned with medical aspects of these deliveries. The second part deals with the nursing care system.

The trend of the increasing number of women delivering by cesarean section and delivering woman with a history of cesarean section brings new challenges for midwives and obstetricians. Attention should be paid to women with psychological and physical needs during the trial of labor after a cesarean delivery. (To alleviate such anxiety, the nurse can encourage the woman to use breathing and relaxation techniques and to change positions to promote the progress of labor.) If a trial of labor after a cesarean delivery does not proceed to a vaginal delivery, the woman will need support and encouragement to express her feelings about having another cesarean birth.

Based on our experience, we have defined the following care procedures. In the provided set, only once did a

complication occur related to uterine rupture, diagnosed early – and there were no complaints related to the performed sterilization.

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