Robson's classification – a way to reduce the number of caesarean sections?

Robsonova klasifikácia – cesta k zníženiu počtu cisárskych rezov?

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Summary: The increasing number of caesarean sections represents a significant health, economic, and psychological problem on a global scale. Robson's classification is a comprehensive approach to regularly analyse every operative abdominal delivery. It appears that particularly promoting the vaginal births after a previous caesarean section and reducing this mode of delivery among primiparas, is one of the ways of stopping the rising trend of caesarean sections. Slovak maternity facilities that have adopted Robson's classification reveal a decrease in the number of these obstetric surgeries.

Key words: Robson's classification – caesarean section – mode of delivery – management

Súhrn: Stúpajúci počet cisárskych rezov predstavuje závažný zdravotný, ekonomický a psychologický problém v globálnom meradle. Robsonova klasifikácia predstavuje komplexný prístup, ako na pôrodníckych pracoviskách realizovať pravidelne analýzu každého operačného abdominálneho pôrodu. Ukazuje sa, že najmä podpora vaginálnych pôrodov po predošlom cisárskom reze a redukcia cisárskych rezov u primipár je jednou z ciest, ako zastaviť stúpajúci trend cisárskych rezov. Aj slovenské pracoviská, ktoré akceptovali Robsonovu klasifikáciu, vykazujú pokles cisárskych rezov.

Kľúčové slová: Robsonova klasifikácia – cisársky rez – spôsob pôrodu – manažment

Introduction

Robson's classification of caesarean sections was published in 2001. This method categorizes deliveries according to several criteria, including parity, history of caesarean section, foetal viability, and number of foetuses. The aim of this classification is to provide a better understanding of the frequency of caesarean sections and to compare the obstetric facilities (Tab. 1) [1].

Use in clinical practices

Robson's classification offers several advantages:

Identification of risk groups

The classification allows healthcare professionals to identify groups of women at risk based on their obstetric characteristics. This helps in predicting possible complications and adapting care for mothers at higher risk.

Improved quality of care

Based on this classification, healthcare professionals can tailor procedures and care for mothers and newborns. For example, mothers with previous caesarean sections may require special attention and birth planning.

Benchmarking and performance evaluation

Healthcare facilities and obstetric units can use the classification to monitor and compare their obstetric outcomes. This helps identify areas for improvement and contributes to increasing the quality of care.

Reduction of unnecessary caesarean sections

The classification enables identification of mothers who can have a safe, uncomplicated, and natural vaginal delivery, thus helping to reduce medically unnecessary caesarean sections. This improves the mother's childbirth experience and reduces healthcare costs.

Personalized care

Based on Robson's classification, care can be provided considering the unique needs of each mother. This increases patient satisfaction and childbirth safety.

Tab. 1. Robson's classification [1].
Tab. 1. Robsonova klasifikácia [1].

Category	Description
Robson 1	**Nulliparous** (first-time mother), single fetus, cephalic presentation, after 36 completed weeks, **spontaneous labor**.
Robson 2	**Nulliparous**, single fetus, cephalic presentation, after 36 completed weeks, **induced labor or caesarean section before labor**.
Robson 3	**Multiparous** (has given birth before), single fetus, cephalic presentation, after 36 completed weeks, **spontaneous labor**.
Robson 4	**Multiparous**, single fetus, cephalic presentation, after 36 completed weeks, **induced labor or caesarean section before labor**.
Robson 5	**Previous caesarean section**, single fetus, cephalic presentation, after 36 completed weeks.
Robson 6	All **nulliparous women**, single fetus, **breech presentation** (buttocks or feet first).
Robson 7	All **multiparous women** (including those with previous caesarean sections), single fetus, **breech presentation**.
Robson 8	All **multiple pregnancies** (twins, triplets, etc.).
Robson 9	All **abnormal presentations** (including those with a previous caesarean section), such as transverse or oblique lie.
Robson 10	All single fetus pregnancies, **cephalic presentation before 36 completed weeks of gestation**.

In conclusion, Robson's classification is an important tool in obstetrics contributing to improving care for mothers and newborns by allowing better identification of risk groups and adapting care based on obstetric characteristics. It is a tool that contributes to a safe and personalized childbirth experience. Additionally, this classification also reduces excessive surgical/medical interventions in groups of women who do not require them [2].

Robson's classification – history

Michael Robson, a British gynaecologist and obstetrician, published his classification in 2001 with the aim of identifying and comparing delivery outcomes among different obstetric units and populations. This system has become an important tool in the field of obstetrics and is used worldwide [3].

In 2015, the World Health Organization (WHO) began implementing Robson's classification into maternity care strategies. In addition to establishing the recommended frequency of caesarean sections, WHO experts recommended using this classification in every maternity facility. This system allows the categorization of labouring women into different groups and ultimately aims to reduce the overuse of caesarean sections without negatively affecting perinatal and maternal health outcomes. WHO and the author of Robson's classification emphasize that the implementation of this classification alone is not the ultimate solution to reducing the number of caesarean sections, but represents a way to identify specific patient groups. This approach can better tailor maternity care to different patient needs and processes to achieve long-term and safer reduction in the number of caesarean sections. Implementation of this classification in many maternity facilities worldwide has already led to a reduction in the frequency of caesarean sections, by maintaining perinatal and maternal safety as a top priority. Identification of key groups of mothers and other effective measures and strategies in labour management have accelerated the safe reduction of caesarean sections. The goal is long-term reduction of medically unnecessary caesarean sections [4].

Frequency of caesarean sections worldwide – WHO guidelines and global trends

According to WHO, the optimal frequency of caesarean sections is between 10–15% of all births. This recommendation dates back to 1980 when experts believed that maintaining this rate would balance the benefits of caesarean sections with potential risks. If the rate exceeds 20%, there is an increased risk of perinatal and maternal complications. WHO has consistently maintained this position over the years, and in 2015, it further emphasized that the rate of caesarean sections should not surpass 15% in any obstetric facility. WHO also advocates the use of Robson's classification to monitor and evaluate caesarean rates across different groups of pregnancies.

Although there may be higher caesarean rates in certain groups, the overall frequency should not exceed this 15% threshold [5–7].

A caesarean section is considered a lifesaving surgical procedure for both the mother and newborn when there are clear medical indications. It is one of the most commonly performed surgical operations globally and is projected to become even more prevalent in the coming decades if the current trend continues. Caesarean delivery significantly affects the health of both the newborn and mother and also influences the mother's future reproductive behaviour. Additionally, it impacts the woman's total fertility rate, with economic factors playing a significant role in this process [6].

Increasing trends and reasons

The frequency of caesarean sections has been steadily increasing particularly over the past three decades. This upward trend is observed globally with the most significant rise in developed countries.

The reasons for this increase are multifactorial and encompass various aspects, including medical, social, and economic factors [6].

Fertility rates and demographic changes

In 1992, the total fertility rate (TFR) – the average number of children per woman – fell below 2.0, reaching a value of 1.239 in 2006. This decline indicates that the average woman has fewer than two children. The projections estimate that TFR will rise to 1.6 by 2025. The net reproduction rate in 2006 was 0.596, indicating that the current generation of women is not replacing itself. Furthermore, the average age of women at childbirth is expected to increase from 27.9 years in 2006 to 29.2 years by 2025. These demographic shifts contribute to the changing dynamics of childbirth and may influence the rising caesarean rates [8].

Impact of caesarean sections on fertility

A study publish in 2020 explored whether the mode of first delivery – vaginal birth versus caesarean section – affects the interval between the first and second childbirths. The study involved 2,423 women and spanned 36 months, with an average maternal age of 27.2 years. The caesarean section rate in this cohort was 29.4%. During the study period, 2,046 out of 2,423 women attempted to conceive again. Out of these, 413 women successfully conceived following a caesarean section, representing a 68.9% success rate. In contrast, 1,090 women out of 1,422 who delivered vaginally successfully conceived again, resulting in a 76.7% success rate. The findings also revealed that the live birth rate was higher after vaginal delivery (50.1%) compared to caesarean sections (42.8%). The conclusion was that women who underwent caesarean sections had a 10% lower chance of conceiving within three years post-surgery and nearly a 20% lower chance of delivering a live newborn. These data suggest that the increasing frequency of caesarean sections is contributing to the overall decline in women's fertility [9].

The study clearly shows a connection between the method of delivery and subsequent pregnancies. A caesarean section reduces the chances of conception and the likelihood of carrying a foetus to term. In the future, this poses a significant risk with the increasing number of caesarean sections. The key factor is the management of the first delivery.

A study published in 2013, which compared the difference in fertility after the first birth, showed that during the monitored 8.5 year period, 40.2% of women after caesarean section did not have a live birth. In contrast, in the group after spontaneous vaginal delivery, it was only 33.1%. Studies confirmed that mothers who had their first birth by caesarean section subsequently have a 15% lower chance of another successful live birth. Even when including possible complications, the strongest factor was still how the first birth was conducted [10].

The drop in live births by 15% considering how the first birth was conducted is massive. Of course, indications for caesarean section should be taken into account, but it should be noted that the overuse of surgical management of labour indicates a very negative trend towards future live births. A significant decrease in the birth rate with a rapid increase in caesarean sections only deepens the demographic problem of obstetrics. Therefore, not only are fewer children born, but also due to the management of the first birth, fewer first-time mothers decide to have another child. If this trend continues in the coming years, the cumulative effect will only multiply and the birth rate will tend to be lower and lower.

Indications and regional variations

The Yulin First Hospital in China recorded 5,267 births from 2009 to 2012, with a caesarean section rate of 41.4%. The most common reasons for caesarean sections included foetal distress, umbilical cord pathology, a previous caesarean section, and maternal request for the procedure, which accounted for 9.1% of cases. Out of 1,404 caesarean sections, 777 were urgent, and 627 were elective. This retrospective analysis confirmed that caesarean sections should be performed only when there are clear medical indications, adhering to WHO's recommended frequency of 15%. Over the past two decades, there has been a significant increase in caesarean section rates in China, which, coupled with unclear medical indications, elevates maternal and perinatal mortality [11].

Indications for caesarean sections should be strictly monitored. It is important that the method of delivery via caesarean section is decided only by the obstetrician, as childbirth is in the hands of the obstetrician. Non-gynaecological and non-medical indications for caesarean sections should be individually reassessed. When indicating the management of delivery via caesarean section, the risks and benefits must be clearly evaluated. A caesarean section is a major abdominal surgery, and this must always be kept in mind when considering it as a method of delivery.

A caesarean section is often a life-saving intervention when medically necessary, but it can also have both short-term and long-term health implications for women and children. With the growing use of a C-Section, especially in cases without medical indication, it is crucial to better understand its health impacts. Maternal mortality and morbidity rates are higher following a C-Section compared to vaginal birth. Additionally, a C-Section is linked to an increased risk of uterine rupture, abnormal placentation, ectopic pregnancy, stillbirth, and preterm birth, with these risks escalating in a dose-response pattern. Emerging research suggests that babies delivered via C-Section experience different

hormonal, physical, bacterial, and medical exposures, which can subtly influence neonatal physiology. In the short term, a C-Section is associated with altered immune development, a higher likelihood of allergies, atopy, asthma, and decreased gut microbiome diversity. While the persistence of these risks into later life requires further investigation, studies frequently report an association between a C-Section and a greater incidence of obesity and asthma in late childhood [12].

The increase in the number of caesarean sections, regardless of indication, also points to a rise in morbidity among children, as well as an increase in postoperative complications for mothers. It is important to note that these studies are still ongoing, as confirming or disproving the effects of overusing caesarean sections requires long-term data analysis. The frequency of caesarean sections should be maintained at an optimal level, while preventative measures should be taken to ensure that morbidity in both children and mothers is not increased iatrogenically. It is crucial to continue collecting these data and evaluating them in relation to the method of delivery.

Factors contributing to rising caesarean rates

The rising frequency of caesarean sections worldwide is driven by several factors, including:

Medical advancements
Improved surgical techniques and anaesthesia have made caesarean sections safer contributing to their increased use.

Maternal requests
Some women prefer caesarean delivery due to perceived convenience or fear of vaginal delivery, even in the absence of medical indications.

Legal and liability concerns
In some regions, obstetricians may opt for caesarean sections to minimize the risk of legal action in cases of complicated vaginal deliveries.

Socioeconomic factors
Higher socioeconomic status is often associated with increased caesarean rates, as private healthcare providers may have financial incentives to perform more surgeries.

Cultural influences
Cultural beliefs and practices can also impact the decision to perform a caesarean section, with some cultures viewing it as a status symbol or as a way to choose auspicious birth dates [13].

Since 1970, the frequency of caesarean sections in the USA has increased from 5% to the current 32%. Antoine and Young in his study revealed that one out of three babies in the US is delivered by caesarean section. Extreme increase began in the 1970s, when due to new surgical procedures and antibiotics prophylaxis, a C-section became a relatively safe surgical procedure. It contributed to an involuntary race for the permanent higher percentage of caesarean sections. All efforts to reduce the number of caesarean sections and the promotion of vaginal birth did not have great success. Perinatological results over the limit of 20% of caesarean sections have stopped improving, hitting a plateau. According to perinatologists, the most successful results of perinatal statistics have already been achieved and with the increasing number of caesarean sections, both neonatological and paediatric morbidity and mortality began to increase [14].

In 2021, Zeitlin et al. analysed data from Euro-Peristat on caesarean frequency in Europe. The study included 27 member states of the European Union, Iceland, Norway, Switzerland, and Great Britain. Since 2015, every birth after the 22nd gestational age was considered. Out of 31 countries, 18 countries supplied data directly in Robson's classification. Frequency of caesarean sections in Europe resulted in 16.1% to 56.9%. Countries that did not supply data in the form of Robson's classification had a higher percentage of caesarean sections. The most caesarean sections were in the Robson groups 5–7 and 10 [15].

Evaluation of the method of childbirth management using Robson's classification seems to be a good first step in identifying the causes and groups where caesarean sections are increasing. It is important to maintain this internal workplace analysis in the long term and to approach it appropriately when reassessing procedures and childbirth management.

Frequency of caesarean sections in the Slovak Republic (SR)

Slovakia is not an exception to the upward trend in caesarean sections. Data from the National Health Information Centre of the Slovak Republic (NCZI) from 1996–2021, excluding 2005 due to missing information, reflects a 25-year period of births and caesarean section frequency trends. During this period, the annual birth rate ranged from 49,578 in 2002 to 59,784 in 1996. Over the last decade, birth rate has stabilized at around 56,000 births per year, with a variation of ± 2%, indicating a relatively stable birth rate in SR. Similarly, the frequency of caesarean sections has remained stable at 30 ± 1% over the last decade. Over the 25-year period, NCZI data showed a significant increase in the number of caesarean sections without a change in the total number of births and without improvement in perinatal outcomes. Long-term effects of the increased caesarean section rates on maternal and paediatric populations are not available. Comparing the years from 2021 to 1996, there were 9,457 more caesarean sections performed, representing a 130% increase over the observed period. Notably, the plateau in the frequency of caesarean sections was reached in 2011/2012, maintaining around 30% since then. This indicates that the 130% increase

occurred over 15 years, with an annual growth rate of 8.65% in caesarean sections. This cumulative calculation reveals that each year, 8.65% more caesarean sections were performed compared to the previous year for a span of 15 years. The significant rise in caesarean section numbers can be attributed to multifactorial causes, with defensive medicine being a primary factor. Over the past decade, the frequency of caesarean sections has remained steady. The most common reason for caesarean sections is repeated caesarean sections. The preceding two decades reveal an unusually high number of primiparous women giving birth via caesarean section. Consequently, when these women became pregnant again, most Slovak maternity hospitals performed caesarean section again. Fortunately, many obstetric facilities have been reducing the number of caesarean sections in the Robson Group 1 category (first-time mothers at term with spontaneous labour onset, head-first position, no indication for caesarean section). This positive trend should result in a decreased frequency of caesarean sections in the coming years [16].

The number of caesarean sections in SR has risen from 12% to 30% over the past three decades. The rate has remained at 30% for more than a decade, and no progress has been made in reversing this trend. There are some facilities that have individually improved their statistics, yet SR as a whole continues to maintain an excessively high number of caesarean sections.

Several maternity units in the Žilina region have used Robson's classification as a strategy to reduce the number of caesarean sections. These maternity units include Kysucká Hospital in Čadca, Hornooravská Hospital in Trstená, Dr. Ivan Stodola's Hospital in Liptovský Mikuláš, and Dr. Ladislav Nádašdi Jégé's Dolnooravská Hospital in Dolný Kubín. In 2019, there were 3,529 births in this region, with 23.9% being caesarean sections. Retrospective evaluations of

births in 2019 were conducted in these hospitals, with a prospective analysis of obstetric indicators using Robson's classification at Kysucká Hospital in Čadca. These are regional maternity hospitals with the same level of perinatal stratification, meaning only physiological births, not preterm ones, occur here. Thus, the proportion of the Robson Group 10 was only 3.5%. At Kysucká Hospital in Čadca, there were 1,149 births in 2019 and 1,031 births in 2020. In 2019, there were 248 caesarean sections, and in 2020, there were 202, resulting in caesarean section rates of 21.5% in 2019 and 19.5% in 2020. The implementation of the Robson's classification led to a 2% overall reduction in caesarean sections, equating to a 10% decrease in caesarean sections. Notably, the rate of caesarean sections in the Robson Group 1 decreased from 9.8% to 6.6%. This reduction presents a significant potential for a long-term stable caesarean section rate. The successful implementation of Robson's classification at these facilities has primarily reduced the number of caesarean sections, especially in the Robson Group 1 [17].

Zahumensky et al. in 2019 analysed caesarean section frequency using Robson's classification at three university hospitals in SR. This multicentre retrospective study analysed births from January 1, 2017 to December 31, 2017, including the Departments of Obstetrics and Gynaecology I and II of the University Hospital Bratislava and the Department of Obstetrics and Gynaecology of the Hospital Trenčín. The caesarean section rates were 1,437 out of 3,361 births (42.8%), 729 out of 2,795 births (26.1%), and 303 out of 2,080 births (14.6%). In the Robson Groups 1 and 2, which include first-time mothers at term with a head-down foetus, caesarean section rates were 613 out of 1,653 (37.1%), 278 out of 1,389 (20.0%), and 91 out of 898 (10.1%) births. In the Robson Group 5, the rates were 405 out of 418 (96.9%), 261 out of 343 (76.1%), and 55 out of

115 (47.8%) births. The study concluded that using Robson's classification to analyse caesarean section rates can identify areas where it is safe to reduce the number of caesarean sections. The Robson Groups 1, 2, and 5 were identified as having the most potential for the reduction [18].

Zahumensky et al. in 2020 extended their work on Robson's classification to not only identify groups with potential for reducing caesarean sections, but also to implement necessary interventions. After implementing a multi-layered intervention aimed at healthcare workers, combined with political and organizational changes, the overall caesarean section rate decreased significantly by 33.5% (from 33.7% to 22.4%). This intervention effectively prevented unnecessary major surgery for one in nine women who would have otherwise had a caesarean section. More importantly, this reduction did not negatively impact perinatal mortality. The most significant reduction was in the number of elective caesarean sections for non-obstetric indications, particularly neurological (mainly disc protrusion) and orthopaedic (status post-hip luxation). Each the Robson group revealed a reduction in caesarean sections, with the most significant decreases in the Robson Group 1 by almost half, the Robson Group 2 by 40%, and the Robson Group 5 by nearly 23%. These groups were identified as the most critical, and significant reductions supported the effectiveness of combining Robson's classification with targeted interventions to maintain perinatal morbidity and mortality outcomes [19].

Zahumensky et al. in 2019 published a study highlighting that Robson's classification does not have a separate category for premature rupture of membranes (PROM). They investigated whether outcomes differed between women with PROM and those with spontaneous labour onset or induced labour. The study included women who

gave birth from January 1, 2018 to September 30, 2019. They divided term pregnancies with a head-down foetus into groups based on admission reason – spontaneous labour, PROM, or induced labour – separately evaluating first-time mothers and multiparous women without a caesarean history. Caesarean rates for first-time mothers with PROM were 14.7%, compared to 8.0% for spontaneous labour, and 20.7% for induced labour. For caesareans due to labour dystocia, the rates were 10.6% for PROM, 5.4% for spontaneous labour, and 13.3% for induced labour. For caesareans due to foetal hypoxia, there was no significant difference between PROM and spontaneous labour (3.6 vs. 2.3%), but a significant difference compared to induced labour (7.1%). The study concluded that women with PROM have different birth outcomes compared to those with spontaneous labour or induction and deserve a separate category in Robson's classification. PROM cases account for about 10% of births, with varied approaches and recommendations. Caesarean section rates in this group can be modified by the timing and method of labour induction, differing from other indications for induction and spontaneous labour. Individual facilities should audit their management success for these births, which Robson's classification currently does not facilitate. The authors suggested creating a new subcategory in Robson's classification: 1B for first-time mothers admitted with PROM and 3B for multiparous women without a caesarean history admitted with PROM [20].

The implementation of Robson's classification at Slovak maternity hospitals is both a benefit and proof that internal audits are functioning. If a specific workplace focuses on the causes of increased numbers of caesarean sections, it can respond adequately to this situation and address it appropriately. In the case of achieving the use of Robson's classification on a national level, we would be able to have much better statistical outcomes and reduce the overuse of caesarean sections.

Conclusion

The World Health Organization in 2015 and the International Federation of Gynaecology and Obstetrics (FIGO) in 2016 implemented Robson's Ten Group Classification System as a universal benchmark to evaluate, compare, and monitor caesarean section occurrence within healthcare institutions, between facilities, and over time. This system categorizes pregnant women and parturients into ten groups based on five fundamental obstetric characteristics: parity, the number of foetuses, history of previous caesarean sections, gestational age, and foetal presentation. The WHO expects the implementation of Robson's classification to improve healthcare in the following areas:

Identifying groups of women contributing most and least to the overall caesarean section rate. Comparing data across different groups. Assessing strategies aimed at optimizing the number of caesarean sections. Evaluating the quality of care in healthcare facilities. Raising awareness about the importance of these data among both professionals and the general public. Recent decades have seen a significant increase in caesarean section rates, necessitating greater attention to improving maternal and perinatal morbidity and mortality. Traditional reporting of caesarean section numbers is insufficient as it does not consider the infrastructure and focus of the facility. Robson's classification is simple and applicable in any setting.

Our hypothesis that Robson's classification has the potential to reduce caesarean section rates and provide clarity in statistical data on births within obstetric facilities has proven to be achievable. It is crucial to ensure that reducing caesarean rates does not increase morbidity and mortality for mothers and infants. There remains space for improvement in reducing caesarean sections at every maternity. Improved statistical tracking and transparency achieved through Robson's classification, along with changes in delivery management strategies based on these insights, demonstrate that the implementation of Robson's classification is clearly beneficial. Such an internal audit in an obstetric facility, along with appropriate conclusions and changes, is a valuable addition to the Slovak healthcare environment.

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