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**Retained products of conception — a retrospective analysis of 200 cases of surgical procedures for the diagnosis of residua postpartum**

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**Running title:** Surgery for residua postpartum

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**ABSTRACT**

**Objectives:** Postpartum retained products of conception are a relatively rare diagnosis occurring in approximately 1% of cases after spontaneous deliveries and abortions. The most common clinical signs are bleeding and abdominal pain. The diagnosis is based on clinical signs and ultrasound examination.

**Material and methods:** Retrospective analysis of 200 surgical procedures for the diagnosis of residua postpartum obtained in 64 months. We correlated the method and accuracy of diagnosis with definitive histological findings.

**Results:** During 64 months, we performed 23 412 deliveries. The frequency of procedures for diagnosis of retained products of conception (RPOC) was 0.85%. Most (73.5%) of the D&C were performed within six weeks of delivery. Histologically, the correct diagnosis was confirmed in 62% (chorion + amniotic envelope). There was interestingly lower concordance of histologically confirmed RPOC in post-CS patients (only 42%). In women after spontaneous delivery of the placenta, the diagnosis of RPOC was confirmed by histological

correlate in 63%, and the highest concordance occurred in women after manual removal of the placenta in 75%.

**Conclusions:** Concordance with histological findings of chorion or amnion was seen in 62% of cases; this means that the incidence rate in our study was around 0.53%. The lowest concordance is after CS deliveries, 42%. D&C for RPOC should be performed after adequate clinical evaluation and in the knowledge of 38% false positivity. There is certainly more space for a conservative approach under appropriate clinical conditions, especially in patients after CS.

**Key words:** retained products of conception; D&C; hysteroscopic resection; manually removed placenta

## **INTRODUCTION**

Post-partum retained products of conception are a relatively rare diagnosis occurring in approximately 1% of cases after spontaneous deliveries and abortions. [1, 2] The most common clinical signs are bleeding, abdominal pain, fever and uterine subinvolution. These symptoms commonly appear during the six weeks of labour but may also occur several months after delivery. The diagnosis is based on clinical signs and ultrasound examination (echogenic focus and distension of the uterine cavity, flow parameters). The definitive diagnosis is confirmed by histological examination. The sensitivity and specificity of the ultrasound examination range from 44–85% and 88–92%, respectively [3–6]. Postpartum residues with minimal clinical manifestations can be managed by conservative management with the administration of uterotonics and monitoring their effect by follow-up ultrasound. The published success rate of this procedure has been nearly 50% [6, 7]. The preferred method is the instrumental revision of the uterine cavity with a curette, preferably under ultrasound guidance. Hysteroscopic resection of residual tissue is another option and is recommended to be performed no earlier than six weeks after birth. The most common complications of surgical management are significant blood loss, uterine perforation during surgery, or even the need for a hysterectomy. Late complications include the development of Asherman's syndrome, sterility, and the possible development of arteriovenous malformations.

### **Aim of the study**

To evaluate procedures for postpartum residua and to find possible associations with parity, age, mode of delivery, gestational week, gynaecological and obstetric history, and other variables.

## **MATERIAL AND METHODS**

Retrospective analysis of 200 surgical procedures for the diagnosis of residua postpartum. Data were obtained from our hospital information system for 64 months. We analyzed the relationship of the diagnosis of residuum postpartum with parity, age, mode of delivery, obstetric complications, uterine procedures, manual removal of the placenta and days since delivery. Ultrasonographic diagnosis of retained products of conception was made by assessing the width of the uterine cavity and the presence of hyperechogenic material. We correlated the method and accuracy of diagnosis with definitive histological findings and the possible presence of inflammation. We considered the chorion or amniotic envelope finding from the retrieved material as histologically confirmed residues. Data were processed using SPSS PC statistical software (for Windows).

## **RESULTS**

We performed 200 procedures for diagnosing postpartum retained products of conception (RPOC) in 64 months at our institution. During this period, we performed 23,412 deliveries, and out of these, 5,567 were caesarean sections (28%), 234 were forceps (1%), and 16,539 (71%) were spontaneous deliveries. After vaginal deliveries, we had to manually remove the placenta (MRP) and instrumental revision of the uterine cavity in 677 (4.1%) women. Thus, if we take all the procedures for RPOC during this period in our health facility, their frequency was 0.85% of all deliveries.

Figures 1–5 show the distribution of age, parity, week of gestation, mode of delivery and beginning of the delivery. The composition of parturients in the study population corresponds to the typical design of the population of parturients in our health facility (4). It consisted of 70% of patients after vaginal delivery with spontaneous delivery of the placenta, 14% of women after caesarean section (CS) and a group of 16% of women after vaginal delivery where we had to perform manual removal of placenta and instrumental revision of the uterine cavity (D&C). Hence 4.75% of women after MRP had later D&C performed for suspected RPOC, *i.e.*, one in 21 women. Similarly, it can be inferred that 0.6% of women had a vaginal delivery, and 0.45% of women after CS D&C procedure for RPOC was performed in women after MRP 7.9 times more often than after spontaneous delivery and 11 times more often than

after caesarean section. Labour started spontaneously in 65%, induction was in 27% and planned CS in 8%. Of the total number of caesarean sections, 66% of CS were acute and 34% planned, which is undoubtedly surprising but may be an error of small numbers. Most (73.5%) of the D&C were performed within six weeks of delivery. Of these, 16% of procedures were performed on days 1 to 5. In our health facility, we perform an ultrasound on every woman after MRP and CS on day 3 during hospitalization, and therefore D&C is performed within 5 days after delivery.

Further, we performed 28% of procedures from days 6 to 14 and 29.5% of procedures from days 15 to 42. After day 42, it was 26.5% of operations (Fig. 6). The longest time span from delivery to D&C performance was 198 days. The diagnosis of residua was 59.5% based on clinical signs and ultrasound examination, 17% based on clinical signs only and 23.5% based on ultrasound examination only. The most frequent clinical manifestations were bleeding, abdominal pain elevated temperature. Ultrasound findings suspicious of RPOC were uterine cavity dilatation over 10 mm, hyperechogenic content, and present flow was not a condition. Histologically, the correct diagnosis was confirmed in 62% (chorion + amniotic envelope). In 34% only decidua was described; in 2%, only myometrium and in 2%, only coagula. In the complete histology findings, myometrial fragments were described in 59 patients (29.5%), which could be a risk factor for further pregnancies. Inflammation was described histologically in 46%. There were 47% of women with a history of mild or no complications. Thirty per cent of the women had a history of uterine cavity surgery (abortion, D&C, suction curettage), indicating a significant effect (Chi-square = 80.554,  $p = 0.0001$ ) of this factor on the subsequent occurrence of RPOC in following pregnancies. A risk factor for RPOC could also be a caesarean section in the previous pregnancy (occurrence in 5.5% of women) or pre-eclampsia in this pregnancy (7.5% of women). When testing the concordance between mode of delivery and clinical diagnosis of RPOC confirmed by histological correlate, at the significance level (Chi-square = 19.599,  $p = 0.46$ ), there was interestingly lower concordance of histologically confirmed RPOC in post-CS patients (only 42%). In women after spontaneous delivery of the placenta, the diagnosis of RPOC was confirmed by histological correlate in 63%, and the highest concordance occurred in women after MRP in 75%. Histological concordance with the diagnosis of RPOC was lower in the women after acute CS group than in women after elective caesarean section. No statistical significance (Chi-square = 217.274,  $p = 0.84$ ) was found between this factor and the mode of delivery of the placenta when the time of the procedure was observed.

Similarly, there was no correlation (Chi-square = 4.966,  $p = 0.291$ ) between the mode of delivery and the presence of inflammation confirmed by histopathology. When the way of onset of the labour (planned SC, induced labour, spontaneous labour) was correlated with the final histological findings (Chi-square = 27.13,  $p = 0.028$ ), a false positive diagnosis of RPOC was found to be almost 50% in patients after induced deliveries. Also, inflammation was more frequently described by the histopathologist in patients after induced deliveries, but this factor appeared only at the level of significance (Chi-square = 4.539,  $p = 0.209$ ). Surprisingly, when testing the concordance between parity and inflammation confirmed by a histopathologist, inflammation was less frequently described in second and multiple births (Chi-square = 6.355,  $p = 0.096$ ).

In 8.5% (17 women), we were forced to perform a repeated D&C for persistent RPOC. In three cases, the uterus was perforated and uterine perforation was corrected by subsequent laparoscopic suture.

The Pathologist described placenta accrete in two cases (1%). We performed a hysterectomy in one patient, and ligation of internal iliac arteries and hysteroscopic resection of the placental remnants was needed in the other patient after six weeks of gestation.

## **DISCUSSION**

In other studies [1, 2], the incidence of RPOC was around 1%, with a higher incidence after preterm termination of pregnancy. This study performed D&C for suspected post-delivery RPOC in 0.854% of women. Histological concordance occurred in 62% of cases, suggesting that only 0.53% of postpartum women had histologically proven RPOC. We are aware of the factors that may reduce the actual number of RPOC in this study, namely incomplete D&C, surgeon bias in the selection of material sent to the Pathologist, the possibility of the Pathologist's error, and the fact that we are a perinatology centre and some women with complications in the sixth-week visit other facilities closer to their homes. All these could lead to a slight underestimation of RPOC in our setting. Striking was the relatively high number of procedures for suspicion of RPOC in women after CS (28%). In fact, in our health facility, we perform D&C or at least digital revision of the uterine cavity in every woman during CS. Furthermore, the higher incidence after elective CS is surprising. However, the histological concordance with the diagnosis of RPOC is only 42% after CS compared to the concordance after spontaneous delivery when we get to 62% and 75% after MRP. The greater concern of patients could be an explanation, but also the more significant

concern of physicians about possible complications after CS and thus the more frequent decision to perform D&C when clinical signs such as bleeding or febrile.

Furthermore, MRP is one of the most critical risk factors for RPOC. The performance risk for RPOC after MRP is 11 times higher than after CS and 7.9 times higher after spontaneous delivery, and concordance with histology is most common here. This ratio is, of course, due to the condition that led to the need for MRP, which is the placenta accreta spectrum and subsequent D&C on the after-delivery distended uterus. The risk factor is the recurrence of retained placenta in the next pregnancy, reported to be around 13.8%. [8]. Risk factors for placental retention include abnormal placentation (history of uterine surgery, uterine curettage, postpartum endometritis, hysteroscopic surgery and endometrial ablation, in vitro fertilization conception), which is consistent with the anamnestic frequency of intrauterine procedures we have described in our study. Another risk factor related to surgery on the uterus is a previous caesarean section. A large population-based cohort study from Sweden described the risk of retained placenta after a previous caesarean section at 3.4% versus 1.9% after spontaneous delivery  $p= 0.0001$ . In this study, there was a higher association with placental failure in older parturients, but the location of the placenta on the anterior or posterior wall had no effect.[9]

The other risk factors are poor uterine contraction (prolonged use of oxytocin and high parity) and other factors, such as preterm delivery, congenital uterine anomalies and prior history of retained placenta. [10, 11] The question of possible complications after D&C where the myometrium has been described in the histological findings seems interesting. In a study by Pather [6], a 39% incidence of myometrium from D&C is described, but only one evidence of Asherman's syndrome (however, the group was not properly followed up long term). The risk factor for developing intrauterine adhesions (IUA) is the caesarean section itself, and the risk further increases with the subsequent need to perform D&C for RPOC. A higher incidence of IUA has also been described in patients after procedures for retained placenta [12].

Our histological results with findings of myometrium and inflammation, especially after induced deliveries, could explain the higher risk of IUA.

We have to consider other possible complications such as foss route during D&C, risk of placenta accreta spectrum in subsequent pregnancies and development of arteriovenous malformation.

## **CONCLUSIONS**



Retained products of conception after delivery is a rare diagnosis with an incidence of about 1%. They occur with greater frequency after MRP and spontaneous deliveries than CS deliveries when we perform perioperative D&C. Concordance with histological findings of chorion or amnion was seen in 62% of cases; this means that the incidence rate in our study was around 0.53%. The lowest concordance is after CS deliveries, 42%. D&C for RPOC should be performed after adequate clinical evaluation and in the knowledge of 38% false positivity. There is certainly more space for a conservative approach under appropriate clinical conditions, especially in patients after CS.

Uterine procedures in personal history are a statistically significant risk factor for the RPOC occurrence in following pregnancies. Thus, there should be more efforts to reduce the number of uterine procedures and conservatively manage complications such as missed abortion or incomplete or complete abortion. The history of the caesarean section could also be a risk factor in the future, especially with its increasing trend.

## **Article informations and declarations**

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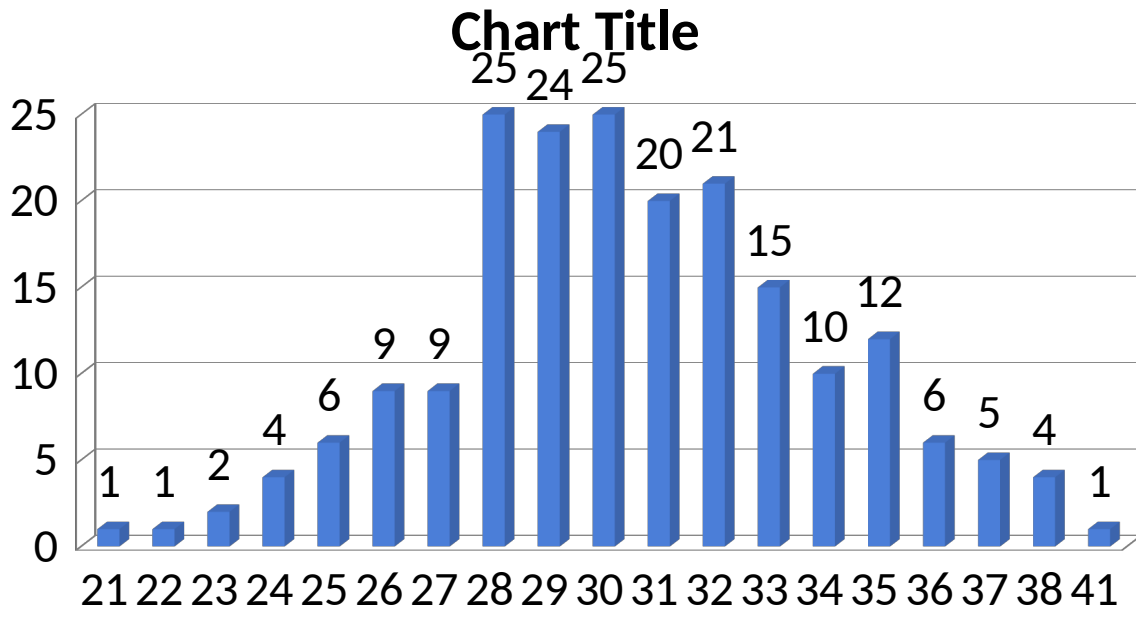
### ***Conflict of interest***

All authors declare no conflict of interest.

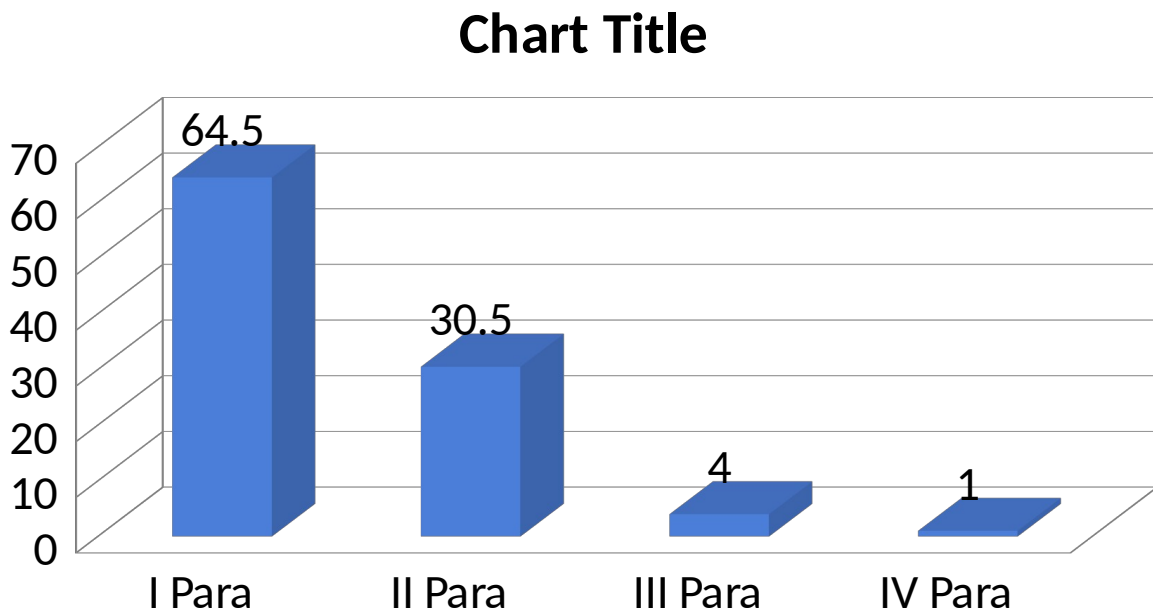
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**Figure 1.** Distribution of age



**Figure 2.** Distribution of parity

### Gestational age

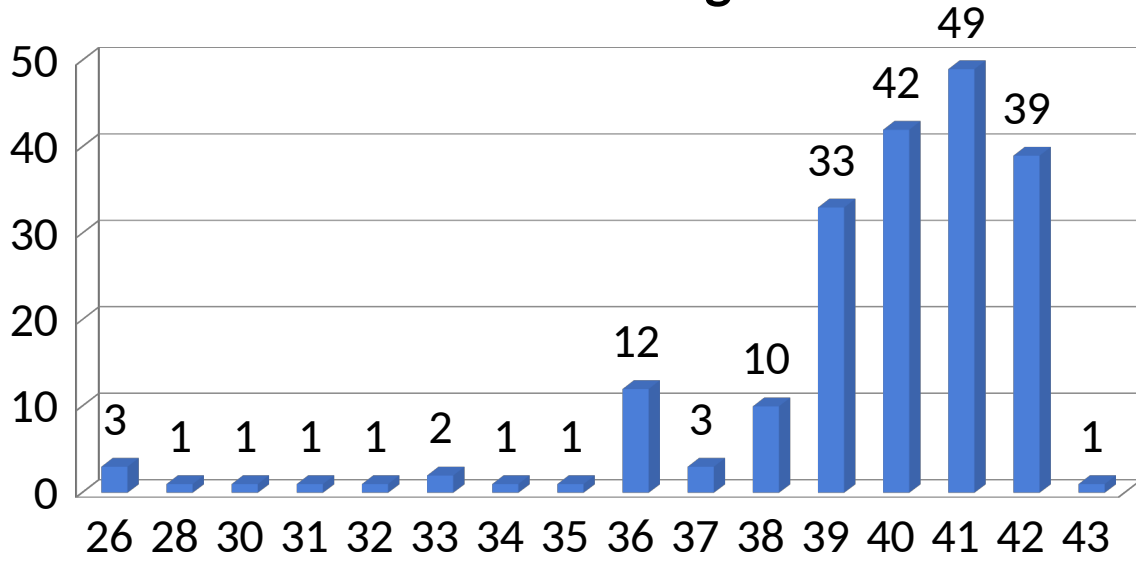


Figure 3. Distribution of gestational age

### Mode of the delivery

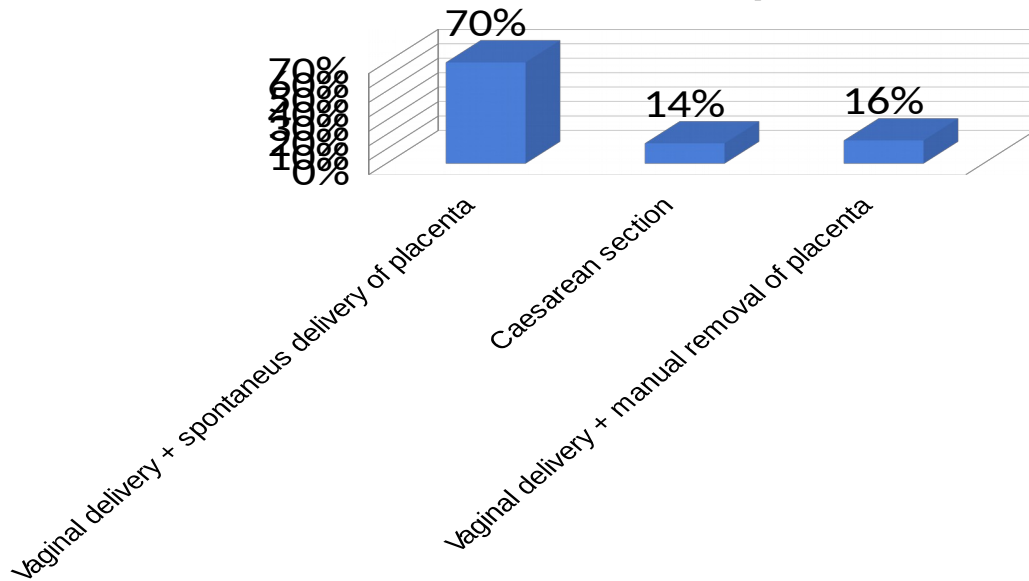
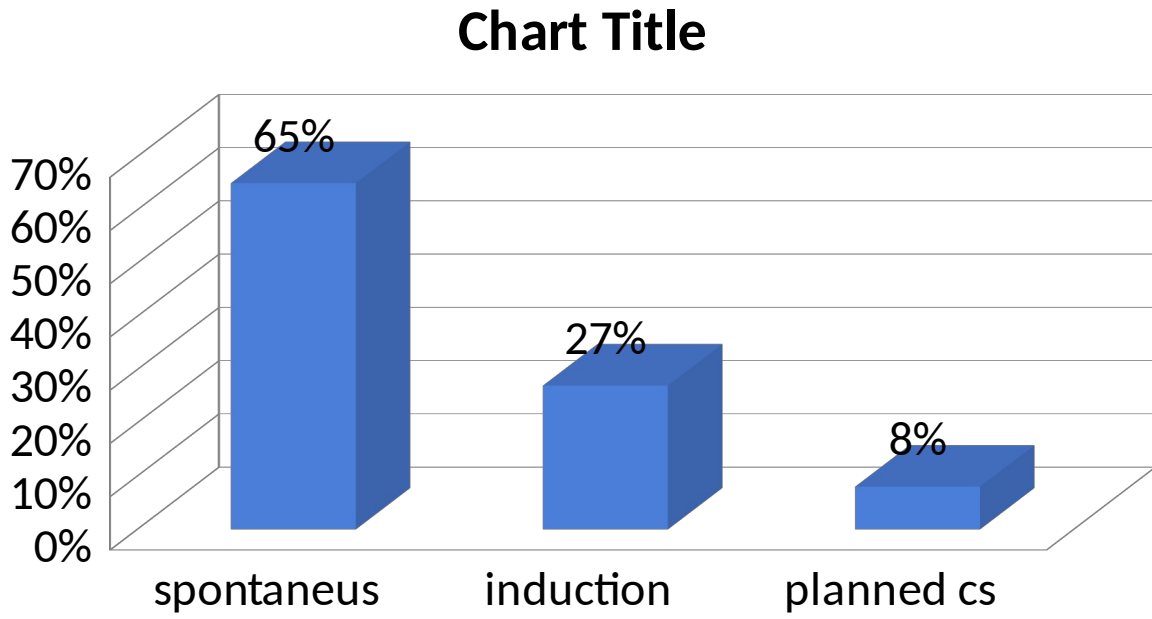
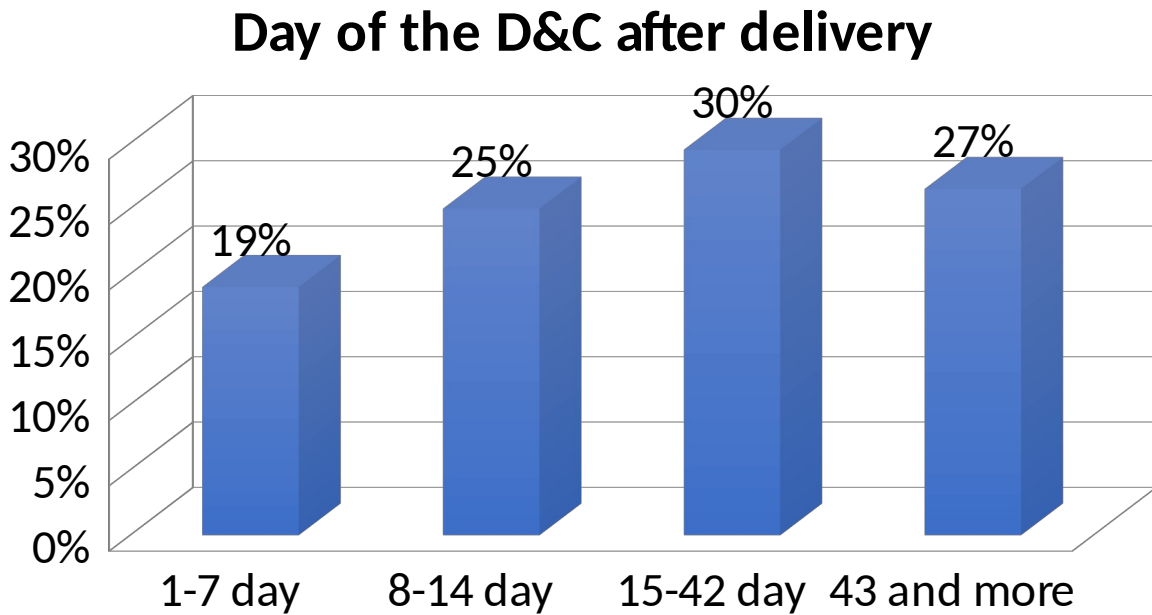


Figure 4. Mode of the delivery



**Figure 5.** Beginning of the delivery; CS — caesarean section



**Figure 6.** Day of manual removal of placenta and instrumental revision of the uterine cavity (D&C) after delivery