

*Original Research*

# Application of the Clavien-Dindo Score in the Classification of Postoperative Complications in Women Undergoing Repeat Cesarean Section in Central Vietnam

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Academic Editor: Michael H. Dahan

Submitted: 12 January 2022 Revised: 15 March 2022 Accepted: 22 March 2022 Published: 8 June 2022

## Abstract

**Background:** Cesarean section (CS) is the most common performed obstetric surgery world widely. Repeat CS is associated with a variety of complications, including intra-peritoneal adhesion, placenta previa, uterine rupture and cesarean hysterectomy. The present study aimed to determine the characteristics, maternal and fetal outcomes and post-operative complications of pregnant women with repeat CS using Clavien-Dindo classification in the Central Vietnam. **Methods:** We conducted a prospective study on 1342 women who underwent repeat CS between June 2020 and October 2021 at the Department of Obstetrics and Gynecology, Hue University Hospital, Hue, Vietnam. Numerous risk factors and adverse pregnancy outcomes of repeat CSs were identified and analyzed. **Results:** Intra-operative complications occurred at a rate of 18.2%, whereas post-operative complications rate was 2.8%. There were statistically significant differences in intra-operative complication rates between the pregnant women who had previously undergone only one CS and those who had previously two or more CSs ( $p = 0.011$ , 95% CI 1.9: 1.1–2.9). Among 1342 women who were indicated for repeat CS, thirty-seven women suffered from complications after surgery, accounting for 2.8%, as categorized by Clavien-Dindo. In which grade I accounted for 2.0%, grade II accounted for 0.4%, grade IIIa accounted for only 0.3%. No maternal mortality was reported in this study. **Conclusions:** Post-operative complications rate of cesarean section is extremely low. Application of the Clavien-Dindo classification in clinical scenario to classify those complications has shown to be highly practical.

**Keywords:** cesarean section; repeat cesarean section; surgical complication; Clavien-Dindo

## 1. Introduction

Cesarean delivery (C-section, CS) is a surgical procedure used to deliver a baby through incisions in the abdomen (laparotomy) and uterus (hysterotomy) [1]. It is the most common performed obstetric surgery worldwide to save maternal and fetal life. With a continuously increasing incidence over the last two decades, this management confers on women an obstetrical status of “previous CS”.

The cesarean delivery rate has increased considerably in many countries over the last decade, which has levelled up the prevalence of repeat CSs, raising questions about its risks and benefits. Cesarean delivery rates in the Italy, Germany, United Kingdom, and France in 2015 were 35.4%, 32.2%, 26.2% and 20.2%, respectively [2]. In the United States, in 2017, the cesarean delivery prevalence was 32.0% [3]. The World Health Organization conducted a global study on delivery methods and pregnancy outcomes in Asia in 2010, encompassing nine countries: Cambodia, China, India, Nepal, Japan, Philippines, Srilanka, Thailand and Vietnam. The results showed that Vietnam had a CS rate of 35.6%, second only to China (46.2%) [4].

Available data showed that repeat CS was associated with a variety of complications, including intra-peritoneal adhesion, placenta previa, uterine rupture and cesarean hysterectomy [5–7]. Additionally, post-operative complications associated with repeat CS, such as endometritis, were also increased [8]. In a study from Israel, excessive blood loss (7.9% versus 3.3%;  $p < 0.005$ ), difficult delivery of the fetal head? (5.1% versus 0.2%;  $p < 0.001$ ), and dense adhesions (46.1% versus 25.6%;  $p < 0.001$ ) were significantly more common in the multiple-CS group. The proportion of women experiencing any major complication was higher in the multiple-cesarean group, 8.7% versus 4.3% ( $p = 0.013$ ), and increased with the number of cesarean delivery: 4.3%, 7.5%, and 12.5% for second, third, and fourth or more cesarean delivery, respectively ( $p$  for trend = 0.004) [9]. However, published data on the pregnancy outcomes of repeat CSs in Vietnam remained limited.

The quality of care and patient safety has garnered considerable attention during the last decade. Using the morbidity and mortality rates of patients to determine the quality of care [10], Clavien and Dindo proposed a post-operative complications categorization [11], which was



later revised and validated [12]. The Clavien-Dindo classification is a modified version of the original 1992 classification of complications [13]. Along with the Clavien-Dindo classification, Accordion Severity Grading System for surgical complications was also developed from the same original classification system [13,14]. In this first classification and its later derivatives, complications are distinguished from failure to cure and sequelae. According to the Clavien-Dindo classification, a complication is any deviation from the expected post-operative condition. The therapy employed to correct serve as the basis for this classification to objectively and reproducibly rank a complication [12].

The purpose of this study is to determine the characteristics, maternal and fetal outcomes and post-operative complications of pregnant women with repeat CS using Clavien-Dindo classification in Central Vietnam.

## 2. Materials and Methods

This prospective study was conducted at the Department of Obstetrics and Gynecology, Hue University Hospital, Hue City, Vietnam. Between May 2020 and October 2021, a convenience sample of pregnant women who had one or more CS was recruited. This study was approved by the Ethics Committee of Hue University of Medicine and Pharmacy, Hue, Vietnam (approval number H2020/188). Prior to enrolment in the trial, all participants provided written informed consent. The privacy of all patients enrolled in this study was protected.

The inclusion criterion was any pregnant women with gestational age of 28 weeks or later, having previously undergone one or more CS. A total of 1381 cases were recruited for review. According to the selection criteria, 39 cases with vaginal birth were excluded from the study, the remaining 1342 cases were assessed and analyzed.

A thorough protocol was developed to collect critical information directly from patients through physical examination and their medical records. Details of cesarean surgery, surgical complications and neonatal outcomes included: mode of CS (elective or emergent), type of anesthesia (regional, general), indication for tubal ligation, operative duration, intra-operative complication, birth weight, Appearance Pulse Grimace Activity Respiration (APGAR) score at 1st and 5th minute. Elective CS is the type of CS that is performed in the presence of maternal diseases such as severe preeclampsia, gestational diabetes, or placenta previa. Emergent cesarean section performed due to emergent situations, such as fetal distress or umbilical cord prolapses. The operative duration was measured from the time of skin incision until the end of surgery. Neonatologists conducted the initial examination included birth weight (grams) and the APGAR score at first minute and fifth minute. Notably, the APGAR scores were calculated on a 2-points scale based on five criteria (Appearance, Pulse, Grimace, Activity, and Respiration). In the context of full-term and late preterm infants, a score of 7 to 10 was

considered as reassuring, 4 to 6 is considered as moderately abnormal, and 0 to 3 as severe distress [15].

Operative and post-operative follow-up were also recorded, including estimated blood loss during surgery, the severity of adhesions, the incidence of placental abnormalities, scar rupture, cesarean hysterectomy, bladder and bowel injury, blood transfusion, intensive care unit (ICU) admission, reduced hemoglobin, wound infection, urinary tract infection, pyrexia and length of hospital stay. Maternal morbidity included intra- and post-operative complications such as uterine laceration, placenta previa, blood transfusion, cesarean hysterectomy, postpartum hemorrhage, post-operative infection, postpartum hemorrhage was also noted. Postpartum hemorrhage was defined as an increase in blood loss of over 1000 mL following CS within 24 hours of birth [16].

After the variables collected, the Clavien-Dindo Classification, as a method of classifying postoperative complications. It is divided into seven grades:

Grade I: Any deviation from the typical post-operative course that does not require pharmacological treatment or surgical, endoscopic, and radiological interventions. Permissible therapeutic regimens are: antiemetics, antipyretics, analgesics, diuretics, electrolytes, and physiotherapy. Additionally, this grade includes wound infections that need to be opened at the bedside

Grade II: Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutrition are also included.

Grade III: Requiring surgical, endoscopic or radiological intervention

Grade IIIa: Intervention not under general anesthesia

Grade IIIb: Intervention under general anesthesia

Grade IV: Life-threatening complication (including CNS complications) requiring IC/ICU management

Grade IVa: Single organ dysfunction (including dialysis)

Grade IVb: Multiorgan dysfunction Grade V Death of a patient

Suffix “d”: If a patient suffers from a complication at the time of discharge the suffix “d” (for “disability”) is added to the respective grade of complication. This label suggests the need for a further follow-up to fully evaluate the complication [12].

### *Statistical Analyses*

The data was collected and analyzed by the Statistical Package for the Social Sciences version 22 (IBM Corp., Armonk, NY, USA). Frequencies were used to describe categorical variables, including clinical characteristics, CS methods, type of anesthesia, type of incision, and complications. Continuous variables, including maternal age, body mass index, GA at delivery (in weeks), and the total duration of the surgery (in min) were described using mean

**Table 1. The demographic characteristics of the study population.**

Variables	Previous CS = 1		Previous CS $\geq 2$		Total		<i>p</i>
	n	%	n	%	n	%	
Maternal age (years)							
18 to <25	91	9.0	11	3.3	102	7.6	0.018
25 to <30	412	41.0	84	25.0	496	37.0	<0.001
30 to <35	356	35.4	118	35.1	474	35.3	0.806
$\geq 35$	147	14.6	123	36.6	270	20.1	<0.001
$\bar{x} \pm SD$ (Min–Max)	29.8 $\pm$ 4.2 (20–42)		32.5 $\pm$ 4.6 (20–45)		30.5 $\pm$ 4.5 (20–45)		<0.001
BMI (kg/m <sup>2</sup> )							
<18.5	26	2.6	6	1.8	32	2.4	0.406
18.5–24.9	605	60.1	201	59.8	806	60.1	0.918
25.0–29.9	326	32.4	116	34.5	442	32.9	0.474
$\geq 30.0$	49	4.9	13	3.9	62	4.6	0.449
$\bar{x} \pm SD$ (Min–Max)	24.1 $\pm$ 3.3 (12.6–34.7)		24.3 $\pm$ 3.3 (16.4–39.4)		24.1 $\pm$ 3.3 (12.6–39.4)		0.382
Duration since the last previous CS (months)							
<24	89	8.8	43	12.8	132	9.8	0.144
$\geq 24$	917	91.2	293	87.2	1210	90.2	
Previous vaginal delivery							
Yes	98	9.7	19	5.7	117	8.7	0.136
No	908	90.3	317	94.3	1225	91.3	
Maternal diseases							
Preeclampsia	34	3.4	11	3.3	45	3.4	0.926
Gestational diabetes	26	2.6	4	1.2	30	2.2	0.135
Anemia	224	22.3	95	28.3	319	23.8	0.025

CS, cesarean section; BMI, Body mass index; SD, standard deviation.

and standard deviation (SD). Chi-Square and independent *t*-tests were used to assess the association between the variables of the study and control groups. For all statistical tests, *p*-values  $\leq 0.05$  were considered significant.

### 3. Results

#### 3.1 Patients' Characteristics

The study comprised 1342 pregnant women who previously had cesarean section. Of these, 1006 (75.0%) had one prior CS, while 336 (25.0%) had two or more prior CS. The demographic characteristics were shown in Table 1. The mean age of the study group was  $30.5 \pm 4.5$  (years). The youngest subject was 20 years old and the oldest was 45 years old. The population had a mean Body mass index (BMI) of  $24.1 \pm 3.3$  kg/m<sup>2</sup>. The majority of women with no history of vaginal birth accounted for 91.3%, and 8.7% had previously vaginal birth at least once. The time interval between the most recent cesarean surgery and this pregnancy was mostly greater than 2 years (90.2%).

#### 3.2 Fetal Characteristics

Table 2 summarizes the major fetal characteristics. Pregnant women who were fully term represented 94.3% of the overall study population. Cephalic presentation was the most prevalent in this study, accounting for 98.2% of the women. 99.2% of pregnant women had single pregnancy, while 0.8% had multiple pregnancy.

#### 3.3 The Outcomes of the Pregnancy

The majority of cesarean sections (94.4%) were elective, whereas emergency surgery was necessary in only 5.6% of cases (Table 3). Spinal anesthesia was the most often used technique during CS, accounting for 98.3% of cases; nevertheless, a few patients need general anesthesia, accounting for 1.7% of all operations. The mean duration of CS was  $48.6 \pm 10.9$  minutes, with no statistically significant difference between the two groups of women who had previously had CS once or twice ( $p > 0.05$ ). 244 women experienced intra-operative complications (18.2%). The most common finding was abdominal adhesions, which occurred in 16.1% of women. Prior  $\geq 2$  times of CS increased the risk of problems in CS by 1.9 times when compared to women with only one prior CS (95% confidence interval [CI]: 1.1–2.9;  $p = 0.011$ ). The mean birth weight ranged between  $3200.5 \pm 421.8$  grams. The mean birth weight of the group with one previous CS was  $3206.4 \pm 438.7$  grams, whereas the group with two previous CS had a mean birth weight of  $3182.7 \pm 367.6$  grams; however, this difference was not statistically significant ( $p > 0.05$ ).

#### 3.4 Classification of Cesarean Section Complications According to Clavien-Dindo

Thirty-seven women developed post-operative problems, representing 2.8% of the 1342 women with uterine scar who were indicated for CS, according to the Clavien-

**Table 2. The main fetal characteristics.**

Variable	Previous CS = 1		Previous CS ≥2		Total		p
	n	%	n	%	n	%	
GA at delivery (weeks)							
<37 <sup>0/7</sup>	58	5.8	15	4.5	73	5.4	0.363
37 <sup>0/7</sup> -40 <sup>6/7</sup>	946	94.0	319	94.9	1265	94.3	0.537
≥41 <sup>0/7</sup>	2	0.2	2	0.6	4	0.3	0.248
$\bar{x} \pm SD$ (Min-Max)	38.8 ± 1.2 (31.7-41.3)		38.8 ± 1.0 (34.6-41.3)		38.8 ± 1.1 (31.7-41.3)		0.833
Number of fetuses							
Single	997	99.1	334	99.4	1331	99.2	0.792
Twin	9	0.9	2	0.6	11	0.8	
Fetal presentation							
Cephalic presentation	986	98.0	332	98.8	1318	98.2	0.741
Noncephalic presentation	20	2.0	4	1.2	24	1.8	

CS, cesarean section; GA, gestational age; SD, standard deviation.

**Table 3. Details of cesarean surgery, surgery complications and neonatal outcomes.**

Variable	Previous CS = 1		Previous CS ≥2		Total		p	OR (95% CI)
	n	%	n	%	n	%		
Mode of CS								
Elective	946	94.0	321	95.5	1267	94.4	0.475	-
Emergent	60	6.0	15	4.5	75	5.6		
Type of anesthesia								
Regional	985	97.9	334	99.4	1319	98.3	0.307	-
General	21	2.1	2	0.6	23	1.7		
Operative duration (minutes)	48.2 ± 10.9 (30-90)		49.8 ± 10.8 (30-90)		48.6 ± 10.9 (30-90)		0.116	-
$\bar{x} \pm SD$ (Mi-Max)								
Intra-operative complication								
Adhesion	138	13.7	77	23.2	215	16.1	0.011	
Hemorrhage	6	0.6	2	0.6	8	0.6		
Uterine rupture	1	0.1	2	0.6	2	0.1	0.255	1.9 (1.1-2.9)
Bladder injury	-	-	1	0.3	1	0.1		
Anesthesia complication	2	0.2	2	0.6	4	0.3	0.563	
Other	11	1.1	2	0.6	13	1.0	0.633	
Birth weight (gram)								
<2500	62	6.2	54	16.1	116	8.6	0.001	
2500-3499	823	81.8	158	47.0	981	73.1		
≥3500	121	12.0	124	36.9	245	18.3	0.001	-
$\bar{x} \pm SD$ (Min-Max)	3206.4 ± 438.7 (1400-5300)		3182.7 ± 367.6 (2200-4500)		3200.5 ± 421.8 (1400-5300)		0.543	
APGAR at 1st minute								
<3	-	-	-	-	-	-	1006	100
3-6	-	-	-	-	-	-		
≥7	-	-	-	-	-	-		
APGAR at 5th minute								
<3	-	-	-	-	-	-	1006	100
3-6	-	-	-	-	-	-		
≥7	-	-	-	-	-	-		

CS, cesarean section; SD, standard deviation; OR, Odd ratio; APGAR, Appearance-Pulse-Grimace-Activity-Respiratory.

Dindo classification. Complications of grade I accounted for 2.1%, grade II for 0.5%, and grade IIIa for only 0.3%. The mean hospital stay for women who experienced post-operative problems was 8.2 ± 3.6 days. There was a statis-

tically significant difference in mean hospital stays between the Clavien-Dindo categorization groups of post-operative complications ( $p = 0.006$ ).

## 4. Discussion

The relative safety of cesarean sections and its perceived advantages over vaginal deliveries have resulted in a shift in the perceived risk-benefit ratio, driving acceptance of cesarean sections. Although the procedure is significantly safer than it was in the past due to advancements in anesthetic, antibiotics, and blood transfusion services, a CS still offers a significant danger to women when compared to a regular vaginal delivery.

Multiple CS raises the risk of placenta previa, a life-threatening maternal complication. This disorder is responsible for over 20% of maternal hemorrhage-related death [17]. A study conducted over a 10-year period found that the incidence of placenta previa was 1.86% following the first cesarean section, 5.49% following the second cesarean section, and 14.28% following the third cesarean section [18]. There were 6 cases with placenta previa in our study, accounting for 0.4%.

According to American College of Obstetricians and Gynecologists (ACOG), termination of pregnancy should be delayed to 39 weeks or higher [19]. The gestational age of between 37<sup>0/7</sup> and 39<sup>6/7</sup> weeks accounted for the highest prevalence in our study (94.3%).

Muntaz Rashid and Rabira S Rashid found that elective CS was more common than emergency CS in 318 women with previous CS between January 1994 and December 2002, with 91% were elective surgery and 8% were emergency surgery [20]. Between April 2014 and March 2015, a study in Kunrool conducted by Kavitha Mettu and CR Reshma on 1281 patients revealed that emergency surgery has more complications (52.8%) in compared to elective surgery (32.5%) [21]. Our study found that elective surgery accounted for 94.4% and emergency surgery accounted for 5.6%. In earlier studies, emergency CS was associated with an increased risk of several complications, including wound infection, bleeding, and the need for blood transfusion [22,23].

General and regional anesthesia are both approved for use during a CS. Ninety five percent of procedures are performed under regional anesthesia, with combination of spinal and epidural anesthesia being the most commonly used techniques for CS [24]. Our study showed that up to 98.3% of CSs performed under spinal anesthesia.

The mean operative time for women a history of CS was  $48.6 \pm 10.9$  minutes; there was no statistically significant difference in operative time between women with a single previous CS and those with 2 or more prior CS. The hospital stay duration was comparable to those of Sobande [25].

CS is a somewhat popular operation that has been deemed safe, but not to the point that we should neglect its potential consequences. As a result, it should be evaluated cautiously, particularly in women with a history of repeated CS. In 622 women referred for repeat CS, our study discovered that up to 107 women experienced problems during

surgery, accounting for 17.2% of cases.

Multiple CS significantly increases the risk of severe thick adhesions, scar dehiscence, uterine rupture, improper placentation, severe bleeding, bladder injuries, and cesarean hysterectomies. Kavitha Mettu and C. R. Reshma did a study in Kunrool with 1281 patients and discovered that the complication rate was twice that of women having two or more previous CS. Abdominal adhesions were the most frequently encountered complication, occurring in 36% of patients with two prior CS and 22% of individuals with one prior CS [21].

This is consistent with our findings, as women who had two or more previous CS had a 1.9-fold higher risk of complications than women who had only one prior CS ( $p < 0.05$ , 95% Confidence Interval (CI): 1.1–2.9), with abdominal adhesions being the most prevalent consequence. Abdominal adhesions at the incision site account for 16.1%; this condition is caused primarily by the uterus adhering to the abdominal wall, the omentum adhering to both the uterus and the abdominal wall, the bladder adhering to the incision site, and the intestines adhering to the incision site.

Excessive bleeding following cesarean delivery is uncommon, but it appears to increase with the number of previous cesarean deliveries [26]. The causes of excessive blood loss following cesarean delivery include uterine atony, adhesions, placenta accrete and trauma. Silver *et al.* [27] observed that, among women who delivered by cesarean delivery without labor, the risk of transfusion of equal or more than 4 units of red blood cells was significantly associated with increased number of cesarean deliveries and was observed in 10% of women who had more than 5 previous cesarean deliveries. In our study 0.6% of the cases had hemorrhages during surgery due to abnormal placentation.

A Norwegian study found that women with previous CS had an eightfold increased risk of uterine rupture following a trial of labour compared to a repeat elective CS, and that induction of labour using prostaglandins was associated with highest risk of uterine rupture [28].

There were 3 cases of uterine rupture in the present study population, owing to the fact that majority of these cases were taken elective or involved a brief trial of labor with intensive intrapartum monitoring.

Injury to the bladder, which is significantly more frequent during repeat cesarean deliveries, is a rare complication that is mostly caused by adhesions. A cohort study of 21,177 cesarean deliveries performed at a larger tertiary referral center over a 14 years period determined that the incidence of bladder injuries was 0.3% [29]. In our current study, there was only 1 bladder injury case.

Post-operative complications in the study were found in 37/1342 women with previous CS who were indicated for repeat CS, accounting for 2.8%. There was no statistically significant difference in maternal complications between women with a history of one CS and those who had

**Table 4. The Clavien-Dindo classification.**

Clavien-Dindo Classification	Complication	n (%)	Total (%)	Hospital stays (day)
I	Wound separation	15 (1.1)	27 (2.1)	7.2 ± 2.9
	Anesthesia complication	3 (0.2)		
	Anaphylaxis	3 (0.2)		
	Vomit	4 (0.3)		
	Constipation	2 (0.1)		
II	Wound hematoma	2 (0.1)	6 (0.5)	7.5 ± 0.7
	Post-partum hemorrhage	4 (0.3)		
IIIa	Wound hemorrhage	2 (0.1)	4 (0.3)	15.5 ± 2.4
	Wound infection	2 (0.1)		
Total (%)			37 (2.8)	8.2 ± 3.6

undergone two or more previous cesarean deliveries. This rate was higher than that reported in some other studies, because we utilize the Clavien-Dindo classification of post-operative complications, which encompasses all abnormal events encountered following surgery.

Infection was the most common consequence within the first 10 days after cesarean delivery. Without prophylactic antibiotics, the rate of infection approaches 85%, whereas the infection rate with prophylactic antibiotics is only about 5% [30]. Prophylactic antibiotics should be administered to all patients undergoing cesarean delivery; a single dose of a first-generation cephalosporin or ampicillin is effective [30,31]. Wound infection manifests as erythema and tenderness, and may develop purulence and fever.

In our study, the most prevalent postpartum complication was wound infection (1.2%). This rate of wound infection was lower than that of Shiferaw's study (8.18%) [32]. Blood transfusion was required in 6 cases, mostly due to excessive blood loss during surgery.

We evaluated the preoperative condition and postoperative complications of 1342 women with prior CS in this study, with 37 patients accounting for 2.8%: grade I was the most common, accounting for 2.0%, grade II was the second most common, accounting for 0.4%, and grade IIIa was the least common, accounting for only 0.3%. Up to 1305 women, or 97.2%, experienced no difficulties, had a fully normal post-operative course, and there were no deaths.

In a previous study, 40 complications were identified in 35 patients out of 566, accounting for 7.1%, and were classified with 3 levels: Grade I: 36/566 (6.37%), Grade II: 3/566 (0.53%), no one with grade III and IV, especially there was 1 mortal case - grade V, accounting for 0.17% [33].

According to Table 4, the mean hospital stay for patients who had post-operative complications was  $8.2 \pm 3.6$  days. The study's findings indicated that the average number of days spent in the hospital after surgery was less than that reported by Sobande [25]. Additionally, our study found a statistically significant difference in the mean hospital stays between the groups with post-operative complications according to Clavien-Dindo classification, with  $p =$

0.006. This also explains why women who experience complications following surgery require a longer hospital stay to receive proper care.

Unnecessary CS is known to cause more harm than good. For a healthy pregnant woman, CS has an 8-fold higher mortality, 8–12 times higher morbidity and a higher incidence of complications than vaginal delivery [34]. Higher emergency CS rate is a major contribution to the increased rate of maternal and fetal morbidity and mortality in cesarean deliveries [35].

There were no statistically significant differences in maternal and neonatal morbidity between women who had the history of one previous CS and those who had previously undergone two or more CSs. This could be due to insufficient sample size to make statistically significant to comparisons of all complications.

Our findings demonstrated that with appropriate prenatal care, adequate preoperative cares, meticulous surgical techniques and careful post-operative care, multiple repeated CSs were safe. All CSs were conducted at Hue University hospital, which has highly experienced surgeons and a state-of-the-art facility.

This is the first study in Vietnam to employ the Clavien-Dindo classification in obstetrics, primarily to assess problems during and following cesarean section, the most often performed operation in this profession. CS rates are growing globally and in Vietnam specifically, resulting in an increased rate of maternal and fetal problems. As a result, analyzing these problems is critical in order to provide suitable suggestions for lowering the cesarean section rate. This study has drawbacks, this is a single center study and that your conclusions are not necessarily valid in other locations. It included a limited sample size and a focus on repeat cesarean section. As a result, we hope to perform a larger multi-center study in the future that includes all participants indicated for cesarean delivery in order to conduct a more extensive statistical analysis.

## 5. Conclusions

Although the complication rate in the repeat CS is extremely low, the complete care should be given at the in-

dividual and clinician level. Application of Clavien-Dindo classification in clinical scenario to classify those complications has shown to be highly practical.

## Data Availability

The dataset used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

## Author Contributions

Conceptualization, methodology, and supervision—LGTT, LMT, and QHVN; data collection, formal analysis—DTT, NBTT, PASL and TDT; original draft, review, and editing—LGTT, LMT. All authors contributed to the interpretation of the data and approved the final manuscript.

## Ethics Approval and Consent to Participate

This study was approved by the Ethics Committee of the University of Medicine and Pharmacy, Hue University (approval number H2020/188). All information and data were encrypted and confidential. All participants provided informed consent. All samples were managed and processed strictly, as stipulated by an approved local review board protocol.

## Acknowledgment

The authors thank the staff of Hue University hospital, department of Obstetrics and Gynecology for support on data recruitment.

## Funding

This work was supported by a research grant from Hue University Research Grant (grant number DHH2020-04-136) and was partially supported by Hue University under the Core Research Program (Research group on Reproductive Medicine, Grant No. NCM.DHH.2022.01). The grantor had no influence in the content of the publication.

## Conflict of Interest

The authors declare no conflict of interest.

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