

Original Research

Maternal and Perinatal Outcomes in Primiparous Women Undergoing First-Stage Versus Second-Stage Cesarean Delivery

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Abstract

Background: To compare maternal and perinatal outcomes of cesarean deliveries performed during the first-stage versus second-stage of labor in primiparous women, and to provide evidence to optimize the timing of intrapartum conversion and improve perioperative management. **Methods:** This retrospective study included 285 primiparous women who underwent intrapartum cesarean delivery following a failed trial of labor at Lingnan Hospital, the Third Affiliated Hospital of Sun Yat-sen University, between January 2022 and December 2023. Patients were classified according to the stage of labor at the time of cesarean delivery into a first-stage cesarean group (n = 253) and a second-stage cesarean group (n = 32). Maternal perioperative indicators and neonatal outcomes were compared between the two groups. **Results:** Compared with the first-stage group, the second-stage group showed a significantly greater postoperative increase in white blood cell count ($p < 0.05$) and higher rates of postpartum fever and hypoproteinemia ($p < 0.05$). Neonates delivered by second-stage cesarean had significantly lower 1-minute Apgar scores ($p < 0.05$) and a higher rate of neonatal intensive care unit (NICU) admission ($p < 0.05$). **Conclusions:** Second-stage cesarean delivery among primiparous women is associated with greater risks compared with first-stage cesarean delivery, including increased postoperative inflammatory response, higher rates of hypoproteinemia, and poorer neonatal disposition. Optimized intrapartum monitoring, accurate assessment of the timing of cesarean delivery, and improved perioperative management may contribute to better maternal and neonatal outcomes and enhanced delivery safety.

Keywords: primiparous women; intrapartum cesarean delivery; first stage of labor; second stage of labor; maternal and perinatal outcomes

1. Introduction

As perinatal medicine developed, and the cesarean delivery became more and more popular, cesarean delivery became one of the most popular ways of giving birth. The safety and appropriate use of cesarean delivery remain key issues in obstetric practice [1]. Some women change their minds to do a trial of labor and then convert to a cesarean delivery due to labor arrest, fetal distress, or any other complications in clinical practice [2,3]. Primiparous women are at increased risk of failed labor, which is associated with prolonged labor period and less favorable cervical conditions, thereby increasing the likelihood of intrapartum cesarean delivery [3,4].

Intrapartum cesarean delivery may be classified into first-and second-stage procedures according to the stage of labor at the time of conversion. Cervical dilation arrest, insufficient uterine contractions, or distorted fetal heart rate patterns commonly cause the first-stage conversions. Second-stage cesarean deliveries occur after complete cervical dilation when fetal head descent fails [2,5]. Previous studies have shown that cesarean delivery at this stage is technically more challenging. It is commonly closely correlated with deep involvement of the fetal head, extreme distension of the lower part of the uterus, and edema of the soft birth canal. Such anatomical alterations predispose in-

traoperative hemorrhage, growth of uterine incisions, and damage to other neighboring structures [6]. Secondly, the second stage of fetal compression in the birth canal can lead to a decrease in the neonatal Apgar scores and neonatal intensive care unit (NICU) admission.

Although some researchers have observed differences in the risks associated with cesarean birth at different stages of labor, there is still limited evidence, and systematic comparative studies aimed mainly at primiparous women are scarce. According to several reports, it has been indicated that complications arise much more often when there is a delivery through a cesarean delivery during the second stage than when they are made at the initial stage of labor [6]. Nonetheless, other researchers have suggested that maternal and neonatal differences between the two phases can be significantly reduced when abnormal labor progression is recognized earlier and converted to a cesarean delivery in time [2]. Hence, elucidating the maternal and perinatal outcomes of cesarean birth at various stages of labor is of significant clinical relevance for proper risk assessment, optimal timing of conversion, and enhanced maternal and neonatal health.

Although several studies have examined outcomes of second-stage cesarean delivery, data specific to primiparous women remain limited, particularly within Chi-



nese populations. Regional differences in obstetric practices and thresholds for intrapartum conversion further underscore the need for locally relevant research. Against this background, the present study focused on first-time mothers and compared maternal and perinatal outcomes between first- and second-stage cesarean deliveries. Primary neonatal outcomes included birth weight, Apgar scores, and NICU admission rates. Maternal outcomes included operative time, postpartum blood loss, and perioperative complications. By comprehensively analyzing these parameters, this study aimed to elucidate the relationship between the timing of intrapartum cesarean delivery and maternal–neonatal outcomes, thereby providing evidence to support improved intrapartum monitoring, more accurate determination of conversion timing, and optimized perioperative management in clinical practice.

2. Methods

2.1 Study Population

This retrospective controlled study included 285 primiparous women who delivered at Lingnan Hospital, the Third Affiliated Hospital of Sun Yat-sen University, between January 2022 and December 2023 and underwent cesarean delivery following a failed trial of labor. All participants had singleton pregnancies in cephalic presentation, were at term gestation (≥ 37 weeks), admitted with the intention of vaginal delivery, and ultimately required cesarean delivery due to labor abnormalities or fetal indications. Based on the timing of intrapartum conversion, participants were classified into two groups: the first-stage conversion group ($n = 253$) and the second-stage conversion group ($n = 32$).

2.2 Inclusion and Exclusion Criteria

Participants were required to meet all of the following criteria: primiparous women with singleton, cephalic, full-term pregnancies (gestational age ≥ 37 weeks) who were admitted with the intention of vaginal delivery and underwent continuous intrapartum monitoring, but subsequently required cesarean delivery due to cervical dilation arrest, uterine inertia, prolonged labor, arrest of fetal head descent, or fetal distress. In addition, complete labor, surgical, and maternal–neonatal outcome records had to be available for all cases. Exclusion criteria included multiple gestation; abnormal fetal presentation (e.g., breech or transverse lie); placenta previa, placental abruption, uterine malformations, or placenta accreta; a history of cesarean delivery or uterine surgery (e.g., myomectomy); and severe medical comorbidities such as heart disease, severe gestational hypertension, poorly controlled diabetes mellitus, or hepatic/renal dysfunction. Also excluded were cases in which emergency cesarean delivery was performed immediately due to critical maternal or fetal conditions without a clearly defined stage of labor or with incomplete clinical data, as well as cesarean deliveries performed before the onset of labor.

2.3 Grouping and Data Sources

Data for all cases were obtained from the electronic medical record system and delivery registry of the Third Affiliated Hospital of Sun Yat-sen University. The timing of conversion to cesarean delivery for each participant was determined by attending obstetricians or senior physicians. All surgical procedures followed a standardized technique, involving a transverse abdominal incision and a transverse incision in the lower uterine segment. Labor management and surgical interventions adhered to current clinical guidelines and were performed by physicians with attending-level or higher professional qualifications.

2.4 Observation Indicators

This study primarily assessed and compared the general characteristics, maternal perioperative parameters, and neonatal outcomes of the two groups. General characteristics included gestational age, history of induction or abortion, maternal age, educational level, occupation, marital status, and the presence of gestational diabetes mellitus or hypertensive disorders of pregnancy. Maternal perioperative parameters included operative duration, intraoperative blood loss, 24-hour postpartum blood loss, postoperative changes in hemoglobin and white blood cell counts, and the occurrence of postpartum complications, including fever, urinary retention, and hypoproteinemia. Neonatal outcomes included birth weight, Apgar scores at 1, 5, and 10 minutes, and the rate of NICU admission.

2.5 Statistical Analysis

Intergroup comparisons were conducted using the independent-samples *t*-test. Continuous variables that do not conform to a normal distribution are presented as median (interquartile range [IQR], Q1–Q3) and were compared using the Wilcoxon rank-sum test (Mann-Whitney U test). Categorical variables are expressed as counts (percentages) and were analyzed using the Pearson chi-square test; Fisher's exact test was applied when the expected frequency in any cell was less than 5. All statistical tests were two-tailed, and a *p*-value < 0.05 was considered statistically significant. All statistical analyses were performed using R software (version 4.5.0; R Foundation for Statistical Computing, Vienna, Austria).

3. Results

3.1 Comparison of General Characteristics Between the Two Groups

No significant differences were observed between the two groups with respect to gestational age, number of previous inductions or abortions, maternal age, educational level, occupation, marital status, or pregnancy-related complications ($p > 0.05$), as shown in Table 1. Specifically, the median gestational week was 39.86 (39.14–40.43) weeks in the first-stage group and 39.57 (38.96–40.57) weeks in the second-stage group ($Z = 0.899$, $p = 0.368$). The median ma-

Table 1. Comparison of general data between the two groups of parturients.

Variable	First stage group (N = 253)	Second stage group (N = 32)	χ^2/Z	<i>p</i>
	M [Q1, Q3]/n (%)	M [Q1, Q3]/n (%)		
Gestational week, weeks	39.86 [39.14, 40.43]	39.57 [38.96, 40.57]	0.899	0.368
Previous induced abortion, n (%)	55 (21.74%)	6 (18.75%)	0.026	0.873
Maternal age, years	29.00 [28.00, 32.00]	31.00 [28.00, 32.00]	-1.376	0.166
Education level, n (%)			/	0.350
High school or below	22 (8.70%)	4 (12.50%)		
College	73 (28.85%)	13 (40.62%)		
Bachelor	115 (45.45%)	12 (37.50%)		
Master or above	43 (17.00%)	3 (9.38%)		
Employed, n (%)	229 (90.51%)	28 (87.50%)	/	0.535
Married, n (%)	245 (96.84%)	32 (100.00%)	/	0.604
Gestational diabetes, n (%)	26 (10.28%)	5 (15.62%)	/	0.366
Gestational hypertension, n (%)	15 (5.93%)	4 (12.50%)	/	0.247

N, number; M, median.

ternal age was 29.00 (28.00–32.00) years and 31.00 (28.00–32.00) years, respectively ($Z = -1.376$, $p = 0.166$). Previous induced abortion was reported in 21.74% and 18.75% of participants, respectively ($\chi^2 = 0.026$, $p = 0.873$). No significant differences were found in educational attainment ($p = 0.350$), employment status ($p = 0.535$), marital status ($p = 0.604$), gestational diabetes mellitus ($p = 0.366$), or gestational hypertension ($p = 0.247$). These findings indicate that the two groups were comparable in baseline characteristics.

3.2 Comparison of Maternal Perioperative Indicators and Postpartum Complications Between the Two Groups

As presented in Table 2, there were no significant differences between the two groups in operative duration, intraoperative blood loss, 24-hour postpartum blood loss, or postoperative hemoglobin decline ($p > 0.05$). However, the second-stage conversion group demonstrated a significantly greater increase in postoperative white blood cell count compared with the first-stage group ($Z = -2.624$, $p = 0.009$). Regarding postpartum complications, the incidence of postpartum fever was significantly higher in the second-stage conversion group than in the first-stage group ($\chi^2 = 6.888$, $p = 0.009$). No significant difference was observed in the occurrence of postpartum urinary retention ($p > 0.05$). In addition, the incidence of postpartum hypoproteinemia was significantly higher in the second-stage conversion group ($\chi^2 = 3.166$, $p = 0.075$). These results suggest that cesarean delivery during the second stage of labor is associated with a more pronounced postoperative inflammatory response and an increased risk of complications, including infection and hypoproteinemia.

3.3 Comparison of Neonatal Outcomes Between the Two Groups

As shown in Table 3, there was no significant difference in neonatal birth weight between the two groups ($p >$

0.05), suggesting similar distributions of fetal weight. The second-stage conversion group had a significantly lower 1-minute Apgar score than the first-stage group ($Z = 1.946$, $p < 0.001$). In contrast, no significant differences were observed in the 5-minute or 10-minute Apgar scores ($p > 0.05$). Additionally, the rate of neonatal transfer to the NICU was significantly higher in the second-stage conversion group than in the first-stage group ($\chi^2 = 4.558$, $p = 0.033$). These findings suggest that neonates delivered via cesarean delivery during the second stage of labor exhibit poorer short-term postnatal adaptation and an increased risk of early asphyxia and NICU admission.

4. Discussion

This study compared the maternal and neonatal outcomes between primiparous women who underwent cesarean delivery during the first and second stages of labor. The findings reported no significant differences in the baseline maternal characteristics of the two groups, indicating good comparability. Nevertheless, women in the second-stage conversion group reported a greater increase in white blood cell count after the operation and a much higher incidence of postpartum fever and postoperative change in protein level than women in the first-stage group. Also, the scores in the Apgar 1-minute assessment were lower in children born in the second stage, and the rate of NICU hospitalization was significantly higher. These results indicate that a cesarean delivery carried out in the second phase of childbirth is related to a stronger maternal perioperative inflammation and inappropriate short-term neonatal adjustment. Because the first- and second-stage cesarean deliveries are associated with distinct labor indicators, such as cervical dilation arrest and fetal head descent arrest, the stage of labor and the underlying indication are intrinsically linked, collectively shaping the clinical context in which maternal and neonatal outcomes occur [7,8,9].

Table 2. Comparison of maternal operative and postpartum outcomes.

Variable	First stage group (N = 253) M [Q1, Q3]/n (%)	Second stage group (N = 32) M [Q1, Q3]/n (%)	χ^2/Z	<i>p</i>
Operative time, min	47.00 [40.00, 54.00]	48.50 [40.00, 55.50]	-0.464	0.642
Intraoperative blood loss, mL	200.00 [200.00, 200.00]	200.00 [200.00, 200.00]	0.882	0.144
24-h postpartum blood loss, mL	335.00 [310.00, 380.00]	347.50 [313.75, 371.25]	-0.500	0.617
Postpartum Hemoglobin (Hb) decrease, g/L	12.82 [7.00, 18.00]	12.82 [7.75, 18.25]	-0.298	0.765
Postpartum white blood cell (WBC) increase, $\times 10^9/L$	5.31 [3.44, 6.92]	6.08 [5.31, 8.41]	-2.624	0.009
Postpartum fever	100 (39.53%)	21 (65.62%)	6.888	0.009
Postpartum urinary retention	27 (10.67%)	4 (12.50%)	/	0.763
Postpartum hypoproteinemia	68 (26.88%)	14 (43.75%)	3.166	0.075

Table 3. Comparison of neonatal outcomes between groups.

Variable	First stage group (N = 253) M [Q1, Q3]/n (%)	Second stage group (N = 32) M [Q1, Q3]/n (%)	χ^2/Z	<i>p</i>
Neonatal weight, kg	3.25 [3.05, 3.50]	3.30 [2.80, 3.60]	0.007	0.995
1-min Apgar score	10.00 [10.00, 10.00]	10.00 [9.75, 10.00]	1.946	<0.001
5-min Apgar score	10.00 [10.00, 10.00]	10.00 [10.00, 10.00]	-0.072	0.614
10-min Apgar score	10.00 [10.00, 10.00]	10.00 [10.00, 10.00]	-0.036	0.722
Transfer to neonatal intensive care unit (NICU)	37 (14.62%)	10 (31.25%)	4.558	0.033

Maternal risks during the second stage of labor are greater than during the first stage, mainly because of the anatomical and technical complexity. The fetal head usually is deeply immersed in the pelvis at the second stage, with the lower uterine segment being over-distended with high levels of soft tissue edema. They make surgical exposure difficult and increase the chances of extending the uterine incision, damaging tissues, and increasing the risk of postoperative infection [6]. The second-stage group in the study showed higher levels of postoperative leukocytosis and fever, which can be explained by tissue injury from prolonged labor, a higher risk of infection, and greater physiological stress responses. Cervix and vaginal tissues are put under persistent pressure by protracted labor, leading to local ischemia, hypoxia, and tissue damage, which may promote the release of inflammatory mediators, triggering a systemic inflammatory response and increasing white blood cell counts [10]. Besides, long duration of labor can also be coupled with a high frequency of vaginal examination, premature rupture of the membrane, and contamination of the amniotic fluid, which are known to act as risk factors in the increased rate of ascending bacterial infection and increase the exposure to postoperative fever and inflammation [11,12]. Cesarean delivery is also a significant physiological stressor; together with lengthy labor or surgical complications, the stress response is enhanced to the point of transient leukocytosis and increased body temperature with no overt infection [13]. Hence, the higher rate of postoperative leukocytosis and fever in the second-

stage cesarean delivery can be due to the combined effect of tissue trauma, infection, and physiological stress.

The present study also demonstrated a significantly higher prevalence of hypoproteinemia in the second-stage cesarean group. Its multifactorial pathogenesis is primarily related to perioperative fluid management, tissue edema, and metabolic stress. Rapid intraoperative crystalloid infusion may cause plasma dilution, whereas prolonged labor increases capillary permeability, promoting albumin extravasation into the third space. Additionally, during the acute-phase response, the liver prioritizes the synthesis of positive acute-phase proteins over albumin, further reducing plasma albumin levels. Factors such as prolonged fasting, high energy expenditure, inadequate nutritional intake, and mild proteinuria may exacerbate hypoalbuminemia [14]. Hypoproteinemia associated with cesarean deliveries in the second stage is, therefore, most likely to be a result of both the dual action of dilutional and extravasation processes. Regarding neonatal outcomes, no differences in birth weight were observed, but Apgar 1-minute scores were lower, and the NICU hospitalization rate was much higher in the second-stage cesarean group. These results can be explained by the idea that in the long term, fetal head compression and intrauterine hypoxia cause temporary respiratory depression and a decreased ability of the newborn babies to adapt to stress, which raises the risk of asphyxia and NICU hospitalization [15]. Consistent with previous literature by Asicioglu et al. [16], this study suggests that cesarean birth is associated with poorer short-term

neonatal outcomes than conversion in the first stage of labor. All in all, the second-stage labor and delayed surgical interventions are the main factors that negatively impact the short-term neonatal prognosis.

The clinical implications of the obtained findings of this study are significant. The use of enhanced intrapartum monitoring and risk assessment is of special concern in the case of the fetal head not descending immediately after the complete attainment of the cervical dilation. Labor progression and fetal status should be carefully monitored to avoid unnecessary second-stage cesarean delivery. Early identification and intervention are important because early management significantly reduces maternal and neonatal complications. The surgical approaches must be streamlined to deal with deeply involved fetal heads; reverse breech extraction, or other alternative methods can be used to reduce the extent of uterine incision and tissue damage. Moreover, it is suggested that body temperature, white blood cell levels, and plasma protein levels also be monitored postoperatively. Proper fluid management, early nutritional support, and rigorous infection control measures should be employed to mitigate complications and facilitate maternal recovery.

Limitations

This study did not set any goals for predicting specific moments of cesarean delivery, as labor progression is complex, and only an overview of the effects of the timing of conversion on maternal inflammatory responses and newborn adaptation was undertaken. However, several shortcomings ought to be admitted. The sample size, especially for the second-stage group, was relatively small, resulting in limited statistical power and a high risk of incomplete adjustment for confounding variables, as no multivariate regression analysis was used. This was a single-center retrospective study with a relatively small sample. Also, only short markers of maternal and neonatal outcomes were measured, with no data on long-term follow-up. More precise predictive models of cesarean conversion should be developed through future multicenter, large-scale prospective studies using more specific parameters, such as cervical dilation rates, fetal heart rate variability, amniotic fluid properties, and anesthesia interventions, to better understand the effects of surgical techniques and perioperative management factors on maternal and neonatal outcomes.

5. Conclusions

To conclude, an operative birth at the second stage of the labor process is associated with greater maternal and newborn risks than first-stage conversion, which entails greater postoperative inflammation rates, a higher rate of hypoproteinemia, and inadequate short-term newborn adaptation. Early intrapartum evaluation and optimal perioperative care are key factors in achieving better outcomes and ensuring the safety of deliveries.

Availability of Data and Materials

The datasets generated and analyzed during the current study are not publicly available due to patient privacy concerns, but are available from the corresponding author on reasonable request.

Author Contributions

SZ contributed to the conception and design of the study, data collection, statistical analysis, and drafting of the manuscript. RL participated in methodology development, data acquisition, and interpretation of the data. ZZhan assisted with data validation, resource management, and visualization. ZZhang contributed to the conception and design of the study, interpretation of the data, supervised the overall study, and critically revised the manuscript for important intellectual content. All authors contributed to critical revision of the manuscript for important intellectual content. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

The study was conducted in accordance with the principles of the Declaration of Helsinki. The research protocol was reviewed and approved by the Ethics Committee of the Third Affiliated Hospital of Sun Yat-sen University (approval number: II2024-037-01). Written informed consent was obtained from all participating women prior to their inclusion in the study.

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Conflicts of Interest

The authors declare no conflicts of interest.

Declaration of AI and AI-Assisted Technologies in the Writing Process

During the preparation of this work, the authors used ChatGPT-5.0 solely for translation and language polishing. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

References

- [1] Keag OE, Norman JE, Stock SJ. Long-term risks and benefits associated with cesarean delivery for mother, baby, and subsequent pregnancies: Systematic review and meta-analysis. *PLoS Medicine*. 2018; 15: e1002494. <https://doi.org/10.1371/journal.pmed.1002494>

- [2] First and Second Stage Labor Management: ACOG Clinical Practice Guideline No. 8. *Obstetrics and Gynecology*. 2024; 143: 144–162. <https://doi.org/10.1097/AOG.0000000000005447>
- [3] American College of Obstetricians and Gynecologists (College), Society for Maternal-Fetal Medicine, Caughey AB, Cahill AG, Guise JM, Rouse DJ. Safe prevention of the primary cesarean delivery. *American Journal of Obstetrics and Gynecology*. 2014; 210: 179–193. <https://doi.org/10.1016/j.ajog.2014.01.026>
- [4] Lee STC, Yeung WWY, Leung KY. Risk factors for Caesarean delivery after induction of labour among nulliparous women at term. *Hong Kong Journal of Gynaecology, Obstetrics and Midwifery*. 2020; 20: 27–31. <https://doi.org/10.12809/hkjgom.20.1.06>
- [5] Hamilton EF, Romero R, Tarca AL, Warrick PA. The evolution of the labor curve and its implications for clinical practice: the relationship between cervical dilation, station, and time during labor. *American Journal of Obstetrics and Gynecology*. 2023; 228: S1050–S1062. <https://doi.org/10.1016/j.ajog.2022.12.005>
- [6] Wyn Jones N, Mitchell EJ, Wakefield N, Knight M, Dorling J, Thornton JG, et al. Impacted fetal head during second stage Caesarean birth: A prospective observational study. *European Journal of Obstetrics, Gynecology, and Reproductive Biology*. 2022; 272: 77–81. <https://doi.org/10.1016/j.ejogrb.2022.03.004>
- [7] Rosenbloom JI, Stout MJ, Tuuli MG, Woolfolk CL, López JD, Macones GA, et al. New labor management guidelines and changes in cesarean delivery patterns. *American Journal of Obstetrics & Gynecology*. 2017; 217: 689.e1–689.e8. <https://doi.org/10.1016/j.ajog.2017.10.007>
- [8] Patil DA, Deshmukh V, Gadappa S, Chandwade A. Comparative Study of Maternal and Neonatal Outcomes in Second Stage LSCS Vs First Stage LSCS in Tertiary Care Centre. *International Journal of Medical and Pharmaceutical Research*. 2023; 4: 625–632. <https://doi.org/10.5281/zenodo.7899905>
- [9] Zhou J, Mao S, Zheng Z, Lin C, Tang J, Lin J, et al. The Impact of Delivery Methods on the Delivery Outcomes of Women with a Prolonged Second Stage and a Fetus in the Occipital Posterior Position. *Clinical and Experimental Obstetrics & Gynecology*. 2024; 51: 97. <https://doi.org/10.31083/j.ceog5104097>
- [10] Maljaars LP, Kastelein AW, Latul YP, Nakoma G, Chipungu E, Roovers JWR, et al. The Microcirculation of Vaginal Tissue in Women with Obstetric Vesicovaginal Fistula and Short-Term Effects of Surgical Repair on Microvascular Parameters. *Gynecologic and obstetric investigation*. 2023; 88: 302–309. <https://doi.org/10.1159/000534066>
- [11] Gomez Slagle HB, Hoffman MK, Fonge YN, Caplan R, Sciscione AC. Incremental risk of clinical chorioamnionitis associated with cervical examination. *American Journal of Obstetrics & Gynecology MFM*. 2022; 4: 100524. <https://doi.org/10.1016/j.ajogmf.2021.100524>
- [12] Wertheimer A, Shemer A, Hadar E, Berezowsky A, Wiznitzer A, Krispin E. The effect of meconium-stained amniotic fluid on perinatal outcome in pregnancies complicated by preterm premature rupture of membranes. *Archives of Gynecology and Obstetrics*. 2020; 301: 1181–1187. <https://doi.org/10.1007/s00404-020-05541-2>
- [13] Ivascu R, Torsin LI, Hostiu L, Nitipir C, Corneci D, Dutu M. The Surgical Stress Response and Anesthesia: A Narrative Review. *Journal of Clinical Medicine*. 2024; 13: 3017. <https://doi.org/10.3390/jcm13103017>
- [14] Allison SP, Lobo DN. The clinical significance of hypoalbuminaemia. *Clinical Nutrition (Edinburgh, Scotland)*. 2024; 43: 909–914. <https://doi.org/10.1016/j.clnu.2024.02.018>
- [15] Omwodo KA, Were E. Comparing adverse maternal and perinatal outcomes in primary caesarean delivery during first versus second-stage of labour in Kenya: An institution-based cohort study. *PloS One*. 2023; 18: e0294266. <https://doi.org/10.1371/journal.pone.0294266>
- [16] Asıcıoglu O, Güngördük K, Yildirim G, Asıcıoglu BB, Güngördük OÇ, Ark C, et al. Second-stage vs first-stage caesarean delivery: comparison of maternal and perinatal outcomes. *Journal of Obstetrics and Gynaecology : the Journal of the Institute of Obstetrics and Gynaecology*. 2014; 34: 598–604. <https://doi.org/10.3109/01443615.2014.920790>