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ARTIGO ORIGINAL

Analysis of Morbidity due to Anesthetic Complications in Obstetric Patients in Ecuador (2018 to 2022)

Análise da Morbidade por Complicações Anestésicas em Pacientes Obstétricos no Equador (2018 a 2022)

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ABSTRACT

Introduction: The article addresses the complexities and risks associated with obstetric anesthesia, emphasizing its pivotal role in maternal care. Despite the advent of novel anesthetic techniques and the implementation of enhanced safety measures, obstetric anesthesia continues to present a formidable challenge, largely due to the presence of specific comorbidities, such as maternal obesity and advanced age.

Methods: The study employs data from the National Institute of Statistics and Census (INEC) to examine the incidence of anesthetic complications in obstetric patients in Ecuador from 2018 to 2022.

Results: A total of 304 complications were recorded, with the highest number observed in 2019. The study demonstrates that complications are most prevalent during the puerperium, followed by labor, delivery, and pregnancy. The cohort most affected was women aged 25-34 years, with an average hospital stay of 2.8 days due to complications.

Conclusion: The findings indicate that complications during labor and delivery result in longer hospital stays, which suggests that these events are severe. Furthermore, the study identifies a decline in complications from 2018 to 2021, which was followed by an increase in 2022. This increase may be attributed to alterations in medical care or external factors, such as the impact of the global pandemic caused by the SARS-CoV-2 virus. The study underscores the necessity for continuous monitoring, staff training, and the formulation of targeted interventions to address the identified risks. However, the study's descriptive nature and reliance on retrospective data limit the ability to establish causal relationships, emphasizing the need for further research to enhance maternal and neonatal outcomes in obstetric anesthesia.

RESUMO

Introdução: O artigo aborda as complexidades e os riscos associados à anestesia obstétrica, enfatizando o seu papel fundamental nos cuidados maternos. Apesar do advento de novas técnicas anestésicas e da implementação de medidas de segurança reforçadas, a anestesia obstétrica continua a ser um grande desafio, em parte devido à presença de comorbilidades específicas, como a obesidade materna e a idade avançada.

Métodos: O estudo utiliza dados do Instituto Nacional de Estatística e Censos (INEC) para examinar a incidência de complicações anestésicas em doentes obstétricas no Equador de 2018 a 2022.

Resultados: Foram registadas um total de 304 complicações, tendo o maior número sido observado em 2019. O estudo demonstra que as complicações são mais prevalentes durante o puerpério, seguido do trabalho de parto, parto e gravidez. A coorte mais afetada foi a de mulheres dos 25 aos 34 anos, com um internamento médio de 2,8 dias por complicações. Os resultados indicam que as complicações durante o trabalho de parto resultam em internamentos hospitalares mais longos, o que sugere que estes eventos são graves. Além disso, o estudo identifica uma diminuição das complicações de 2018 para 2021, seguida de um aumento em 2022. Este aumento pode ser atribuído a alterações nos cuidados médicos ou a factores externos, como o impacto da pandemia global causada pela SARS-CoV-2.

Conclusão: O estudo sublinha a necessidade de monitorização contínua, formação do pessoal e formulação de intervenções específicas para abordar os riscos identificados. No entanto, a natureza descritiva do estudo e a dependência de dados retrospetivos limitam a capacidade de estabelecer relações causais, enfatizando a necessidade de mais investigação para melhorar os resultados maternos e neonatais em anestesia obstétrica.

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INTRODUCTION

Obstetric anesthesia is generally regarded as a high-risk field of anesthesia. The care of both the mother and the fetus, as well as the changes in maternal physiology during pregnancy, present unique challenges to obstetric anesthetists.[1] Despite the development of new systems and technologies to ensure consistent and safe anesthetic care for pregnant mothers, the modern-day obstetric anesthetist must also address issues related to changing population characteristics, such as maternal obesity, advanced maternal age, and increased complexity of medical diseases (including cardiac diseases), which may impact women with reproductive potential.[2] Both regional and general anesthesia has the potential to cause complications, some of which, despite being rare, may be severe, life-threatening, and/or irreversibly disabling.

At present, the global maternal mortality rate (MMR) is approximately 400 per 100 000 live births, with a substantial disparity between developed and developing countries.[3] The risk of maternal morbidity and mortality is known to be elevated by factors such as advanced maternal age, black race, maternal obesity, cesarean delivery, and multiple pregnancies (due to the rise in complications such as preeclampsia and peripartum hemorrhage). The anesthesia-related maternal mortality rate in the United States was estimated to be 1.[3] per million live births in a preliminary report.[4] Anesthesia-related complications are the seventh most common cause of pregnancy-related mortality in the United States, contributing to 1.8% of all pregnancy-related fatalities, according to a similar recent study.[5]

Following complications may arise as a result of central neuraxial blockades (CNB).[6]

Post-dural puncture headache (PDPH): The highest risk category is parturients, with a reported incidence of 0% to 30%.[7]

Neurological complications: The estimated incidence of permanent or transient neurologic complications following CNB is between 1/1000 and 1/1 000 000.[8]

Epidural hematoma: The literature has demonstrated that epidural hematoma is a complication of regional anesthesia that is feared but rarely observed (1/150 000–250 000) in healthy patients.

Cardiovascular complications: Cardiac arrests occur at a substantially higher rate following spinal anesthesia than after epidural anesthesia. The incidence of cardiac arrest is seven cases per 10 000 spinal anesthetics and one case per 10 000 epidural anesthetics, according to the report.[6] Women who undergo neuraxial blockade for labor or CS experience shivering at a rate of 20%–70%.

Backache: The prevalence of back discomfort among pregnant women is as high as 76%.[9]

Local anesthetic convulsion: the incidence was previously reported as 0%–0.5%; however, it is now one in 5000–9000.

The morbidity and mortality that are frequently associated with modern anesthesia care are frequently linked to complications of neuraxial anesthesia, such as high or total spinal anesthesia following failed epidural anesthesia and unrecognized spinal catheters.[10] Even though there is still space for improvement, these figures indicate a significant decrease in the number of anesthesia-related deaths over the past few decades. Maternal morbidity has become increasingly significant as the overall maternal mortality rate has decreased. It has been acknowledged that maternal morbidity is a more suitable and beneficial metric for evaluating the quality of obstetric care than mortality.[11]

METHODS

Study Design:

A cross-sectional descriptive study was conducted to analyze morbidity due to anesthetic complications in obstetric patients in Ecuador during the period from 2018 to 2022. This design allows an accurate description of the prevalence and characteristics of anesthetic complications in this specific population, using data collected retrospectively from national databases.

Study population:

The study population consists of obstetric patients who were registered in the National Institute of Statistics and Census (INEC) database within the hospital discharge tabulations between 2018 and 2022. These patients have been identified using the following International Classification of Diseases, 10th revision (ICD-10) codes:

- O29: Complications of anesthesia administered during pregnancy.
- O74: Complications of anesthesia administered during labor and delivery.
- O89: Complications of anesthesia administered during the puerperium.

Inclusion criteria:

- Obstetric patients found in the INEC hospital discharge tabulations with one or more of the ICD-10 codes mentioned.

Exclusion criteria:

- Obstetric patients whose records in the INEC tabulations do not include the specified ICD-10 codes.
- Patients who, despite meeting the inclusion criteria, received medical care outside Ecuador.

Data sources:

Data were obtained from the statistical base of the National Institute of Statistics and Census (INEC), using hospital discharge tabulations corresponding to the period from 2018 to 2022. These data include demographic and clinical information relevant to the analysis.

Data processing and analysis:

The collected data were entered and processed using Microsoft Excel statistical software. Descriptive analyses were performed to identify the frequency and distribution of anesthetic complications in obstetric patients, including subgroup analyses according to demographic and clinical variables. Absolute and relative frequencies were calculated, as well as measures of central tendency and dispersion as appropriate.

Ethical aspects:

To ensure the confidentiality of patients' personal information, all records were anonymized prior to analysis. Since the data used are from a public source and are already depersonalized, it is considered that there are no additional ethical risks associated with this study. In addition, compliance with local and international rules and regulations related to data protection and research ethics was ensured.

RESULTS

During the period 2018-2022, 304 cases of complications related to obstetric anesthesia were observed in Ecuador. As Fig. 1 indicates, the highest number of cases occurred in 2019. Throughout the study period, complications from anesthesia administration were mainly distributed during the puerperium, with a total of 129 reported cases, while 97 cases were recorded during labor and delivery, and 78 cases were documented during pregnancy.

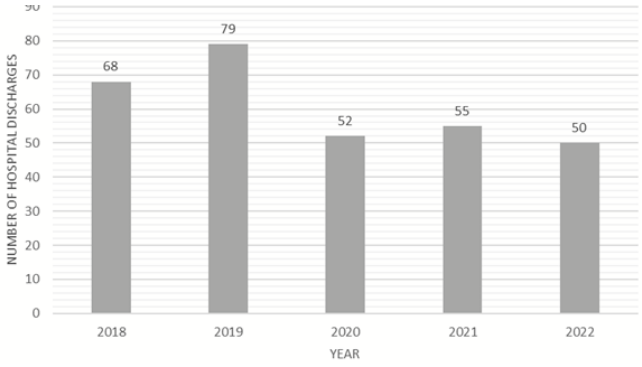

Figure 1. Complications of obstetric anesthesia during the years 2018-2022

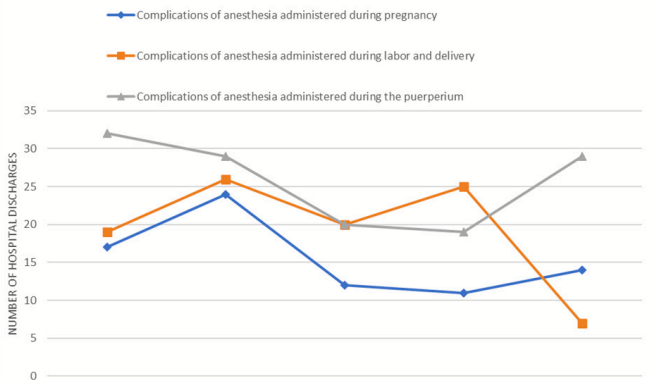

Figure 2. Number of hospital discharges due to complications of anesthesia administered during pregnancy, labor, delivery or puerperium during the years 2018-2022

Complications from anesthesia administered during the postpartum period have gradually decreased from 2018 to 2021; however, an increase in these cases was observed in 2022. A similar pattern occurred in anesthesia-related complications during pregnancy. A similar pattern occurred in complications related to anesthesia during pregnancy. This is in contrast to complications from anesthesia administered during labor and delivery, which reached their lowest level in 2022.

The age group that has been mainly affected by complications related to obstetric anesthesia throughout the study period is the 25-34 age group. As shown in Figs. 2 and 3, the highest number of complications from anesthesia administered during pregnancy, labor and delivery was observed in the 25-29 age group. Meanwhile, a higher frequency of complications related to anesthesia during the puerperium is evident in the 30-34 age group. Complications from anesthesia during the puerperium represent the greatest number of days of hospital stay. On average, each patient who presents complications related to the administration of obstetric anesthesia remains hospitalized for 3 days (Table 1).

DISCUSSION

The study, which encompasses the period from 2018 to 2022, provides an integrated view of complications related to obstetric anesthesia in Ecuador. It highlights both the variability in the incidence of these complications and the patterns observed at different stages of the gestational process and in different age groups. A detailed analysis of the data reveals several critical areas that require attention and raises questions about the potential causes of the observed patterns.

The total of 304 recorded instances of complications over the five-year study period underscores the vital role that anesthesia plays in obstetric management. However, it also draws attention to the inherent risks associated with its administration. It is noteworthy that the year 2019 saw the highest number of complications, which may indicate a convergence of adverse factors during that period. This observation warrants further investigation to ascertain whether it was an isolated phenomenon or indicative of an underlying trend related to changes in anesthetic practice, such as the introduction of new techniques or adaptation to international guidelines, or even external factors such as access to medical resources or changes in the demographic of patients served.

The study revealed that complications related to anesthesia occurred in a non-uniform manner throughout the different stages of the obstetric process. The postpartum period was identified as the most vulnerable, with a total of 129 cases (42% of the total), followed by labor and delivery with 97 cases (32%), and pregnancy with 78 cases (26%). This finding is consistent with existing literature, which identifies the puerperium as a phase of high susceptibility to complications due to the hemodynamic and hormonal changes that occur postpartum.

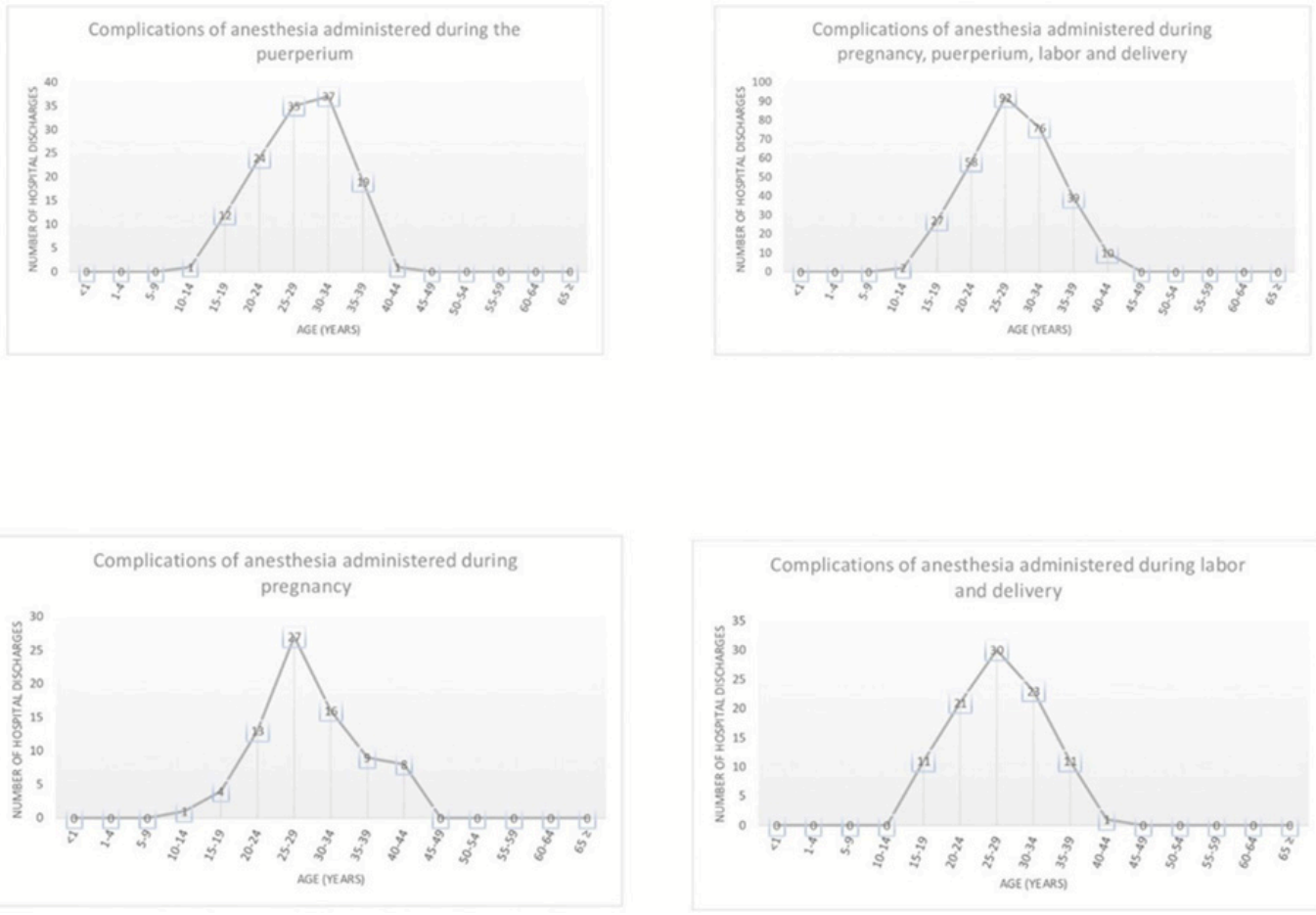

Figure 3. Number of hospital discharges due to complications of obstetric anesthesia by age group during the period 2018-2022

Table 1. Days of hospital stay due to complications of obstetric anesthesia administration during the period 2018-2022

Complications associated with anesthesia	Days of hospital stay	Average number of days of hospital stay
Pregnancy	216	2.7
Labor and delivery	279	3.2
Puerperium	321	2.6
Total	**816**	**2.8**

The decline in complications over time, from 2018 to 2021, suggests an improvement in perinatal care and anesthetic practices. However, the increase observed in 2022 may indicate a regression or the emergence of new challenges that require urgent attention.

In 2020, a notable reduction in hospital discharges due to complications related to obstetric anesthesia was observed. This decline might be associated with the COVID-19 pandemic. Although evidence suggests that cesarean sections were favored for women with COVID-19 regardless of the disease severity or fetal status,[12] several studies indicate a decrease in cesarean section rates during 2020.[13-15] While general anesthesia is rarely used for cesarean sections,[16] complications from epidural or spinal anesthesia are more common in cesarean deliveries compared to vaginal births.[17-19]

A specific analysis of complications during pregnancy and labor also provides valuable insight. Although the overall number of complications was lower than that observed in the puerperium, the fact that complications during these periods showed a similar pattern of decline followed by an increase in 2022 suggests that common factors influence all stages of the obstetric process. It is imperative to ascertain whether this increase is associated with variations in the quality of medical care, alterations in clinical protocols, or external factors such as the impact of the SARS-CoV-2 pandemic on the healthcare system, which could have influenced both the availability of resources and the training of personnel.

From a demographic perspective, the findings indicate that women between 25 and 34 years of age were the most affected by complications of obstetric anesthesia. This finding is consistent with previous epidemiological studies that found the same age group to be the most affected.[13,16] This can be explained by the fact that this is the age range during which most women experience their highest level of reproductive activity. Specifically, the age group of 25 to 29 years presented the highest incidence of complications during pregnancy,

childbirth, and the postpartum period. In contrast, women aged 30 to 34 years demonstrated a higher prevalence of complications during the puerperium.

This age-related pattern suggests that preventive and management interventions should be focused on this demographic, as they represent the largest segment of the obstetric population and, consequently, have a significant impact on the overall maternal morbidity statistics.

The assessment of the number of days spent in the hospital due to complications related to anesthesia provides an additional perspective on the severity of adverse events. In total, 816 days of hospitalization were recorded, with an average of 2.8 days per patient. The data indicate that complications during labor and delivery resulted in the longest hospital stays, with an average of 3.2 days. This finding suggests that complications during these phases tend to be more severe or require more intensive management, which may be related to the critical nature of labor, where any anesthesia-related complication can have immediate and severe consequences for both mother and fetus.

Throughout the study period, it was observed that the highest number of days of hospitalization occurred during the puerperium, followed by labor, delivery, and finally during pregnancy. This same distribution is evident in the frequency of cases, which suggests that the days of hospitalization may be related to the frequency of cases due to complications of anesthesia.

Morbidity from complications of obstetric anesthesia is a better indicator of the quality of medical care than mortality.[12] This is because, although it is true that mortality has been significantly reduced, to the point of no deaths being recorded from these causes, morbidity has not undergone a significant change. For this reason, the present research is important to understand and analyze the complications of the administration of obstetric anesthesia, as well as to indirectly evaluate the quality of obstetric care.

The findings of this study underscore the necessity for continuous monitoring and an integrated approach to the management of obstetric anesthesia in Ecuador. The fluctuations in the incidence of complications and the variability in patterns by age and gestational period underscore the importance of adapting clinical strategies to the specific characteristics of the population. Furthermore, these findings reinforce the importance of continuous medical staff training in obstetric anesthesia and the implementation of evidence-based protocols to reduce complications and improve maternal and neonatal outcomes. It is imperative that future research delves more deeply into the causes of the observed variations and develops targeted interventions to address the highest-risk areas identified in this study.

CONCLUSION

In 2020, complications associated with obstetric anesthesia decreased compared to 2019 and 2018. However, this trend has remained unchanged until 2022. The age group most affected by these complications is 25 to 34 years old.

Overall, during the period from 2018 to 2022 in Ecuador, complications related to obstetric anesthesia required a hospital stay of approximately 3 days.

This study offers a descriptive account of the complications associated with obstetric anesthesia in Ecuador between 2018 and 2022, identifying key patterns across different stages of the gestational process and in distinct age groups. However, the study is subject to several theoretical and methodological limitations that must be taken into account when interpreting the results. Firstly, the descriptive nature of the study precludes the establishment of definitive causal relationships between the analyzed variables and the observed complications, thereby limiting comprehension of the underlying factors influencing the incidence of anesthesia-related complications. Additionally, the study's reliance on retrospective data from a national database limits the generalizability of its findings to other populations or international contexts, as the results reflect the specific characteristics of the Ecuadorian healthcare system and the demographic profile of the study population. Consequently, although this study contributes valuable insight into the morbidity associated with anesthesia in obstetric patients in Ecuador, further research, both nationally and internationally, is needed to gain a deeper understanding of the causes of the observed complications and to develop more effective interventions that will improve maternal and neonatal outcomes.

CONTRIBUTORSHIP STATEMENT / *DECLARAÇÃO DE CONTRIBUIÇÃO*

KEY: Conceptualization, data curation, formal analysis, research, project management, validation, visualization, writing, proofreading, editing and approval of the final version to be published.

AVH: Data curation, formal analysis, research, project management, validation, visualization, methodology and approval of the final version to be published.

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