JOURNAL OF INTERNATIONAL CRISIS AND RISK COMMUNICATION RESEARCH
ISSN: 2576-0017
2024, VOL 7, NO S11

Anesthesia during caesarean sections: a comparison between general anesthesia and semi-anesthesia

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Abstract

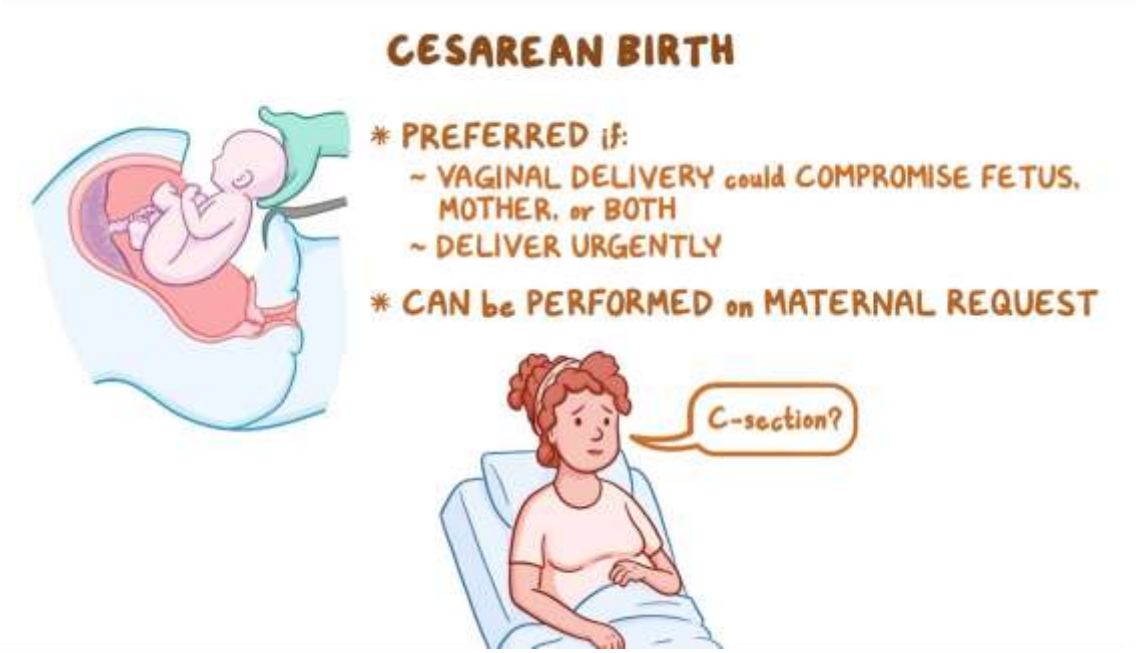
The purpose of the study, or the reason why the research was performed, is the comparison between general anesthesia and semi-anesthesia during cesarean sections, since the selection of this anesthetic technique must be borne in mind first in order to rule out the extreme maternal emergency, as neonatal safety is primary. A methodological center was used for data analysis in the absence of evidence databases. Our aim is to foster a debate on clinical practice implications in a spirit of openness with other healthcare professionals, in line with scientific evidence-based research. Given the mortality and morbidity of cesarean section in general and of general anesthesia in particular, knowing the varied parameters for choosing anesthetic technique is of absolutely greater interest for the patient. Along with the neonatal pulse rate, the blood pressure of the newborn was also analyzed. This contrasts with systematic reviews. (Naus et al.2024)

Thus, the need to establish "real and statistically robust grounds" on which to focus greater attention in the anesthetic choice, and to allow the anesthetist to advise the patient with evidence-based recommendations. To support this conclusion, we conducted a clinical study comparing general anesthesia and semi-anesthesia: there are no relevant differences in maternal hypotension or vasopressor use to prevent it, in the amount of blood loss or the quality of bleeding from the uterus. The stomach raffinage required for the intragastric suction of pregnant women is statistically significant between the two hospital centers, but there is no clinical relevance to advise which surgical technique to use. In the cesarean section, or in the central blocks of this study, no differences are to be expected in the quality and safety of the anesthesia that can be compared with the mother.

1. Introduction

Out of the minor surgery subcategory, during the last century, there has been a very significant evolution in obstetric anaesthesia. We have seen a proportional increase in

operative deliveries mainly as a result of the increasing number of caesarean operations. In this direction, the development of drugs with a short duration of action represents a major advancement. The appropriate choice of anaesthesia is of great significance, not only for the woman but also for the newborn, as it could have immediate as well as long-term consequences. General anaesthesia has nowadays become quite rare in current obstetric practice; however, recently, there has been an interesting revival of its utility, combining ultrasound and the involvement of the parturient, known as semi-anaesthesia. The purpose of the present essay is to compare and, if possible, to evaluate the two different anaesthesiological techniques, discussing their possible use in dangerous operations differently, according to the physiological and systemic pathological states of each individual case. Over the years, the number of deliveries performed worldwide has increased linearly, as has the rate of operative deliveries. The correct choice of anaesthesia for both the caesarean section and the fetal side is of pivotal relevance. Today, the most commonly used anaesthesia is neuro-axial, either the one with a rapid onset or the one with a faster development. But can we still safely perform a caesarean section under general anaesthesia? And is semi-anaesthesia and general anaesthesia really equivalent in terms of maternal health safety? (Ring et al., 2021)



2. Historical perspective of anesthesia in obstetrics

Historical perspective In Casanova's memoirs, it is written how, in 1775, he saw a young girl giving birth: she was waiting outside the church, and a few hours later, she went to the confessional. In Ancient Greece, slaves supported parturients. No remedies for the pain were employed, and some ancient philosophers with a masochistic bent expressed the opinion that the pangs of childbirth were the need for expiation of original sin. Ignorance about the pain of childbirth is also very marked in the principles that the Upanishads of Hinduism contemplate. It was only in the Renaissance, with the avant-garde Leonardo da Vinci, that the drawings began to illustrate the topography of the nervous system; various works of the British Thomas Willis in the heart of the 17th century represented a milestone for the detailed description of anatomical nervous system structures. The period from the 17th century up to the present day is marked by generous activity, and two figures stand out in this regard: Hippolyte Cloquet, teacher of the facilities for the parturients in 1793

during the Reign of Terror; Dr. Charles White, who proposed the use of carbonic acid, giving a review of seven pregnant women on whom he had attempted to use digital nerve compression, sugar, and opium; in 1748, the Abbé Félix Chauveau-Charleville reported the case of a laborer with mental difficulties who, refusing to help his parishioners, decided to give them the means to make their infant birth painless. During the 18th century, the Scottish doctor Giles Fontenelle performed a caesarean section under hypnosis on a 21-year-old woman with measles, saving the child and causing the amazement of the woman. Finally, Eziio Rebuggio, Bishop of Constantinople, ordered six women to be led by hypnosis during his residence in Paris. Dr. James Young Simpson, in the follow-up of his research, used chloroform as an anesthetic during childbirth in 1846. It was the first documented delivery. The patient was an emaciated woman who gave birth to a dead child, showing that the two births are not incompatible. In 1916, Sir Henry Dickinson published the number of women who were given chloroform and those delivered without bulbs; in Italy, Dr. Saverio Gulli of Naples performed spinal anesthesia several times at patients' homes. Societal changes followed similar strides in the evolution of medicine, anesthesiology, and pain relief for mothers, at least in Western Europe; today, in most cases, our country is no exception. There has been a very clear regression, and it is rare to see a woman in Europe who does not receive any type of analgesia for an indigestion, including the uterine and cervical motility inhibitor, as pain is unbearable for her as a first existential stress for the new member. Therefore, in gynecology and obstetrics, the nervous system has become one of the most important organs, along with the hematolymphatic system. The effect of drugs on the woman gives the clinician some useful information. The lower death rate is justified by the availability of new drugs, control of blood distribution during anesthesia, the beginnings of organ transplant surgery, bloodless care during pregnancy and childbirth (especially operation risk), and bloodless care during endoscopic surgery. The emotional stress resulting from gynecology and especially obstetrics in the context of the desire for external reproductive control is well known, at least with regard to women, international societies, and specialist associations in Western Europe. Rapid progress, recovery, the ability to pay, and the lack of whim may compete with the enjoyment of childbirth. All in all, historical means for our discipline are today a priority for good medical care. (Snow, 2022)

3. Anesthesia techniques for caesarean sections

At present, urgent or elective cesarean delivery is the most common major surgical procedure carried out in pregnancy. Local or regional anesthetics are the choice methods to achieve analgesia and anesthesia for cesarean section. If general anesthesia is selected because of difficulties encountered during regional and local anesthesia, urgent occasions may arise where tracheal intubation is expected to be easily performed to ensure a rapid recovery after anesthesia. If the operation is elective, it is acceptable for the mother and the surgeon to anesthetize themselves and allow a combination of methods to perform the anesthesia, having the authorization of all the necessary qualified skills and conditions of the doctor who will be involved in the operation, the successful effectiveness of the regional blocks, and the development and acceptance of standard operating procedures for oral intake and postoperative care. (Regmi et al.2022)

Anesthesia techniques for cesarean sections include two types: general anesthesia or semi-anesthesia. General anesthesia is directly an etheral anesthesia since 1985, which is the use of a combination of propofol, sevoflurane, and a muscle relaxant. Semi-anesthesia may be given as adequate analgesia to a painful mother by administering intravenous or inhaled distracting analgesics, inhalation along with regional blocks, and does not require an overdose to depress the central nervous system. As the choice of different circumstances,

semi-anesthesia can combine with different types when necessary since 1985, including inhalational sedation and minimal water-soluble regional blocks, and this anesthesia technique is referred to as semi-anesthesia. In this guide, semi-anesthesia is given by using the continuous epidural analgesic of bupivacaine and fentanyl, and a small dose of hypnotic propofol if the patient is excited and shivering during general anesthesia. In the guide, it is noted that the semi-anesthesia dosage of propofol will be notably decreased by 10% of the effective amount until reduced or responded. (Turkoglu et al., 2024)

3.1. General anesthesia

Cesarean is considered one of the significant surgeries for which it is entirely possible to apply the method of general anesthesia. General anesthesia, often referred to as sleep anesthesia, employs a variety of depolarizing muscle relaxant agents, nondepolarizing muscle relaxants, and different classes of hypnotic or sedative agents. It can involve a combination of inhaled or intravenous agents, as well as appropriately used neuromuscular blocker agents designed to ensure the patient's comfort and safety throughout the procedure. The process typically begins with the induction phase through either mask ventilation using oxygen and an inhalation agent or through intravenous injection of necessary agents such as hypnotics, muscle relaxants, and analgesics prior to the intubation process. During the surgery, the appropriate level of surgical anesthesia is meticulously maintained through various means, including inhalation techniques, intravenous injections, patient-controlled epidural analgesia (PCEA), sedation, and the administration of nerve block techniques. Additionally, the feature of quick induction and rapid waking can be crucial, as it provides the ability to allow for prompt emergency treatment if necessary, thus ensuring the highest level of patient care and responsiveness in critical situations. (Durga et al.2023)

Prolonged twilight sedation utilizing benzodiazepine sedatives, propofol, or alternatives such as ketamine and inhalation agents presents a variety of options for patients. The significant benefit of choosing general anesthesia lies in its rapid onset of effects and its advantages in scenarios that require emergency surgical interventions. Nonetheless, there are potential risks involved; complications such as aspirated pneumonia, difficult airway management, as well as cardiovascular and respiratory depression can emerge based on differing individual patient conditions. Therefore, it becomes imperative that appropriate management techniques and close monitoring are consistently implemented. Consequently, general anesthesia is utilized primarily in urgent or emergency situations when the application of other types of anesthesia proves challenging. In instances where semi-anesthesia cannot be effectively and fully applied, the decision to intubate awake female patients and apply inhalation anesthetics must be based on a detailed assessment of individual differences, the specific conditions of the airway, and the urgency of the surgical procedure at hand. (Deljou et al.2023)

3.2. Semi-anesthesia

The term "semi-anesthesia" refers to a carefully controlled method designed to minimize pain and discomfort while still allowing some sensory and emotional awareness. This technique is characterized by maintaining the patient's ability to experience certain sensations instead of eliminating them completely. The primary focus of semi-anesthesia is to fine-tune the different components involved, achieving a deliberate reduction in analgesic effects while maintaining an appropriate level of hypnosis. This balance promotes a more conscious state during medical procedures. Semi-anesthesia is especially relevant in specific scenarios such as fetal surgeries or cesarean sections, where it is often

termed "awake" sedation. In contrast, general anesthesia is widely recognized as the standard approach for pain management in surgical settings, particularly for women in labor, where effective airway management and anesthesia are crucial, especially during cesarean deliveries. Full general anesthesia is generally reserved for critical situations involving life-threatening issues, pregnancy terminations, or emergency surgeries like heart transplants.

Advantages of semi-anesthesia as the initial approach to anesthesia in cesarean sections encompass several key benefits that enhance the entire experience for the mother and support the overall success of the procedure. One significant advantage is the preservation of respiratory modulation due to awakening, which not only promotes a more natural recovery process but also fosters a stronger bond between mother and newborn in those critical moments right after birth, further enhancing the overall experience for the mother. Additionally, employing this method leads to a noticeably faster recovery period in comparison to more traditional anesthesia approaches, allowing mothers to reunite with their babies more quickly. Moreover, semi-anesthesia often utilizes less expensive drugs, making the entire procedure more cost-effective, thereby alleviating some of the financial burdens often associated with childbirth.

Patients frequently report feelings of reduced anxiety and fear regarding the procedure when semi-anesthesia is utilized, which translates into improved satisfaction ratings post-delivery. This enhanced comfort can translate into a more positive birthing experience overall. Furthermore, semi-anesthesia provides superior recovery outcomes, with a significant detection of awareness that is crucial for allowing for effective coverage of deeper planes of surgery. This particular aspect greatly reduces the need for intense analgesia during and after the procedure, ultimately contributing to a more seamless and comfortable experience for the mother.

However, it is important to consider that some disadvantages of semi-anesthesia may present themselves, particularly in specific cases involving challenging airway management, especially among obese parturients. These complicating factors can pose challenges in the application of this technique. Additionally, employing this anesthesia method can also be time-consuming, potentially adding stress to what is already an anxious and high-pressure situation for patients and healthcare providers alike. The primary rationale for administering varying degrees of analgesia, from severe to moderate, to these pregnant women hinges on the nuanced assessment of various clinical scenarios, which can significantly impact outcomes.

In these diverse clinical situations, effective management of the patient plays a vital role in significantly lowering risks associated with certain comorbidities that might otherwise complicate the delivery process. Furthermore, the alternating clinical scenarios may also encompass a range of critical factors such as the preservation of the fetus, thorough assessment and mitigation of the risks associated with general anesthesia, identification of any contraindications to regional anesthesia, and importantly, minimizing the reliance on general anesthesia whenever feasible. Lastly, aiding the mother in remaining awake during fetal delivery does more than support medical necessity; it can also serve to provide her with a memorable and cherished experience during this pivotal life-changing event, creating lasting memories that she can hold dear. (Ferrer and Nietzsche, 2023)

4. Benefits and risks of general anesthesia in caesarean sections

A Caesarean section, also known commonly as a C-section, is a surgical operation that typically takes about 20 to 25 minutes to complete. This procedure is most often performed under regional anesthesia, which allows the patient to remain awake while the surgery takes place. However, there are instances, particularly in emergency situations, where general anesthesia is preferred due to its shorter induction time. In such cases, the transition to administering regional anesthesia may be delayed, which can lead to a higher percentage of patients receiving general anesthesia instead. Induction of general anesthesia is a straightforward process. To enhance the ease of intubation or the effective use of an oxygen mask, it is sometimes beneficial to employ a technique referred to as semi-anesthesia. This involves the use of low-dose intravenous anesthetics combined with a short-term neuromuscular blockade while the patient is lightly sedated. Additionally, an oxygen mask can be used to ensure the patient receives adequate oxygenation during the procedure. (Clauser et al.2021)(Terwiesch2023)

The advantages of general anesthesia for a Caesarean section are certainly effective analgesia with a rapid induction to secure an urgent Caesarean section, but its disadvantages include multiple serious respiratory complications in pregnant women, especially those who are hemodynamically unstable. Several recommendations limit the use of general anesthesia in obstetrical anesthesia practices because of the potential negative impact on neonatal respiratory outcomes, from laryngospasm with a brief interruption of oxygenation to the quick clamping of the gastroesophageal sphincter and possible regurgitation of maternal gastric contents into the trachea and bronchi. Partial or total intubation, the absence or delayed administration of ineffective oxygen, and ventilation against pressure in a hyperinflated respiratory volume can cause regional reduction or abolition of umbilical blood flow. Regarding the mother, after surgery under general anesthesia, awakening is unpredictable, and the anesthesia should be deep, with progress evaluated and doses of medication balanced with the high dose of drugs administered intravenously and the high blood concentration. (Lu et al.2023)

5. Benefits and risks of semi-anesthesia in caesarean sections

Semi-anesthesia is a technique utilized during caesarean sections, which combines general intravenous anesthesia with locoregional analgesia. This method allows for the patient's consciousness to be preserved, enabling her active involvement in the delivery process to the greatest extent possible. Semi-anesthesia facilitates a quick recovery and awakening, which is particularly beneficial for women facing adverse maternal conditions, as well as in both planned and emergency caesarean sections. The primary objective during delivery is not only to ensure the safe birth of the child but also to promote the well-being of the mother, minimizing any trauma related to the obstetrical procedure. When selecting an anesthesia strategy for a caesarean section, it is important to consider various risk factors and potential complications. Merely eliminating pain during surgery or addressing the effects of surgical stimulants on the mother does not adequately account for her overall experience; such an optimistic view would only be justified if the patient were under general anesthesia.

The dominance of hormonal and volatile adaptive changes is favored, being the best guarantee for adaptation to energy metabolism, to provide the energy required for the energy crisis associated with surgery, postoperative recovery, and lactation, while avoiding the danger of acidosis, cardiovascular decompensation, and metabolic issues that accompany absolute interventions as a result of absolute blockade against the physiological

hypertonia and hypermetabolism of the interventions. The communication between the anesthesiologist and the parturient is optimal when the woman is awake. However, the anxiety or fear of caesarean section leading to a generalization of the analgesic-resistant complaints can lead to incomplete or inadequate semi-anesthesia management, resulting in insufficient satisfaction and increasing the risk of the caesarean section to anesthesia as a consequence of multidisciplinary discomfort, which can generate critical concerns and discussions about the relational balance between the doctors and the patient for its physiological and social effects on the birth process. (Dumitrascu et al.2024)

6. Maternal and neonatal outcomes

In the setting of cesarean section, the choice of anesthesia technique is more influenced by the impact of anesthesia on the mother and neonate than on maternal and placental physiology. All anesthesia techniques have maternal, neonatal, and fetal effects; specifically gastric reflux, which might have a negative impact on the estimation of maternal mortality rates. For the mother, the choice of anesthesia technique has no effect on the evaluation of intraoperative pain. However, some studies are preferable because mothers who have elective or semi-urgent cesarean sections also have lower maternal morbidity, either because they have fewer removals or because they benefit from suitable perioperative analgesia for the operation. Some aspects to be evaluated in future studies are the measurement of plasma catecholamine concentrations, the presence of reflux, and any negative impact on the nasopharyngeal ring, the changes in invasive blood pressure for 48 hours, current quality of postoperative analgesia, the dosage of opioids induced after cesarean section, neonatal intensity, and any factors or levels of anesthesia that may affect them. Recent data show that they maintain the same level of intraoperative mobilization, recovery time, complications after discharge, and maternal or neonatal satisfaction. Short-term results show that women benefit from fewer side effects and less leg thickness in infusion, and shorter time for release and discharge from post-anesthesia care. It is important to monitor the well-being of the fetus and the newborn in the postoperative management of maternal care, regardless of the type of anesthesia used. The operation should be performed without causing hypothermia to the fetus, and the presence of hypoxia or fetal suffering in utero should be detected by means of heart monitoring. Postoperative maternal care is also important to remove fetal acids. (Kearns et al.2021)

6.1. Comparison of outcomes between general anesthesia and semi-anesthesia

In past years, several studies have highlighted previously undocumented complications for anesthesia in obstetrics, suggesting that new investigations focus on anesthesia during cesarean sections. When comparing the two techniques, spinal anesthesia and general anesthesia, the results showed that spinal anesthesia is associated with a lower need for intra- and post-operative opioids and intravenous drugs, along with several less common adverse outcomes linked to maternal spinal anesthesia, e.g., higher intraoperative arterial systolic and diastolic blood pressure, a higher risk of hypotension during anesthesia, and neonatal jaundice requiring phototherapy. These findings should be interpreted with caution, and more research is needed to define the obstetric anesthesia techniques to be recommended in the guidelines. Researchers and clinicians are asking for comparative studies that also account for the patient's and clinical scenario, given that, in practice, patients rarely receive different anesthetic treatments randomly, a problem amenable to study only in adequately designed randomized trials. Maternal outcomes: In several non-randomized trials, the time in which the mother was ready to leave the operating room after either receiving general anesthesia or spinal anesthesia for cesarean section was observed to be significantly longer for the general anesthesia patients. The use of general anesthesia was positively associated with the primary composites of morbidity. Satisfaction with 24

hours of antalgic therapy with the woman taking meloxicam. Neonatal outcomes: None of the obstetricians showed any preference for either anesthesia technique. A compelling number of studies indi cate that the general acceptance of regional anesthesia during cesarean section is mainly due to the reduction of the surgical stress of the mother in the absence of general anesthesia after the initial regional anesthetic procedure: it has been observed that the birth experience is significantly less stressful. Different results for children have also been documented but only considering pain. The presence of some significant differences among gestational strata may be due in part to the comparisons performed on complications, of which the severity is, in general, inversely proportional to gestation. (Taylor et al.2023)

7. Patient satisfaction and preferences

Considering the individual's need and the significant emphasis on patient experience, this element stands out as one of the most fascinating aspects. A thorough study highlighted that, particularly for those classified as originally "low-risk expectant mothers," the occurrence of their first childbirth was not only anticipated but also deeply appreciated. However, it was noted that these individuals were not particularly inclined to view the event through a critical lens. There are numerous reasons that account for the high satisfaction levels of those who underwent non-urgent cesarean sections. In the medium term, many mothers expressed that they primarily valued the overall health of their newborns. In addition to this, patients also placed considerable importance on the likelihood of giving birth and the quality of surgical assistance they received throughout the process. Furthermore, interestingly, the aspects concerning the baby did not significantly impact their judgment regarding the care they received or their overall satisfaction with the healthcare services. This insight is particularly noteworthy, as the type of care that focuses exclusively on one party often runs the risk of treating the other solely as a means to an end, which raises questions about the ethics and balance within patient care dynamics in modern healthcare settings. (de et al.2024)

Another study, mainly based on interviews and qualitative surveys, showed that a sense of disappointment was associated with birth by non-urgent cesarean in healthy women. This would mainly result from the claim that birth is an ambient experience; women seek the opportunity to experience emotions in an environment endangering neither themselves nor their baby. Furthermore, immediate, continuous, and unlimited access to their baby and observing the first breath are the most frequently mentioned wishes concerning childbirth. However, in contrast to the results of surgical delivery studies, these mothers declare themselves relatively satisfied with both the overall management and the course of childbirth. This concept is even underlined by the use of the word "apparent" in the study title. In another study, 12 formerly pregnant women who gave birth in Germany declared both that they would like to deliver semi-anesthetized and that giving birth is not an unpleasant task. Satisfaction is also related to the amount of pain felt and the anesthetic technique used. (Blakey et al., 2024)

8. Economic considerations

General anesthesia is associated with some costs that are not related to the obstetric department. However, patients are usually those who have to pay for these, except for the monitoring cost. If one wants to compare general and local anesthesia for cesarean sections, a comparison of costs for drugs and disposables is leading. General anesthesia requires four more propofol bottles than semi-anesthesia. Both have more costs with muscle relaxants than local anesthetics. It is estimated that local anesthetics cost $20 and muscle relaxants

$90 to $200. Two to three tuberculin syringes plus the same amounts of needles add six to 18 dollars. A monitoring cost of ten dollars is associated with general anesthesia. Considering these sums, the difference is only substantial when the shortest procedure times are translated into short recovery times. These considerations disregard a potential financial gain related to healthcare policies. Immediate semiprivate care might save more than what is actually reimbursed to the institution by the mother's insurance carrier. Therefore, these policies must be developed and maintained.

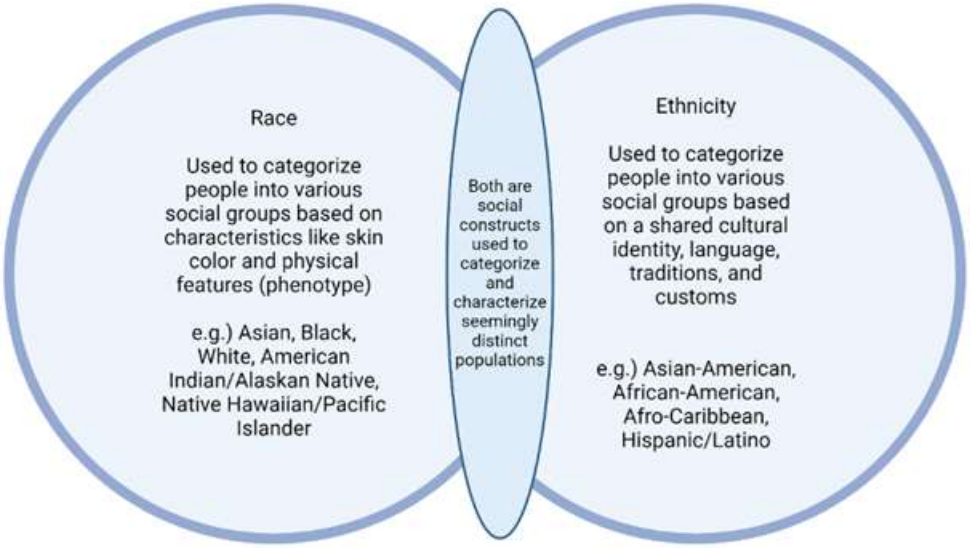
The actual reimbursement for cesarean delivery can vary significantly based on the specific type of anesthesia that is administered during the procedure. This aspect is crucial because it creates a clear distinction regarding who ultimately bears the responsibility for paying the anesthesia bill that is associated with these deliveries. Out of a total of 16 hospitals that were surveyed, five of them have explicitly made this distinction clear: four of these hospitals provide local or regional anesthesia to patients at no cost, which can be categorized as "free." In sharp contrast, general anesthesia is considered to be more expensive and, as a result, may carry additional charges for patients. One specific hospital has implemented a policy that takes into account the financial needs of patients—most notably low-income individuals—who are granted "free" access to local anesthesia, which is certainly a commendable step in ensuring equitable healthcare access.

It is undoubtedly in the best interest of the healthcare system as a whole to facilitate deliveries for all normal-risk patients and their fetuses through the means of semiprivate care settings. However, it becomes particularly essential—not just important—to ensure that socially deprived families are given access to this vital service within the healthcare framework. This is foundational to fostering a healthier population and addressing health disparities. Furthermore, the economic impact on individual hospitals will inevitably vary depending on the specific obstetrical practices they have in place and the policies they choose to enforce. For instance, if the standard hospital policy dictates that all mothers, regardless of whether they are receiving communal or semiprivate care, must remain in the facility for a minimum of one hour following the administration of either local or general anesthesia, the potential "savings" that might be derived from this protocol would be precisely equivalent to the direct costs that have been discussed in this context. Such policies play a significant role in shaping the overall financial landscape of maternity care and can greatly influence hospital management decisions. (Ganeriwal et al.2021)(Yonekura et al.2024)

9. Ethical considerations

Providing adequate and comprehensive preoperative information to the patient regarding the future anesthesia technique that will be implemented during their medical procedure is absolutely mandatory. It is essential to understand that informed consent is not merely a legal formality; rather, it is a crucial medical requirement that holds significant importance for every individual engaged in the healthcare sector and the treatment process as a whole. The primary aim of delivering such information is to convey, in a clear and understandable manner, all the necessary operational details during the counseling session prior to the procedure. This thorough process ensures that the patient is fully informed of the steps and implications involved, allowing them to confidently provide his or her consent to the proposed anesthesia technique before any medical intervention takes place. By doing so, we not only uphold ethical standards but also foster a trusting relationship between the patient and healthcare providers, ultimately enhancing the overall quality of care delivered. (Al-Husban et al.2021)

It goes without saying that the healthcare provider should diligently check whether the message has been successfully received and accurately understood. There is no absolute moral requirement for either the mother or the fetus to receive only the most careful and meticulous treatment in all circumstances, as situations can vary widely. It must be remembered that not only maternal happiness, but also the avoidance of future suffering is a significant concern of obstetric-anesthetic activities. According to the principles of Kantian ethics, the autonomy and personal responsibility of the individual person or both patients involved must be taken very seriously and respected fully. This could lead to making a decision that might choose the inferior of two goods; however, the value of maternal autonomy should in itself be considered as most highly prioritized in decision-making processes regarding medical care.



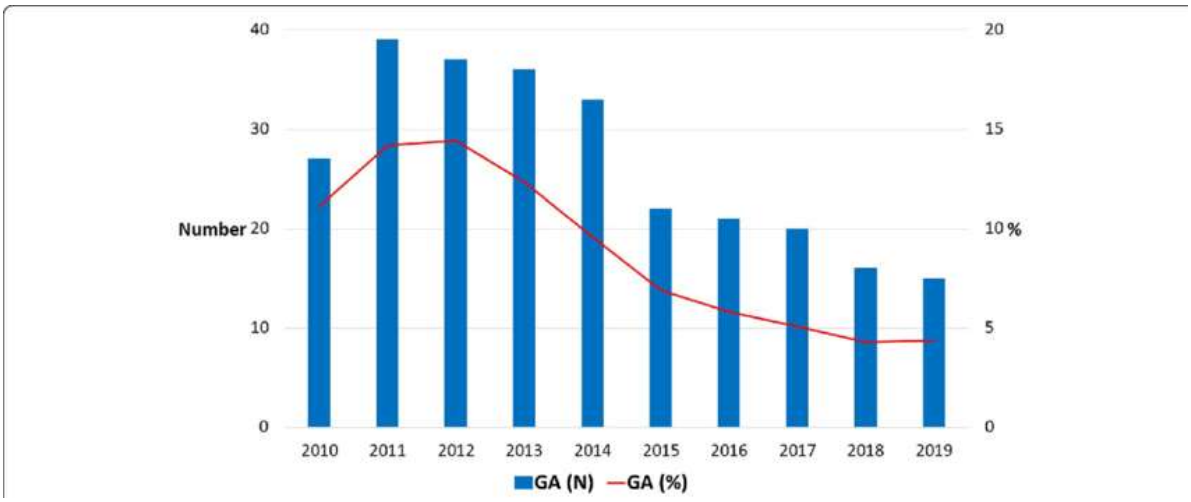
A therapeutic anesthesia-associated maternal mortality because of maternal self-determination exceeds utilitarianism because in calculating versus the anesthesia-associated feto/neonatal risks, a sufficient life time value and quantity indicate participation or are killed, whereby a reasonable calculation base potentially indicates a favored alternative. Whether the confined autonomy of patients or whether the preventive orientation by the healthcare professional reveals the greater ethical correctness, this question is difficult and needs a mesh conduct consultation. Complex clinical cases beg for joint, interdisciplinary cooperation. From an ethical point of view, medical professionals should rely on information about existing national or regional guidelines in relation to caesarean delivery. It also requires advocating for establishing a national technical regulation to ensure safe and high quality in obstetric delivery and safeguard patient safety in obstetric anesthesia care, improve the service quality of anesthesia care in obstetric surgery to the satisfaction of patients and their families. Whether empty rooms are used instead of other establishments in favor of interim earnings, an infrastructural solution for all is in the interest of each of them, and a concern for better health and satisfaction of pregnant women and their family members. (Health Organization, 2021)

10. Future directions in anesthesia for caesarean sections

In considering the extensive labor analgesia studies conducted over time, it can be strongly supposed that obstetric anesthetists are primarily and fundamentally concerned about the

well-being of women in labor. The very same conclusion could be logically deduced from the prevailing research trends observed over the last two decades. These trends predominantly focus on exploring innovative and advanced techniques of semi-anesthesia specifically for cesarean sections. The primary goal of this research is to create conditions that facilitate postoperative mothers in their vital role of taking care of their newborns immediately following surgery. The development of a groundbreaking new approach to semi-anesthesia not only offers a promising glimpse into future directions but also emphasizes the importance of catering to better patient outcomes. This advancement highlights what modern anesthesia practices might contribute to enhancing the visibility and overall experience of cesarean sections for mothers and their newborns.

Among anesthesia research trends, obstetrics must choose between spinal, locoregional, or exclusively general anesthesia. Postponing general anesthesia to women who do not benefit, or in some cases agree to receive spinal or locoregional anesthesia, may allow healthy women to breathe spontaneously and not risk tracheal intubation, perhaps even with difficult airways, and maternal death. Even if the study does not change the future perinatal trend of anesthesia for cesarean sections, it could renew interest in risky research in publicly funded neonatal anesthesia. Perhaps general anesthetists will try to use laryngoscopically guided tubes to decide whether general anesthesia is the inevitable choice for cesarean sections, and how to prepare neuraxial anesthesia in order to ensure good effectiveness without the toxemia characteristic of pregnant women on the future surgical volume. Some will take on new pediatric anesthesia studies relevant to the healthy term newborn, for example, ventilating cannulas, capnometry, or new analgesic and hypnotic medication. No matter what these anesthesiologists decide, the perinatal field still has to fill in a number of knowledge gaps in the context of semitology. For the academic reasons above, obstetric anesthesia must also develop. There will always be very ill pregnant women of high obstetric risk who undergo emergency or elective cesarean sections in need of general anesthesia. In an educational and ethical context, obstetricians must continuously develop the exchange of science, improve critical skills, and create a culture of eliminating obsolete, suboptimal practices while respecting our mothers throughout their reproductive life in a modern, original, and, if possible, in a transdisciplinary manner. (Martinello et al.2023)



11. Conclusion

In conclusion, the review of the data so far suggests that it is not very useful to compare the two intravenous techniques without knowledge of the drugs that are used. On the other hand, the drugs that permit awakening, which also have better scores of maternal and

neonatal outcomes, are the most frequently used by anesthesia practitioners. There are still a few data that suggest the superiority or non-inferiority of a technique over the other, up to date. However, more and different results are still awaited, as the data that came out from the review of the literature are relevant and may have a possible impact from a clinical point of view. In addition, the evidence that the operation of pediatrics is considerably different suggests that the two techniques must be viewed independently. It is not possible yet to have strategies useful for the whole ward, as personal choice must be characterized by different personal, medical, and ethical statements. The tailored and adequate approach to these statements may be useful, in addition to patient satisfaction, to construct a path of quality in care. The choice, from an anesthesiological perspective, of the most appropriate technique for caesarean section is often a matter of opportunity, as other relevant aspects should be taken into account. Nevertheless, it is likely that this decision will be made more and more based on scientific data and comparisons. Given the limited evidence up to date, the current policy of no preference seems to be appropriate, and the air trajectory is still open to new standards in practice. Ongoing studies and multi-center trials, with additional and novel comparisons, might confirm or change the strategy, finally implementing valuable options for modern obstetric anesthesia standards. (Deys et al., 2021)

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