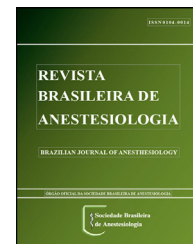




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SCIENTIFIC ARTICLE

Adverse events in anesthesiology: analysis based on the *Logbook* tool used by specializing physicians in Brazil



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Abstract Logbook is a digital tool launched by the Brazilian Society of Anesthesiology in 2014 and has since been used. This tool allows physicians specializing in anesthesiology to record and store activities performed during the training period. This enabled a descriptive analysis of an extensive database of anesthetic procedures, as well as complications that occurred and were reported by these doctors. The present study includes the review of these data over a period of 2 years (2014–2015).

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PALAVRAS-CHAVE

Anestesiologia;
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Eventos adversos;
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de Anestesiologia

Eventos adversos em anestesiologia: análise por meio da ferramenta *Logbook* usada por médicos em especialização no Brasil

Resumo O *Logbook* é uma ferramenta digital, lançada pela Sociedade Brasileira de Anestesiologia em 2014 e empregada desde então. Esta ferramenta permite, aos médicos em especialização em anestesiologia, o registro e o armazenamento das atividades executadas durante o período de treinamento. Isto possibilitou a análise descritiva de um extenso banco de dados dos procedimentos anestésicos, bem como das complicações ocorridas, relatadas por

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esses médicos. O presente estudo compreende a revisão desses dados num período de dois anos (2014–2015).

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Introduction

According to the World Health Organization (WHO) international classification,¹ patient safety is the reduction of risk of unnecessary harm associated with healthcare to an acceptable minimum. One of the outcomes frequently analyzed in studies addressing this theme is the occurrence of adverse events. According to the terminology created by the WHO World Patient Safety Alliance, an adverse event is harm to a patient that was associated with healthcare, or, more precisely, it is the injury incident, classified as the event or circumstance that could have resulted, or, resulted in unnecessary harm to a patient. A study performed in Spain (Ibeas), which assessed the prevalence of adverse events occurring in hospital settings of various institutions in five Latin American countries, defined adverse event as “an event that caused harm to a patient and was more associated with healthcare than with the patient’s underlying disease”.²

In recent years, greater emphasis has been placed on initiatives for patient safety in anesthesiology in both developed and developing countries. The Brazilian Society of Anesthesiology has been a signatory to the Helsinki Declaration since 2006, which provides for a series of actions aimed at patient safety and has structured several projects that have contributed to reduce the incidence of adverse events in anesthesia. In 2017, the Federal Council of Medicine approved Resolution No. 2174 on guidelines for the practice of anesthesiology, which repealed the previous resolution (2006) and aimed, among others, at enhancing the safety of anesthetic procedures.³ In 2013, the Ministry of Health published Ordinance No. 529/2013, which instituted the National Patient Safety Program. According to the ordinance, one of the responsibilities of its implementation committee is the proposition and validation of protocols, guidelines, and manuals focused on patient safety in surgical and anesthesiology procedures.⁴

The literature on anesthesia-related adverse events shows a tendency towards a reduction in the occurrence of complications associated with anesthesia and a decrease in perioperative mortality. A systematic review assessing perioperative mortality in patients undergoing general anesthesia has shown a reduction in the risk of perioperative mortality and anesthesia-related mortality in the last 50 years, particularly in developed countries,⁵ corroborated by other more recent studies, including one performed in Brazil.^{6,7} Studies assessing mortality during anesthesia are relatively more common in the literature than studies assessing the incidence of different types of complications, such as the occurrence of cardiac arrest, both nationally

and internationally.⁸ Studies evaluating the magnitude of anesthesiology-related adverse events in Brazil are still scarce, and most of them are systematic reviews or studies conducted in teaching hospitals, whose particularities are different from other hospitals.^{6–13}

Logbook is a collection of learning objectives, additional information about a specific educational period, its use in various formats, from undergraduate to postgraduate, occurs in different parts of the world.¹⁴ The option for different means of recording, storing activity data during training entails advantages, disadvantages, either because of cost, filling time, ease of transport, specific expertise or the ability to share, secure data.¹⁵ In the United Kingdom, the use of the Logbook in digital media for educational activities in anesthesiology originated in the 1990s.¹⁶ The purpose of the Logbook is to record the acquisition of skills, independence achieved by the student during the training process, also to assist trainees, their supervisors to identify the learning objectives, verify their accomplishments, evaluate the outcomes.¹⁷ These authors further suggest that the standardized digital Logbook, if updated periodically, could serve as, a career identity card used throughout the medical career, enable the doctor’s integration in the healthcare systems of other countries.

The Brazilian Society of Anesthesiology (Sociedade Brasileira de Anestesiologia — SBA) launched the first version of the digital Logbook in Brazil. This system was designed to assess the training and practice of trainee doctors; it allows the recording and monitoring of anesthetic procedures performed by each professional and is an educational support instrument.¹⁸ In order to obtain the title of specialist and approval between the years of specialization training, the trainee doctor is required to complete the Logbook with at least 440 anesthetic procedures each year of training, and periodically feed this record in the internal area of the SBA website. The Logbook allowed the creation of an expressive database with records of anesthetic procedures performed in public and private hospitals in Brazil, which contains information on the characteristics of the anesthetic procedures performed and the occurrence of complications, among others. The objective of the present study was to use the Logbook tool to analyze the data on anesthetic procedures and their respective complications, having as perspective the concepts related to patient safety.

Methodology

This was a retrospective observational study. With the use of the Logbook tool, we evaluated information gathered in

Table 1 Global characteristic of anesthetic procedures – Brazil (2014–2015).

| Variable | <i>n</i> | % |
|--|-----------|--------|
| Sex | | |
| Female | 899,631 | 55.49 |
| Male | 721,545 | 44.51 |
| Total | 1,621,176 | 100.00 |
| Age group | | |
| Newborn (up to 30 days) | 6,537 | 0.40 |
| Infant (30 days–2 years) | 33,416 | 2.06 |
| Child (2–12 years) | 139,203 | 8.59 |
| Adolescent (12–18 years) | 75,938 | 4.68 |
| Adult (18–65 years) | 1,125,580 | 69.43 |
| Elderly (65–85 years) | 225,395 | 13.90 |
| Fragile (over 85 years) | 15,112 | 0.93 |
| Total | 1,621,181 | 100.00 |
| Anesthetic technique | | |
| General and regional combined anesthesia | 171,570 | 10.58 |
| General anesthesia/sedation | 876,957 | 54.10 |
| Regional Anesthesia | 572,576 | 35.32 |
| Total | 1,621,103 | 100.00 |
| ASA physical status | | |
| I | 732,972 | 45.21 |
| II | 647,283 | 39.93 |
| III | 202,776 | 12.51 |
| IV | 34,778 | 2.15 |
| V | 2,607 | 0.16 |
| VI | 707 | 0.04 |
| Total | 1,621,123 | 100.00 |
| Have the following morbidity | | |
| Kidney disease | 34,514 | 2.13 |
| Heart disease | 304,888 | 18.81 |
| Gastrointestinal Disease | 48,380 | 2.98 |
| Liver disease | 14,416 | 0.89 |
| Lung disease | 64,267 | 3.96 |
| Central nervous system disease | 45,188 | 2.79 |
| Multisystem disease | 294,144 | 18.14 |
| Other diseases | 194,485 | 12.00 |
| Patient care regimen | | |
| Elective | 1,236,533 | 76.28 |
| Urgency or emergency | 384,596 | 23.72 |
| Total | 1,621,129 | 100.00 |
| Inpatient regimen | | |
| Outpatient | 309,640 | 19.10 |
| Inpatient | 1,311,483 | 80.90 |
| Total | 1,621,123 | 100.00 |
| Pre-anesthetic visit | | |
| Yes | 1,200,497 | 74.05 |
| No | 420,644 | 25.95 |
| Total | 1,621,141 | 100.00 |
| Care setting | | |
| Pain | 9,638 | 0.59 |
| Remote | 107,341 | 6.62 |
| Operating room | 1,310,498 | 80.83 |
| Obstetrics | 193,657 | 11.94 |
| Uninformed | 107 | 0.01 |
| Total | 1,621,241 | 100.00 |

Note: Missing data were excluded.

a database of 1,621,241 anesthetic procedures, which were collected by trainee physicians, members of the Brazilian Society of Anesthesiology, in public and private hospitals in various regions of Brazil.

To allow a descriptive analysis of the information in the database using the Logbook tool and to allow comparability with other published studies regarding the magnitude of anesthesiology complications, the main data analyzed were the total complications reported in the period, total anesthesia-related complications (adverse events), total avoidable events, and number of deaths. We also analyzed the incidence of perioperative complications, such as cardiac arrest and difficult airway, in addition to variables potentially associated with the occurrence of complications such as: timing of detection; medical specialty in which the anesthetic procedure was performed; anesthetic technique used; size of the surgery; inpatient regimen; patient care regimen; occurrence of preanesthetic visit; patient's age, sex, and ASA physical status; and previous comorbidities.

The overall incidence of complications was calculated by the number of complications (numerator) divided by the total number of anesthesia performed during the study period (denominator). The incidence of adverse events in anesthesia was calculated by the number of anesthesia-related complications (numerator) divided by the total number of anesthesia performed during the study period (denominator). Results were presented as rates per 10,000 anesthetics, with the respective 95% confidence intervals (95% CI).

Taking into account the WHO classification and the nomenclature used in the Ibeas study,^{1,2} an adverse event was defined in the present study as the complication described in the database in which the physician attributed a causal link with anesthesia. It was based on two assumptions: (1) if a complication was described, the damage occurred; (2) if the physician who entered the information in the Logbook attributed the causal link to anesthesia, the event was more related to the care received (anesthetic procedure) than to the underlying disease or some clinical condition of the patient.

In general, we chose to group the complications for the analysis. For example, we grouped unexpected difficult airway, accidental extubation, and unplanned reintubation into a single category because they are related to patients' airway problems. In some cases, it was decided to assess separately the following specialty groups: remote care setting, operating room, and obstetrics, as it is understood that these specialties cover different patient profiles, with different types of complications.

For the variables care setting, time of occurrence, time and method to detect complications, the proportions and their respective 95% confidence intervals were calculated. Pearson's chi-square test was used to analyze complications according to specialty group and event avoidability (according to type of complication and in case of death), in cases that met the criteria for the test application.^{9,19} A significance level of 5% was considered. The statistical software SPSS version 22 was used for analyzes.

The study was approved by the Ethics Committee of the Escola Politécnica Joaquim Venâncio, Fundação Oswaldo Cruz (No. 60761516.1.0000.5241, 10/24/16).

Results

Of the 1,621,241 anesthetic procedures performed, 1414 complications were reported, with an incidence of 8.72 complications per 10,000 anesthetic procedures (95% CI: 8.27–9.19). Of the 1414 complications, 445 were adverse events (31.5%; 95% CI: 29.1–34.0), i.e., complications related to the anesthetic procedure reported by the physicians who entered the information in the Logbook, which makes up an incidence of adverse events in anesthesiology of 2.74 events per 10,000 anesthetic procedures. (95% CI: 2.49–3.01).

In the sample analyzed, 455 deaths were recorded, with an incidence of 2.81 deaths per 10,000 procedures (95% CI: 2.55–3.08).

Table 1 provides a descriptive analysis of the anesthetic procedures contained in the Logbook, showing that most patients are female (55.5%), aged between 18 and 65 years (69.4%), underwent general anesthesia/sedation (54.1%), with physical status ASA I (45.3%), and no comorbidities (53%). 76.3% of the procedures were performed electively and with hospitalization (80.9%). Among the procedures, 74.1% had a pre-anesthetic visit and 80.9% were performed in the operating room.

Table 2 shows that OR was the place where complications occurred most frequently (79.3%). The most frequent occurrence times were during anesthesia maintenance (34.5%) and anesthetic induction (21.5%). Most complications were detected very quickly (66.5% of cases under one minute and 17% under five minutes). Complication detection methods (checking and monitors) accounted for almost all cases (96.8%).

The analysis of Table 3 revealed that the complications: perioperative cardiac arrest, unexpected difficult airway/accidental extubation/unplanned reintubation, and others, accounted for almost all occurrences in the operating room, remote care setting, and obstetrics (86.9%) for the three specialty groups. Perioperative cardiac arrest had the highest representation (55.1%) in the remote care setting, decreased to 28% (2nd place) in the operating room and to 17.4% (2nd place) in obstetrics. The unexpected difficult airway/accidental extubation/unplanned reintubation complication was more present in the operating room (21%). The category "other complications" had an expressive representation (67.4%) in obstetrics and also the highest percentage (37.3%) in the operating room.

Among the avoidable events (Table 4), the highest percentages were found for unexpected difficult airway/accidental extubation/unplanned reintubation and other complications. Together, they reached 78.1% of the cases. These two categories of complications also appeared prominently among the unavoidable events. The category unexpected difficult airway/accidental extubation/unplanned reintubation significantly decreased (15.6%), while the category "other complications" had a slight fall (37.1%). Also noteworthy is the significant percentage (34.1%) of perioperative cardiac arrest among unavoidable events. The chi-square test showed a statistically significant difference between avoidable and unavoidable events, according to the types of complications ($p < 0.001$).

Table 5 shows the complications of cases in which the outcome was death, practically with responses only to perioperative cardiac arrest and other complications that together accounted for more than 90% of cases. Such complications stood out, both among avoidable events (30.8% and 53.8% respectively) and non-avoidable events (35.3% and 56.1%, respectively).

Discussion

Methods for risk identification and assessment of adverse events related to anesthetic procedures have been suggested for over three decades.²⁰ Anesthetic-related morbidity and mortality data have decreased over the years,^{9,21} although the occurrence of adverse events with low or moderate morbidity are still high.²² These authors highlight that more recent data on the prevalence of cardiac arrest and brain damage have values between 0.8–3.3 and 0.15–0.9, respectively, per 10,000 anesthetic procedures. Mortality rates are around 1:100,000 cases for ASA I and II patients and 5.4 deaths per million general anesthesia resulting from airway management complications.²³ The incidence of complications is due to a combination of factors involving inadequate training and experience, challenging work environment, limitations on team performance, stress and fatigue, but most complications are multifactorial and rarely due to a single factor.²⁴ Difficult airway accounts for 37% of respiratory events and is more likely to occur outside the operating room (OR), but 67% of difficult intubations are seen inside the OR during anesthesia induction.²⁵

The findings of the present study show that most procedures were performed in adult patients (69.4%), female (55.5%), ASA physical status I and II (85.1%), using general/sedation or regional analgesia (89.4%) in elective surgeries (76.3%), and this is compatible with the exposure to cases and techniques expected in the training of these professionals.

It is noteworthy that this was the first study performed in Brazil that evaluated a sample of over one million anesthetics, performed in public and private hospitals in several Brazilian regions. Several types of complications were analyzed, such as cardiopulmonary arrest, difficult airway, and acute myocardial infarction, important outcomes in anesthesiology, and their occurrence was considered according to specialty groups and avoidability. In the present study, the incidence rates found for cardiac arrest and death outcomes were much lower than the rates found in the literature.^{6–13} There were 407 cases of cardiac arrest in 1,621,241 anesthetic procedures, giving an incidence of 251 cases per 10,000 anesthetics for the two-year period (2014–2015). Although there has been a decrease in the incidence of this outcome over the past 25 years, the incidence of 2.5 for the two-year period is still well below the incidence of 13 cases per 10,000 anesthetics for 2007, as observed in a previous study.⁶ This difference can be mainly explained by two factors. Firstly, by the continuous advancement of anesthetic techniques and safety related to the anesthetic procedure in more recent years. Secondly, it is important to highlight the peculiarities related to the information entered in the Logbook. Data should be entered into this platform by the last day of the month following the date of the procedure. After

Table 2 Care setting, time of occurrence, time and method of detecting complication in anesthetic procedures – Brazil (2014–2015).

| Variable | <i>n</i> | % | 95% CI |
|--|----------|--------|---------------|
| Care setting | | | |
| Operating room | 1.120 | 79,21 | (77,09–81,32) |
| Induction room | 77 | 5,45 | (4,26–6,63) |
| PACU | 88 | 6,22 | (4,96–7,48) |
| Outside the operating room | 129 | 9,12 | (7,62–10,62) |
| Total | 1.414 | 100,00 | |
| Time of occurrence | | | |
| After preanesthetic medication | 15 | 1,06 | 1,06 |
| Before anesthetic induction | 78 | 5,52 | (4,33–6,71) |
| During anesthetic induction | 304 | 21,50 | (19,36–23,64) |
| Within 12 hours after anesthetic induction | 251 | 17,75 | (15,76–19,74) |
| 12–24 hours after anesthesia induction | 79 | 5,59 | (4,39–6,78) |
| 24–48 hours after anesthetic induction | 26 | 1,84 | (1,14–2,54) |
| Over 48 hours after anesthetic induction | 10 | 0,71 | (0,27–1,14) |
| During maintenance of anesthesia | 489 | 34,58 | (32,1–37,06) |
| During emergence | 162 | 11,46 | (9,8–13,12) |
| Total | 1.414 | 100,00 | |
| Detection time | | | |
| <1 minute | 939 | 66,41 | (63,95–68,87) |
| 1–5 minutes | 241 | 17,04 | (15,08–19) |
| 5 minute–1 hour | 120 | 8,49 | (7,03–9,94) |
| 1–12 hours | 68 | 4,81 | (3,69–5,92) |
| 12–24 hours | 27 | 1,91 | (1,2–2,62) |
| 24–48 hours | 12 | 0,85 | (0,37–1,33) |
| Over 48 hours | 7 | 0,50 | (0,13–0,86) |
| Total | 1.414 | 100,00 | |
| Detection method | | | |
| Checking | 707 | 50,00 | (47,39–52,61) |
| Monitors | 662 | 46,82 | (44,22–49,42) |
| Casual detection | 45 | 3,18 | (2,27–4,1) |
| Total | 1.414 | 100,00 | |

this date, the system was locked for data entry. The deadline for data entry by the trainee physician coincided with the date recorded for the end of each doctor's specialization period.

It is believed that the possibility of the procedure and its complications being retroactively recorded by the physician may have substantially contributed to the underreporting of these events due to two main aspects: (1) memory bias, related to forgetfulness or loss of important information about the case over time; (2) the culture of fear, which despite the efforts of recent years, still exists among health professionals since the publication of the Ministry of Health's 2013 Ordinance on the National Patient Safety Program, in order to seek the adverse event not to punish those involved but, above all, to learn how to act preventively in the future with these occurrences. Added to this is the fact that these data were entered by physicians in specialization training, which may have contributed to the underreporting of complications. Underreporting was also observed for the incidence of deaths.

The study also allowed the observation of important data regarding the most frequent care setting in which complications occurred (79.3% in the OR) and the most

frequent times of occurrence (56% during anesthesia induction and maintenance). A study of surgical adverse events in hospitals in Rio de Janeiro also showed that the most frequent place where these events occur is in the OR (78.1% of cases).²⁶ The identification of the times in which complications occur more frequently is important to signal potential areas for improvement.

The most common types of complications observed in the study (87% of cases) were: perioperative cardiac arrest, airway-related problems (difficult airway/accidental extubation/unplanned reintubation), and other complications. In the analysis of test results for anesthetic procedures recording in Personal Digital Assistant (PDA), Bent et al. (2002) identified a serious incident rate of 2.5% in Australia and New Zealand, half of these events were airway related and 40% were cardiovascular.²⁷

When comparing the percentage of avoidable complications and avoidable deaths by type of complications, we can see that there were more avoidable deaths related to cardiac arrest. Regarding difficult airway, although it was one of the complications with the highest percentage of avoidability, no avoidable deaths associated with this complication were recorded. However, we should

Table 3 Types of complications in anesthetic procedures, according to the specialty group of the complications that occurred.

| Complications | Remote care setting | | Operating room | | Obstetrics | | Total | |
|--|---------------------|--------|----------------|--------|------------|--------|----------|-------|
| | <i>n</i> | % | <i>n</i> | % | <i>n</i> | % | <i>n</i> | % |
| Others ^a | 16 | 23.2% | 481 | 37.3% | 31 | 67.4% | 528 | 37.6% |
| Perioperative cardiac arrest | 38 | 55.1% | 361 | 28.0% | 8 | 17.4% | 407 | 29.0% |
| Unexpected difficult airway/Accidental extubation/Unplanned reintubation | 10 | 14.5% | 270 | 21.0% | 4 | 8.7% | 284 | 20.2% |
| Perioperative pulmonary aspiration | 2 | 2.9% | 55 | 4.3% | 0 | 0.0% | 57 | 4.1% |
| Perioperative acute myocardial infarction | 2 | 2.9% | 55 | 4.3% | 0 | 0.0% | 57 | 4.1% |
| Unplanned Semi-intensive/ICU admission (anesthetic cause) | 1 | 1.40% | 48 | 3.7% | 3 | 6.50% | 52 | 3.7% |
| Perioperative central nervous system complication (Stroke/Coma) | 0 | 0.0% | 14 | 1.1% | 0 | 0.0% | 14 | 1.0% |
| Malignant hyperthermia | 0 | 0.0% | 4 | 0.3% | 0 | 0.0% | 4 | 0.3% |
| Total | 69 | 100.0% | 1,288 | 100.0% | 46 | 100.0% | 1,403 | 100% |

Note: One complication in the pain specialty has been excluded.

^a Anaphylaxis; Wrong anesthesia (site/technical); Accidental high spinal block; Post-dural puncture headache; Wrong surgery (site/procedure); Complication due to vascular access; Intraoperative awareness; Perioperative peripheral neurological deficit; Inadequate pain control; Accidental extubation; Accidental hypothermia; Nausea/vomiting difficult to control; Medication-related complication (dispensing/administration error); Visual deficit/loss after anesthesia; Technical Complaint (medications/materials/equipment); Perioperative transfusion reaction; Unplanned reintubation; Local anesthetic toxicity; Dental Trauma; Difficult intubation; Perioperative death.

Table 4 Types of complications occurred in anesthetic procedures, according to avoidability — Brazil (2014–2015).

| Complications | Avoidable event? | | | | | |
|--|------------------|--------|----------|--------|----------|--------|
| | Yes | | No | | Total | |
| | <i>n</i> | % | <i>n</i> | % | <i>n</i> | % |
| Others ^a | 114 | 40.0% | 415 | 37.1% | 529 | 37.6% |
| Perioperative cardiac arrest | 25 | 8.8% | 382 | 34.1% | 407 | 29.0% |
| Unexpected difficult airway/Accidental extubation/Unplanned reintubation | 109 | 38.1% | 175 | 15.6% | 284 | 20.2% |
| Perioperative pulmonary aspiration | 18 | 6.3% | 39 | 3.5% | 57 | 4.1% |
| Perioperative acute myocardial infarction | 9 | 3.2% | 48 | 4.3% | 57 | 4.1% |
| Unplanned Semi-intensive/ICU admission (anesthetic cause) | 7 | 2.5% | 45 | 4.0% | 52 | 3.7% |
| Perioperative central nervous system complication (Stroke/Coma) | 2 | 0.7% | 12 | 1.1% | 14 | 1.0% |
| Malignant hyperthermia | 1 | 0.4% | 3 | 0.3% | 4 | 0.3% |
| Total | 285 | 100.0% | 1,119 | 100.0% | 1,404 | 100.0% |

p-Value < 0.001 (Chi-square test).

^a Anaphylaxis; Wrong anesthesia (site/technical); Accidental high spinal block; Post-dural puncture headache; Wrong surgery (site/procedure); Complication due to vascular access; Intraoperative awareness; Perioperative peripheral neurological deficit; Inadequate pain control; Accidental extubation; Accidental hypothermia; Nausea/vomiting difficult to control; Medication-related complication (dispensing/administration error); Visual deficit/loss after anesthesia; Technical Complaint (medications/materials/equipment); Perioperative transfusion reaction; Unplanned reintubation; Local anesthetic toxicity; Dental Trauma; Difficult intubation; Perioperative death.

carefully analyze the data due to the limitations already described regarding Logbook data entry, as well as the subjective nature of the avoidability assessment and the fact that the six-point avoidability assessment scale was not used, which is commonly used in adverse event assessment studies.²

Logbook has been adopted to follow the training of anesthesiologists in some countries, providing useful information on exposure, training and experience in anesthesiology

subspecialties.^{28–30} However, as Nixon (2000) points out, the isolated use of case numbers are a limited indicator for competence assessment, but the use of the Logbook can serve as a tool for measuring competence when the level of supervision, the complexity of cases, and the complication rate are included in its analysis.²⁹ The recording of adverse events during anesthesia and the feedback of this information to the clinical team led to a significant decrease in the rates of these events,³¹ signaling a possible use of Logbook data

Table 5 Types of complications, according to avoidability of deaths occurred in anesthetic procedures — Brazil (2014–2015).

| | Avoidable event? | | | | | |
|--|------------------|--------|----------|--------|----------|--------|
| | Yes | | No | | Total | |
| | <i>n</i> | % | <i>n</i> | % | <i>n</i> | % |
| Complications | | | | | | |
| Unplanned Semi-intensive/ICU admission (anesthetic cause) | 0 | 0.0% | 6 | 1.4% | 6 | 1.3% |
| Perioperative pulmonary aspiration | 1 | 7.7% | 9 | 2.1% | 10 | 2.2% |
| Perioperative central nervous system complication (Stroke/Coma) | 1 | 7.7% | 2 | 0.5% | 3 | 0.7% |
| Perioperative acute myocardial infarction | 0 | 0.0% | 13 | 3.0% | 13 | 2.9% |
| Perioperative cardiac arrest | 4 | 30.8% | 155 | 35.3% | 159 | 35.2% |
| Unexpected difficult airway/Accidental extubation/Unplanned reintubation | 0 | 0.0% | 7 | 1.6% | 7 | 1.5% |
| Others ^a | 7 | 53.8% | 247 | 56.1% | 254 | 56.2% |
| Total | 13 | 100.0% | 439 | 100.0% | 452 | 100.0% |

^a Anaphylaxis; Wrong anesthesia (site/technical); Accidental high spinal block; Post-dural puncture headache; Wrong surgery (site/procedure); Complication due to vascular access; Intraoperative awareness; Perioperative peripheral neurological deficit; Inadequate pain control; Accidental extubation; Accidental hypothermia; Nausea/vomiting difficult to control; Medication-related complication (dispensing/administration error); Visual deficit/loss after anesthesia; Technical Complaint (medications/materials/equipment); Perioperative transfusion reaction; Unplanned reintubation; Local anesthetic toxicity; Dental Trauma; Difficult intubation; Perioperative death.

for perioperative evaluation and monitoring of anesthetic procedures.

The present study allowed the descriptive analysis of an extensive database of anesthetic procedures and related complications. It is the first of its magnitude conducted in the country using the Logbook tool. Thus, the data obtained should be evaluated considering the particularities involved with data entry.

Conflicts of interest

The authors declare no conflicts of interest.

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