



CLINICAL RESEARCH

Postmortem qualitative analysis of psychological, occupational, and environmental factors associated with lethal anesthetic and/or opioid abuse among anesthesiologists: case series

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Abstract

Background: Anesthetic and/or opioid abuse is more prevalent among anesthesiologists than in other medical specialties and it has been associated with high mortality. The aim of this study was to evaluate factors associated with lethal anesthetic and/or opioid abuse among anesthesiologists.

Methods: We evaluated psychological factors, and occupational history and circumstances of death of anesthesiologists who died from anesthetic abuse. Data were obtained *post-mortem* from colleagues, and relatives. After finding eligible cases, we identified the *key informants*, who were interviewed personally or via email, through the qualitative method known as “Psychological Autopsy”.

Results: Eighteen cases of death were identified, but we were able to interview 44% of them (n = 8), most of whom were young males. They died at home or at the hospital and were found “at the scene”. Being an introspective person who did not share personal issues at workplace was the most prevalent personal characteristic. At work, they seemed to perform very well their functions, but some presented subtle changes such as to staying more than usual at the workplace and/or neglecting some of their responsibilities. The main reported factors to explain their substance abuse were emotional problems including psychiatric, excessive hours of work, and other health factors.

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Conclusion: This study identified that emotional disturbances, compulsive work, and general health problems were the more prominent factors involved with those deaths. Further, larger studies are needed to better understand how these factors could be early identified in order to timely prevent anesthetic and/or opioid abuse and several deaths among anesthesiologists. © 2021 Published by Elsevier Editora Ltda. on behalf of Sociedade Brasileira de Anestesiologia. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

In the United States of America (USA), at the moment, death from drug overdose, fentanyl in particular, overcomes other causes of death, such as gun homicides or car crashes.¹ Physicians are at high risk for abuse of prescription drugs.² Among them, anesthesiologists have 2.79 more chances to die from substance-related causes (RR 2.79, 95% CI 1.87–4.15) compared to other specialties.³ The first five years after graduation is the period of highest risk for death and suicide related to substance use.⁴ The rigorous training, personal sacrifice, easy access to prescribed drugs, and high expectations that physicians experience during and after training put them at increased risk to develop a substance use disorder (SUD). Another explanation for this fact is that young medical students are highly exposed to use more potent anesthetics during residency.⁴ Substance abuse, work-related stress, burnout, depression, and anxiety are intertwined and tend to lead to medical errors and patient harm.² For these reasons, anesthesiology could be considered a high-risk career, especially when compared to other dangerous professional careers such as freight trucking (29/100,000).^{5–7}

The most common substances used by resident anesthesiologists are alcohol, cannabis, cocaine, anesthetics, and opioids.⁸ A recent study about emerging worldwide trends in substances diverted for personal non-medical use by anesthesiologists showed that whilst the use of alcohol and opioid medications remains the most likely reason an anesthesiologist with SUD would be referred to a facility for treatment, there are emerging trends also involving the use of non-opioid anesthetic agents, particularly propofol.⁹

Self-medication for anxiety and depression is mentioned by up to 65.1% of the subjects, suggesting that drug use could be a kind of “psychological relief” associated with heavy workload. Fentanyl, in particular, is used by 1.6% resident anesthesiologists¹⁰ and may become more prevalent given its abuse is increasing also on the general population.¹¹ Substance abuse among this population could lead to very serious consequences: residents with SUD are 15 times more likely to give up studies, 10 times more likely to fail to obtain the professional Board (American Board of Anesthesiology), 7 times more likely to have adverse medical licensure actions after residency, and 7.9 times more likely to die during residency.¹² Studies have shown a high mortality rate among resident anesthesiologists who have SUD varying from 26% to 37%. When not treated during residency, SUD could result in serious future problems, as loss of medical license or restrictions from the practice of medicine.⁹ For professionals with SUD, the mortality rate is also high, reaching 20%.¹³ The mortality due to substance use including anes-

thetic abuse among anesthesiologists is high, varying from 9% to 19%.^{14,15}

SUD in anesthesiologists is difficult to detect for various reasons. First, physicians are afraid to disclose their problem as it could lead to negative consequences for their job and career.⁶ Second, anesthesia professionals are not well equipped to diagnose and help their colleagues.¹⁶

Despite the high lethality of the problem, to our knowledge, there are no previous post-mortem studies focusing on specific psychological and occupational factors associated with drug use deaths among anesthesiologists.

To understand more in depth the circumstances of death of these physicians we used a methodology called Psychological Autopsy. It is an investigative method dating back to the 1950s that aims to reconstruct data and situations of the deceased that preceded his death through the interview with people close to the victim. First used in a legal context to confirm the cause of death by the police, it was used in the 1970s and 1980s to explore factors associated with suicide.¹⁷

The goal of the present study was to evaluate psychological, occupational, and environmental factors associated with lethal substance and/or opioid abuse among anesthesiologists. The main reason of studying individuals who died from substance overdose is to identify predisposed factors and to better understand the circumstances of deaths, thus providing evidence-based information that may guide to early detection and other prevention programs for this serious and emerging problem in the medical practice.

Methods

This was a case series study.

Subjects

We used three main search strategies in order to find the anesthesiologists who died from anesthetic abuse: 1) official contact with 12,000 professionals registered at the Brazilian Society of Anesthesiology (SBA) via email in October 2014, and again in February 2015; 2) contact with leaders of the main anesthetic departments in universities and public hospitals, mainly in São Paulo; and 3) snowball sampling as shown in [Figure 1](#).

During 2 years of search (2013–2015), we identified 18 cases of doctors who died from anesthetic abuse in universities and public hospitals mainly in São Paulo in the previous 15 years. From these 18 cases, 10 were males and 8 were females. We had more detailed information only from 8 cases ([Table 1](#)), mainly because we could not have access to

Table 1 Gender distribution of anesthesiologists with lethal anesthetic abuse and information about key-contacts.

| n ^o | Case gender | Contact | Interview, when and if not, why not | How |
|----------------|-------------|---|---|--|
| 1 | Male | Spouse Colleague Colleague | we were not able to contact the informant Oct/2013 Nov/2013 | we could not found her contact Personally Personally |
| 2 | Male | Brother Colleague Colleague Friend Friend | Dec/2013 we were not able to contact the informant we were not able to contact the informant we were not able to contact the informant Feb/2014 | Personally we could not found his contact we could not found his contact não sei (he did not answer our calls?) Personally |
| 3 | Male | Father Colleague Colleague | we were not able to contact the informant we were not able to contact the informant we were not able to contact the informant | we could not found his contact we could not found his contact we could not found his contact |
| 4 | Female | Father Colleague Colleague Colleague | we were not able to contact the informant Apr/2015 we were not able to contact the informant we were not able to contact the informant | we could not found his contact Personally she did not answer our calls he did not answer our calls |
| 5 | Male | Colleague | did not know doctor who died | |
| 6 | Male | Colleague | we were not able to contact the informant | we could not found his contact |
| 7 | Male | Colleague | Sept/14 | Personally |
| 8 | Male | Colleague | Oct/14 | Email |
| 9 | Female | Colleague | Nov/14 | Email |
| 10 | Female | Husband | we were not able to contact the informant | we could not found his contact |
| 11 | Female | | we were not able to contact the informant | we could not found anyone who knew her |
| 12 | Female | Colleague | we were not able to contact the informant | we could not found his contact |
| 13 | Male | Cousin | we were not able to contact the informant | he did not answer our calls |
| 14 | Female | Mother | we were not able to contact the informant | she did not answer our calls |
| 15 | Male | Daughter | we exchanged mail but did not return call | |
| 16 | Male | Colleague | we were not able to contact the informant | he did not answer our calls |
| 17 | Female | Colleague | Out/14 | Email |
| 18 | Female | Colleague/friend | Fev/15 | Email |

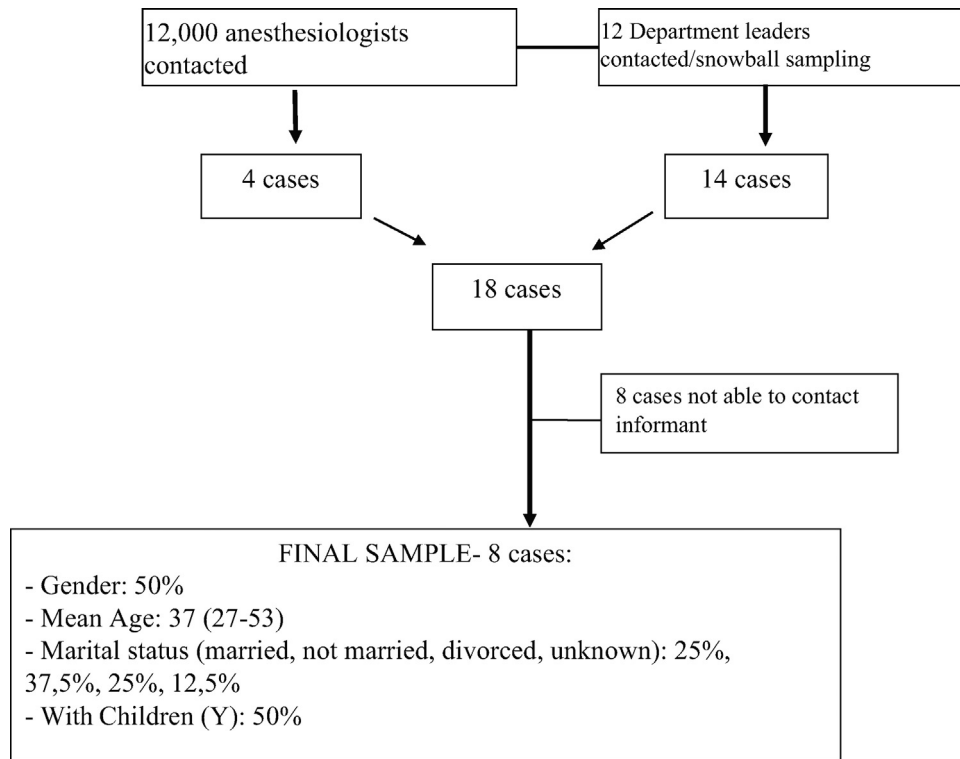


Figure 1 Flowchart showing our search strategies to find the cases and sociodemographic information of anesthesiologists who died from anesthetic abuse.

the other case informants. Half of the sample of the physicians who died were male. The age ranged from 27 to 53 years, being 62.5% ($n = 5$) aged below 30 years and 33% ($n = 3$) between 45 and 53 years of age. Although the email from SBA was sent to professionals from all over the country, all the cases were from São Paulo State.

Table 1 presents basic information about how, when, and why we were not able to contact half of the sample, including the details about the 18 initial cases. Although we received a list of possible cases from the leader of the anesthesiology services, and we tried to contact all of them, only 8 were included. The first informant was asked to indicate our key informant, who could be either a relative or an ex-colleague close to the anesthesiologist who died from anesthetic abuse. Of the 10 people interviewed, only one was from the family of the professional who died. The others were close work colleagues who had limited knowledge of the person in question. A close relationship with the professional who died was considered an objective criterion to find key informants who could effectively provide more reliable information for the purpose of this study.

After identifying the eligible cases, an initial contact was made by telephone with the key informants. The key informant was invited to participate after all explanations about the aim of the study. Those who agreed to participate in the study protocol were invited to provide the necessary information. Two interview methods were offered: by email or in person. At the time of the interview, the purpose of the study was explained again and the Informed Consent Form ensuring the confidentiality of the information provided was signed. In the case of an internet interview, the consent form

was sent by mail. We interviewed 10 people, of whom 60% ($n = 6$) were in person. The others answered by email. Of the 10 people interviewed, 4 were through the emails sent via SBA, from where we received 5 email replies, but only 3 people answered the questionnaire (one person answered about 2 different cases). We identified a case in which the family refused to participate, and 2 close colleagues did not want to get involved with. We ended up including this case after another colleague provided adequate information about it.

Interviews

The method used in this study was the Psychological Autopsy mentioned above, which is basically characterized by an interview that sought the detailed and descriptive report of the circumstances of the death.

This method was implemented in our study to understand more in depth the circumstances of death of the physicians. In this regard, occupational and psychological factors of the subject and the characteristics of his/her substance and/or opioid abuse were important topics of the interview.

Data analysis

Data were analyzed according to a quantitative and qualitative method called Discourse of the Collective Subject (DCS), that allows to investigate the meaning of collective opinions. DCS-based research is characterized by individual interviews using basically open questions to stimulate a discursive behavior that allows the idea to be expressed and qualitatively preserved. DCS is a complex process, subdivided

into several moments, carried out through a series of operations based on the verbal material collected. In order to identify the DCSs, four operators/operations are required, which are: a) *Key Expressions* (Ech): selected excerpts from the verbal material of each testimonial that best describe its content; b) *Central Ideas* (Ics): synthetic formulas that describe the meaning(s) presented in the verbal material, and also in the sets of responses of different individuals, which has similar or complementary meaning; c) *Anchors* (Acs): synthetic formulas that no longer describe the senses, but the ideologies, values, beliefs usually presented in the verbal material of individual responses or grouped in the form of generic statements intended to describe particular situations; d) Discourses of the Collective Subject (DCSs) *per se*. The DCS method considered that there are anchorages only when explicit discursive marks of these generic statements are presented in the verbal material.

The Discourses of Collective Subjects are the Key Expressions present in the statements, which have Central Ideas and/or Anchorages of similar or complementary meaning.¹⁸ These Key Expressions of similar meaning form collective statements written in the first person singular, with the primary purpose of expressively marking the presence of collective thinking in the person of a Subject and a Collective Discourse. It is as if everyone spoke as they were (or by means of) one. A typical DCS survey is an opinion poll on a given topic, divided into a few open questions, aimed at being answered by a given population sample. Each of these answers generates a varied number of different placements, i.e., from different DCSs. These DCSs are qualitatively different in that they convey different opinions and positions, and from a quantitative point of view, since each of them is the result of the contribution of a certain number of interviews or testimonies of individuals. In addition, using the software Qualiquantisoft,¹⁹ the results can be quantified by working with well-selected large samples of individuals and, to the register embedded in the program, segment results by the registration variables.

Based on this methodology, after collecting information through the Psychological Autopsy, we organized the material in a way to evaluate responses to 2 questions: 1) "how was his/her personality?" 2) "how was the doctor professionally?"

Ethical procedures

This study was conducted at the Hospital das Clínicas, in São Paulo, and was approved by the Ethical Committee of the Institution.

Results

From the 8 detailed cases, 50% were male, mostly married, with a mean age of 37 (27–53) and 50% had children, as shown in Figure 1.

Table 2 summarizes the information about psychological factors, occupational characteristics, the circumstances of death, and possible factors associated with substance abuse and death. The main substance(s) involved in the episode of lethal use was also registered. In most cases, anesthetic opioid was cited. Alcohol was cited in only one episode. In

only one case there was evidence of an addiction. Among others, it seems that the substance was used as an attempt to "alleviate" psychological negative emotions, and in a few cases, we found clues to interpret the anesthetic and/or opioid abuse as a suicide rather than an accidental overdose. The death occurred at home or at workplace in the same proportion (50%).

Regarding to the DCS, for the first question regarding personality, the following categories were observed: A) Intelligent and a little impulsive (one answer); B) Pleasant, sociable, vain, handsome, outgoing (3 answers); C) Strong personality, arrogant (2 answers); D) Introspective and arrogant, frank, polite and reserved (2 answers); and E) Agitated and full-mouthed (one answer). For the second question regarding the doctor professionally, we observed the following categories: F) Available (one answer); G) Average (one answer); H) Excellent (2 answers); I) Competent but negligent (2 answers); J) Irresponsible (one answer); K) Competent but arrogant (one answer). In terms of circumstances of death, half of the sample died at the hospital during worktime and half at home. All of them were found alone, mainly in the bathroom and sometimes after the lethal circumstance itself. In most cases, substances involved were anesthetics (meperidine, propofol and sevoflurane) (n = 4), fentanyl (n = 3), midazolam (n = 1), and alcohol (n = 1). Main factors possibly involved in death vary: personality traits such as impulsivity, depression, and difficulties in controlling drug use; relationship problems; and severe clinical illness.

In terms of personality and psychological factors, some of them were described as having personality problems and narcissist/arrogant tendencies, while others were evaluated as more introspective/reserved as well as pleasant, sociable, or even "outgoing". At work, they were generally considered excellent and competent while performing their jobs, but closer to the fatal incident, it was reported that some of them started to stay excessively at work and/or became negligent with their responsibilities.

Discussion

This small qualitative study allowed us to observe similar characteristics in this case series analyzed through the Psychological Autopsy.

Being an introspective person who did not share personal issues at workplace was the most prevalent psychological characteristic found among anesthesiologists who accidentally died from substance overdose. At work, most professionals used to perform well their jobs, but right before the lethal incident they started staying excessively at workplace and/or working a lot, but also neglecting their responsibilities. In general, they were found dead alone in the bathroom, at work (hospital), or at home. The main reported reasons to use substances were excess of work, emotional problems, divorce/separation, depression, physical illness, and impulsivity. The reasons regarding professional stress go along with other studies that report work pressure leading to anesthetic abuse^{2,4,20} as well as a comorbid psychiatric history. However, other situations described in the present study such as divorce or personality characteristics are not reported elsewhere as risk factors.

Table 2 Personal and professional characteristics of anesthesiologists who died from anesthetic abuse: circumstances of death, substance use and possible other factors involved.

| Case | Personality characteristics | How was at work? | Circumstances of death | Substances involved | Main factors possibly involved in death |
|----------------|--|-----------------------------|---|----------------------------------|--|
| 1 ^a | Intelligent and a little impulsive (A) Pleasant, sociable, vain, handsome, outgoing (B) | Available (F) | At the hospital. At the comfort room, in the following day, in the bathroom, 'the door had to be broken and found him dead there, already in deadly rigidity. They found a bulb of dolantine and another of dormonid on the floor. He was tied with a sock on his arm and a syringe injected into his arm, with a needle in his arm.' | Meperidine and midazolam | Impulsivity, relationship issues (being married and maybe liking another man) Stress, doing a lot at the same time, financial problem |
| 2 | B | Average (G) | At the hospital | Sevoflurane | A chronic problem with former husband, and a tendency to seek relief from the use of prescribed drugs |
| 3 | Strong personality, arrogant (C) | Excellent (H) | At the hospital. Was on duty at the hospital, she left a suicide letter, she made some noise after injecting the drugs, which caught the attention of the staff of the surgical center, she was locked in the duty room, the door was broken open and she was already in a cardiorespiratory arrest, resuscitation was attempted without success | Midazolam, Fentanyl and propofol | Depression that generated opioid dependence, from which she could not get rid of |
| 4 | Introspective and arrogant, frank, polite and reserved (D) | Competent but negligent (I) | At home | Fentanyl | He had a severe clinical illness and must have gotten depressed. Because of the illness, he started using the opioids. Too much medication. Doubt about if he had missed the dose of what he was using or had done on purpose. |

Table 2 (Continued)

| Case | Personality characteristics | How was at work? | Circumstances of death | Substances involved | Main factors possibly involved in death |
|----------------|-------------------------------|-------------------------------|---|---------------------|---|
| 5 | B | Irresponsible (J) | At home, found dead with syringe connected to the arm, containing white liquid | Propofol | 'Do not believe he committed suicide, think he thought he had control of the situation.' If it was really propofol, think he challenged the danger too much. Always gave a lot of 'duties', maybe he really suffered from severe insomnia. Depression, fatality |
| 6 | D | I | At home, found by her son on the bathroom in the morning. | Probably Alcohol | |
| 7 | C | H, Competent but arrogant (K) | At home. Alone and did not answer the phone, the bride went home and found him lying on the floor, with a syringe on his side and a glass that seems to be used to applied some substance. It is possible that he had aspirated, that he had a respiratory depression due to the use of the substance, there probably had a respiratory depression, aspired and died. 'He lost his hand, it was not suicide.' | Fentanyl | 'Confused relationship with drugs. He used alcohol in a deleterious way and this may have been transferred to another deleterious drug.. . Being an anesthetist so you have access to the drugs, and the fact that he knew what they were used for, facilitate the use.' 'Very ambitious personality, he would never settle down.' |
| 8 ^b | Agitated and full-mouthed (E) | No answer (L) | Hospital, was working and was found dead in the duty room. | Not known | Not known |

Notes:

^a Informants: 2 colleagues.^b Informants: 1 colleague and 1 family member; the other had one informant (a colleague).

In general, the demographic and behavioral characteristics seemed somewhat diverse, which made impossible to define a unique type of personality among them. Considering the obvious impossibility of having performed a previous semi-structured clinical interview with the subjects who died, we could not classify them in terms of use or abuse diagnosis.

Our results reinforce that psychological and occupational particularities among anesthesiologists in terms of professional daily activities (such as easy access to medication, a lonely and stressful medical activity, and the long working hours) and environmental factors (such as a recent divorce, among others) might have contributed to the abuse of substances and death. Also, details regarding the circumstances of their deaths and psychological characteristics could suggest a possible concomitant psychiatric illness.^{21,22} In this regard, the “self-medication” hypothesis seems to be a relevant risk factor for substance experimentation and chronic use²³ precisely because of the easy access to large quantities of strongly addictive substances, becoming easier to deviate small quantities of this substance for personal use.^{4,15,24,25} The intense professional life with long work hours might lead to chronic emotional stress, and the abuse of those substances could be interpreted as tentative to “relief” such psychological burden, leading inadvertently to death.

However, few anesthesiologists have been referred to treatment: Wilson et al.²⁶ reported that in the USA, 31 of 106 interviewed doctors (29%) were considered addicted, with only 48% of them being referred to rehabilitation. In our sample, none of them was receiving psychological or psychiatric treatment in the period when the lethal use occurred. The physicians’ elevated social status brings many rewards, but it may also include an isolating effect when they become addicted, which include a devastating social stigma. The consequence is probably a significant delay in the recognition of their substance abuse as a relevant problem, and consequently another delay in the process of beginning an intervention to prevent substance abuse, thus culminating in a more elevated risk of death by inadvertent overdose or suicide.²⁷ Additionally, many health professionals sometimes do not have appropriate knowledge about how to deal with this complex problem,⁵ leading to what has been called “conspiracy of silence” involving families, colleagues and the affected doctors as well.⁶ When the substance user is a senior professional, the others tend to fear being punished to bring up the subject. Delay in the diagnosis process includes concern of disclosing an addictive illness and losing not only prestige but also the license to practice medicine and thus livelihood. Families recognize the problem, but also fear talking about it at workplace and must deal with financial and occupational consequences. The false belief that addiction is a personal choice and not a brain disease also significantly limits the medical attention to that matter. Although the literature shows an association between anesthetic/opioid use and suicide among doctors,⁴ and that prevalence of suicide ideation among medicine students is high,^{20,28,29} it is unclear whether the deaths we searched, in this particular study, were suicides or not. Further studies are needed to disentangle the real motive in other particular lethal cases.

More recently, it has been discussed the importance of early detection of afflicted colleagues since the beginning

of their training program and the discussion of the issue in medical school.¹⁶

We consider that the qualitative methodology was consistent in terms of providing a set of possible explanations to a better understanding of the circumstances and personal/professional factors that lead those individuals to die from non-prescribed anesthetic and/or opioid abuse. This was possible through the application of an in-depth qualitative method of analysis, based on a psychological autopsy as a method of data collection, both original in this kind of investigation. At the best of our knowledge, this is possibly the first *post-mortem* qualitative study to show evidence of a set of particular characteristics in terms of psychological issues, occupational factors, circumstances of death, and characteristics of anesthetic and/or opioid abuse among this specific and vulnerable population, derived from reports provided by colleagues and other closer friends, and relatives.

This study has some limitations. First, the retrospective design of this investigation, based on people’s memories of a past time could be a limiting factor. Second, in spite of the effort to search for lethal cases (death registration system and search for well-known people, mainly colleagues through snowball sampling, contact with anesthesia service chiefs in our context and mailing – from the local anesthesiology society), there was a great difficulty to identify eligible cases. Moreover, it was not easy to contact the key informants. When available, they had little information due to the socially restricted behavior that we found among the sample. Also, most of the families were not available. After some attempts to contact them, in some cases we gave up after perceiving that it would be extremely sensitive for them to talk about their relative’s death. There was only one familiar more available to talk about the subject, perhaps because of his professional background in Psychiatry. Also, it was difficult to find more than one person to talk about the same doctor who died. It seems that they felt very uncomfortable when talking about the person, not wanting to “commit” themselves. “Substance abuse and overdose” are delicate topics and it seems that people tend to talk only good things about those who are dead, particularly the family of the deceased, in a way to “preserve their souls”. In general, doctors do not feel comfortable to intervene in what they call “personal life” of their colleagues. In the USA, residency program directors did not consistently report USD to the American Board of Anesthesiology.⁸

This is an exploratory study that, in our opinion, offers precious and original material for designing some initial preventive strategies and should be replicated in a larger scale. First of all, it is clear the need to think about preventive strategies to minimize the significant negative consequences of the illicit anesthetic and/or opioid use, and to avoid a very frustrating/traumatizing end such as an overdose. Knowing better the profile of more “at risk” anesthesiologists would facilitate an early detection of more vulnerable individuals in order to approach the physician. Some other possible interventions might help dealing with this problem: 1) basic preventive efforts could focus on providing information about the substances and their effects through psychoeducation; 2) demystifying the topic for users and for colleagues (chiefs and professionals) who could refer them for a proper diagnosis; 3) implementing a systematic

control of substances used in surgical procedures or under sedation or anesthetic diagnosis; and 4) urine and hair analyses that could be systematically implemented for a more precise control, as well as investing in the mental and physical health of professionals who care for people seems to be crucial. It is also relevant to promote an open field for discussion/reflection among professionals about this subject and maximize the support network for health professionals.

In sum, our investigation identified some specific characteristics of this sample, but more studies are needed and strongly encouraged in this area to better understand the factors associated to the abuse of anesthetics among the medical professionals, as well as how preventive strategies may contribute to a more stable and healthy professional life for anesthesiologists.

Conclusion

Our results suggest that a particular anesthetic occupational routine (such as easy access to medication, a lonely and stressful medical activity, and the long working hours), recent emotional problems (i.e., divorce), impulsive personality, and being introspective were relevant factors that might have contributed to the abuse of substances/opioids and consequent overdose/death among anesthesiologists. Possible concomitant psychiatric illness and “self-medication” also seem to be significant risk factors for substance abuse and overdose. Larger studies are needed to better understand how these factors could be identified early in order to timely prevent anesthetic and/or opioid abuse and several deaths among anesthesiologists.

Conflicts of interest

The authors declare no conflicts of interest.

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