Substance abuse in anaesthetists

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Purpose of review
Anaesthesiologists have a significantly higher frequency of substance abuse by a factor of nearly 3 when compared with other physicians. This is still a current problem that must be reviewed.

Recent findings
Many hypotheses have been formulated to explain why anaesthesiologists appear to be more susceptible to substance abuse than other medical professionals (genetic differences in sensitivity to opioids, stress, the association between chemical dependence and other psychopathology or the second-hand exposure hypothesis). Environmental exposure and sensitization may be an important risk factor in physician addiction. There is a long debate about returning to work for an anaesthetist who has been depending on opioid drugs, and recent debates are discussed. Institutional efforts have been made in many countries and physician health programmes have been developed.

Summary
As drug abuse among anaesthesiologists has continued, new studies have been conducted to know the theories about susceptibility. Written substance abuse policies and controls must be taken in place and in all countries.

Keywords
anaesthesiologists, drug addiction: opioids, recovery, relapse, substance abuse

INTRODUCTION
Addiction among anaesthesiologists has been considered as a result of access to drugs of abuse and efforts to prevent diversion have been intense over the past decades.

Although many efforts have been made to control or lessen the number of addicted anaesthesiologists, the problem of anaesthesiologists as substance abuse and addiction patients has continued.

EPIDEMIOLOGY
Whenever the demographics of physicians with addictive behaviours are reported, anaesthesiologists are usually overrepresented. Twenty-five percent of physicians followed for substance abuse/dependence are anaesthesiologists.

The prevalence of substance abuse among trainees is 2% [1]. Eighty percent of US anaesthesiology residency programmes identified at least one resident with chemical dependence (2.1 ± 1.8 resident per programme), with a prevalence of 0.87%, and 19% reported at least one pretreatment fatality (drug overdose or suicide) [2].

Many surveys have been conducted in different countries, along with USA [3,4], Australia [5], France [6], Catalonia (Spain) [7,8] showing different prevalences of impaired physicians and anaesthesiologists.

When comparing specialities of the physicians who reported fentanyl as their primary drug, 94.4% were anaesthesiologists or surgeons [9].

The prevalence of self-reported substance abuse or dependence for alcohol and/or other drugs was highest for psychiatrists (14.3%) and emergency medicine physicians (12.4%). Psychiatrists were more likely to have used benzodiazepines. Family practice and obstetric/gynaecology physicians were more likely to use minor opiates and there was a suggestion that anaesthesiology, emergency and chronic pain physicians were more likely to use...
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KEY POINTS

- The prevalence of substance abuse among staff and training anaesthesiologists is still high and dangerous.
- New theories have been described to explain dependence of anaesthetic drugs: second-hand exposure.
- Surveillance of drug transactions using drug-dispensing systems must be introduced in all hospitals.
- There is no agreement about returning to work after having been dependent on opioid drugs.
- It is essential that each health organization has written policies in place regarding the country laws with respect to the dependent anaesthetist who can prevent disastrous medical and legal outcomes.

 mayor opiates. Residents followed the same pattern [10].

A recent study supports the finding that anaesthesiologists have a significantly higher rate of substance abuse by a factor of 2.7 when compared with other physicians. Anaesthesiologists were significantly less likely than their peers to enrol in a physician health programme because of alcohol abuse and much more likely to enrol because of abuse of opioids [11*].

TYPE OF DRUG

Opioids were implicated in 66% of cases overall. The next most frequent were anaesthesia induction agents (20%) and benzodiazepines (15%). Alcohol accounted for 12% followed by inhalation anaesthetic agents 5%. Recreational drugs were implicated in only 7% of reports [5]. The literature concerning abuse of remifentanil is limited.

The incidence of propofol abuse among all anaesthesia personnel was 0.10%. Propofol was often the final drug used in a pattern of controlled substance abuse often initiated with opiate abuse and followed by propofol abuse after one or more relapses. This pattern may be because of the ease of obtaining propofol, short duration of symptoms and a lack of routine testing [12]. Although nitrous oxide (N₂O) has found clinical utility, professionals who have ready access to substance (dentists, medical students and hospital staff) are at elevated risk for N₂O misuse, abuse and dependence. However, new methods to access N₂O have been described and have become a significant drug of abuse among US adolescents [13**] and university students [14]. Nevertheless, N₂O is about to be withdrawn from many hospitals because of its secondary effects and the scarce potency. Abuse among anaesthetists will not probably be a problem in the near future.

Little is known about the incidence of volatile anaesthetic abuse among anaesthetists. A number of individuals abusing inhalational agents were found to be abusing more than one agent at the same time. Nearly half (47%) of the inhalational anaesthetic abuse cases involved N₂O. The remaining cases involved isoflurane (19%), halothane (19%) and desflurane (9.5%) [15]. Inhalational agent abuse is very difficult to detect, with the abuse being discovered when the abusing individual is found to have died from an overdose [12].

Surprisingly, there are no publications on the misuse of ketamine among anaesthesiologists except for some case reports [16]. Anyway, it continues to gain popularity in the drug abuse scene of ‘rave wave’ of all nightclubs. This increasing abuse has led the drug-testing laboratories to consider adding ketamine screening to their random urinalysis programme [17]. Sometimes, consumers are identified by urinary bladder ulceration. A high level of urine ketamine active metabolites might result in bladder irritation [18].

THEORETICAL IMPLICATIONS

Many hypotheses have been forwarded to explain why anaesthesiologists appear to be more susceptible to substance abuse than other medical professionals, including ease of access to the drugs, self-medication, the demands of the job and the psyche of the anaesthesiologist.

As there is empirical evidence that the disorders of substance abuse are prevalent within multiple generations of some families, it makes sense that there should be some associated genetic component [19*]. The overwhelming majority of physicians with opioid abuse or dependence have a family history of substance abuse [20].

There is also considerable association between chemical dependence and other psychopathology. The observation that individuals with the same personality traits tend to self-administer drugs from the same class (opioids for anxiety and depression and amphetamines for attention deficit and hyperactivity states) lends credence to this theory [19*].

Stress, chronic fatigue and depression are probably important factors [21,22*]. Stress can lead to isolation and cause physicians to acquire maladaptive strategies, including alcohol or drug abuse [23]. Stress leads to state-related changes in brain reward circuits resulting in a greater sensitivity to the reinforcing properties of the drugs, and thereby
enhancing the reinforcing efficacy of drugs, particularly in those vulnerable to drug abuse [24]. Ready access to opioids and other drugs, together with a detailed knowledge of their pharmacodynamics and pharmacokinetics, must surely play an important role in the onset of substance misuse among anaesthetists [21,25]. The second-hand exposure hypothesis has been postulated. The exposure in the workplace sensitizes the reward pathways in the brain and promotes substance use. Sensitized neurons can be triggered by low doses of the drug which can be assumed to change the brain and the person [26].

A sensitive assay to measure the intravenous anaesthetic and analgesic agents, propofol and fentanyl in air using liquid chromatography–mass spectrometry and gas chromatography–mass spectrometry methods has been developed. The highest concentrations are close to the patients’ mouth in which anaesthesiologists work for hours [9]. We could think that exposure to fentanyl, propofol or other drugs in the operating room might be the factors in anaesthesiologists’ relapses and the frequency of dependency on opioids such as fentanyl [27**], although in other studies, norfentanyl and fentanyl were not detected in the air during two cardiovascular surgeries [28].

**BEHAVIOUR OF THE ADDICTED ANAESTHESIOLOGIST**

Those anaesthetists who are dependent upon drugs present a set of subtle changes which occur over a period of months or even years. These may include deteriorating professional performance and health, social withdrawal or financial problems, which, if they occur over long periods, may go unnoticed [29].

**MORTALITY**

Death, or a nearly fatal overdose, has been the presenting symptom in 7–18% of physicians’ substance abusers [3]. There is an increased risk of suicide, especially drug-related suicide in anaesthesiologists compared with internists [30]. Among all anaesthesia-based providers found to be abusing inhalational anaesthetics, the overall mortality rate was 26% (8/31). Among residents, the mortality rate was 36% [15]. The risk of death from inhalational anaesthetics abuse is similar to the overall mortality of misusers of propofol (28%) and the mortality rate was 38% among residents found to be abusing propofol [12], which is similar to the rate of suicide in anaesthetists [30]. In addition, a 2.8-fold increased risk in drug-related deaths in anaesthesiologists compared with internists may represent additional suicides because suicide may have been concealed [30]. However, the finding of a 34% excess risk of death of accidental poisoning compared with the risk of the general population did not reach statistical significance [31].

**HARM TO PATIENTS**

A drug infraction was two to four times more likely to be reported than an alcohol infraction [32]. The stigma which is attached to these problems will discourage referral by the individual or indeed by friends or colleagues until a catastrophe is either imminent or occurs such as the atypical outbreak of hepatitis C virus detected in Spain in 1998 whose source was an anaesthetist, a morphine addict for many years [33]. Failure to report an impaired colleague may be considered negligence and leaves the individuals and institutions involved in the case if harm comes to any patient [19*]. There are not many claims involving substance abuse among anaesthesiologists [34]. Some other studies have not found any evidence of patient harm [35,11**].

**INSTITUTIONAL EFFORTS**

Most countries, anaesthesiology societies and governments have developed specific treatment centres designed just for them or for other physicians. In Europe, the first project to ensure appropriate care for physicians suffering from addictions to legal and illegal drugs was put forward in Catalonia (Spain) in 1998. The programme was called: integral programme for sick physicians (PAIMM; catalan acronym) http://paimm.fgalatea.org/eng/home_eng.htm and the idea has been spread all over Spain [36,37] and appeared to be successful 2 years later [38,39].

A low-threshold facility for seeking help with such problems has been developed in Norway, [40] Great Britain and Ireland Task Force [29]. An American Society of Anaesthesiology Task Force on Chemical Dependency and a model drug abuse and addiction can be found on the American society of anesthesiologists website at www.ASAhq.org/profinfo/curriculum.htm. Nineteen percent of Australasian departments have substance abuse policies in place [5]. Programmes to prevent and/or detect substance use in this relatively high-risk group would therefore seem especially justified [11**].

In spring 2010, the Professional Wellbeing Work Party of the World Federation of Societies of Anaesthesiologists (WFSA) carries out research involving 120 member societies from across the world to identify the incidence of occupational
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It is essential that each health organization, regardless of its size, has written policies in place specific to the country laws [41].

CONTROLS AND TESTS

Documented diversion of controlled substances from the operating room by anaesthesia care providers has a reported incidence of 1% for faculty and 1.6% for residents [3]. Recent technologic advances, including surveillance of drug transactions via anaesthesia drug-dispensing systems, may allow earlier detection of diversion by analysis of abnormal patterns of usage. These practices are not yet widely adopted [42]. In general, propofol is not under pharmacy control. Lack of control of propofol was significantly associated with positive diversion/abuse [12]. Some programmes of preplacement and postemployment random urine testing of all residents in anaesthesiology have been introduced in an attempt to decrease the incidence of substance abuse [43*]. Unlike intravenously abused drugs, securing inhalational agents is much more of a logistical challenge given the dispensing and storage characteristics of inhalational agents [15].

TREATMENT

Early diagnosis and prompt treatment are important and the support of family members, general practitioners and former colleagues will be vital in achieving a satisfactory outcome [21]. At the end of a 5-year follow-up period, 71% of anaesthesiologists and 64% of nonanaesthesiologists had completed their contracts and were no longer required to be monitored [11**].

Treatment involves detoxification, monitored abstinence with periodic urine and hair toxic tests, intensive education, exposure to self-help groups and psychotherapy. Urine testing is still the cornerstone for monitoring and documenting abstinence in the recovering addict. An alternative method developed to detect chronic exposure to these drugs of abuse is the analysis of hair samples obtained from the individual. Hair can serve as a marker of chronic exposure because drugs of abuse or their metabolites are incorporated into the structure of the hair follicle over time as the hair grows [19*].

Naltrexone, like naloxone, is a relatively pure μ-receptor antagonist. It is highly effective orally, and still remains part of the treatment for anaesthesiologists returning to the operating room.

RELAPSING

The risk of relapse with substance use is markedly increased in healthcare providers who use a major opioid, have a coexisting psychiatric illness or a family history of substance abuse [35]. With aggressive follow-up and monitoring, clinicians can expect similar relapse and recovery rates for anaesthesiologists as with others [44].

Death as the initial relapse symptom occurred in 16% of the parenteral opioid abusers who were allowed to re-enter anaesthesia training [1]. Relapse is most common in the early period of recovery. Although relapse does not necessarily foretells long-term failure, it has been shown that in the setting of re-entry into anaesthesia, relapse is associated with significant mortality [2]. A period away from clinical practice after treatment may reduce the rate of relapse, during which most of the relapses occur [45].

RETURN TO WORK

Of major importance is the question of whether an anaesthetist who has been dependent on opioid drugs should be allowed back to practise anaesthesia wherein such drugs are integral to basic anaesthetic practice.

Among a group of residents receiving treatment for drug abuse, 42–46% successfully re-entered and completed training in anaesthesia [1,2]. With inhalational anaesthetic abuse, there is a lack of successful return to work without relapse. In the study of Wilson, only 22% of those initially found to be abusing inhalational anaesthetics were able to return to anaesthesia practice successfully [15].

Many programme directors will probably feel that re-entry into anaesthesia, with the expectations that fully two-thirds of the re-entrants will relapse into opioid abuse, represents too high a risk. Based on previous studies on mortality [1,12,15,19*], multiple studies have debated the outcome of anaesthesiologists who have returned to the operating room after some form of treatment for chemical dependency [46]. Berge et al. [47**], in his editorial, is extremely pessimistic and clearly believes that a default ‘one strike, you are out’ policy should replace the current default position of assuming a return to the workplace.

This idea has been shared by others who admit that the substance-related deaths after treatment is a reminder of the risks and mortal consequences of an ill-advised return to the specialty [48]. But some authors disagree [49–53], thinking that with an aggressive follow-up and monitoring, individualized diagnosis and treatment plan, clinicians can expect similar relapse and recovery rates for
anaesthesiologists as others. Each case must be evaluated on an individual basis. A graded reintroduction into the clinical practice of anaesthesia may not be better at reducing the incidence of relapse than the reintroduction after a short period of treatment [19].

CONCLUSION
Addiction remains an occupational hazard for anaesthesiologists because of the highly addictive agents that are readily available in the operating room and it is essential to learn to recognize the signs and symptoms of addiction. Successful completion of a treatment programme is not a guarantee against relapse and careful thought is needed to be given to what constituted a sufficient reason to allow an addictive physician to return to the practice of anaesthesiology [19,35].

Sick doctors may fear being stigmatized as weak or inadequate and may also have concerns about confidentiality, claims and losing patients’ respect [54].

Hospitals and institutions must identify anaesthesiologists whose performance may endanger patients with an objective, fair and responsive system. Assessment and treatment programmes must be available for management of all underlying causes of substandard performance: substance abuse, psychiatric problems, behavioural problems and dyscompetencies. Serious consideration should be given to implementing annual physical examinations and random drug testing for all physicians. Institutions and medical organizations must have policies which can help prevent disastrous medical and legal outcomes for the affected physician, for his or her colleagues or employer and for the physician’s patients [41].

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REFERENCES AND RECOMMENDED READING
Papers of particular interest, published within the annual period of review, have been highlighted as:
- of special interest
- of outstanding interest
Additional references related to this topic can also be found in the Current World Literature section in this issue (pp. 000–000).


The article describes how adolescents find how to inhale N₂O.


This is the most recent and complete review about addiction abuse in anaesthesiology.


Recent article that underlines the importance of depression and suicide among anaesthesiologists.


New theories about sensitization to intravenous anesthetics.


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