

Anesthesiology
77:619-622, 1992

Substance Abuse

Now, and for Some Time to Come

This issue of the Journal includes three papers that deal with some aspect of abuse of controlled drugs used in anesthesia.¹⁻³ Two of these papers are case reports; one describes primary propofol abuse by a physician, and the other describes abuse of fentanyl, orally ingested, by an operating room nurse. The third paper reports the results of a mailed survey concerning drug control and accounting in anesthesiology training programs in the United States. Given that all three deal with a similar theme, I will summarize and comment briefly on each in turn before examining their implications in greater detail.

Propofol

The patient described in this case report¹ was in his early 30s, had completed residency, and had a history of drug use dating from high school. Interestingly, his history included little alcohol use. He consulted the *Physicians' Desk Reference* for possible drug alternatives to help him deal with "a variety of stressors." Clearly, this puts to rest, at least in this case, the idea of impulsiveness or simple curiosity as the predominant drive to initial drug use. After trying and rejecting midazolam and fentanyl, the patient selected propofol, because it was short acting, had no reported history of addiction, and was easy to obtain, *i.e.*, uncontrolled. The selected dose was 100 mg, and frequency increased, presumably rapidly, to 15 times per day. By this point, traditional drug craving and compulsion were motivation for continued propofol use. An unusual feature of this situation, uncommon to opioid use,

was the repeated choice of dose to produce complete loss of consciousness.

Common to health care workers, observations about changes in behavior generated the initial questions concerning possible drug abuse. Characteristically for anesthesiologists, many of the questions came from operating room nurses. This underscores the isolation inherent in day-to-day practice, which makes it highly doubtful that anesthesiologists will form the first question concerning colleagues. Close observation is a prerequisite to the diagnosis; few of us ever actually see other practitioners administering anesthesia. Even after the patient's own decision to seek psychiatric aid and subsequent contact with the Committee for Physicians' Health, the Medical Director of which is an anesthesiologist, the patient successfully concealed his propofol use. Finally, after being discovered unconscious, he agreed to enter extended treatment for chemical dependency.

In their discussion, the authors of this case report¹ make several salient points. First, anesthesiologists are prone to abuse drugs found in the workplace. Second, some of these drugs lead to rapid development of physical and psychological dependence. Third, the authors point out that anesthesiologists addicted to injectable drugs "may not do well with one-on-one outpatient therapy." Finally, the mood-altering chemicals must be eliminated for therapy to be effective.

Fentanyl

The patient in this case report² was a male operating room supervisor, age 38 yr, referred to an addictive disease treatment unit for suspected self-administration of fentanyl. Again, the trigger for referral was observed changes in behavior. He firmly denied drug use but freely

Accepted for publication May 26, 1992.

Key words: Addiction. Controlled substances: abuse; dependence; propofol; fentanyl.

admitted to depression. He requested admission for psychiatric therapy, during which time he revealed a history of childhood physical abuse and, eventually, a 5-yr history of abuse of propoxyphene. He responded well to therapy and was discharged after 10 days as an inpatient. Subsequently, he was readmitted when his admission urine drug screen, initially reported as negative, was specifically reanalyzed and reported as positive for fentanyl. Differing from the usual history obtained from anesthesiologists, this patient self-administered fentanyl orally instead of intravenously. Presumably he chose this route because of its greater familiarity and because of relative lack of comfort with intravenous dosing. The authors² emphasize the necessity of alerting the screening laboratory of suspected fentanyl use and suggest that all operating room personnel suspected of substance abuse should be screened for this drug.

Controlled Substance Dispensing and Accountability

This paper is the result of a survey of 158 anesthesiology training programs in the United States concerning institutional methods of controlling mood-altering drugs used in the practice of anesthesia. The authors obtained a 64% response rate to their mailings. Six primary methods of controlling drugs were reported. Nearly 42% reported "traditional nurse dispensing," unfortunately mingling both operating room nurses (external to anesthesia) and certified registered nurse anesthetists (internal to anesthesia) in the same response. The least frequently reported mechanism for control was a dispensing machine (4.4%), and a substantial number of institutions reported a number of different methods, depending on hospital location and time of day.

Accounting for drug use was also examined, and here the variability in response was quite broad. Forty-nine percent of institutions randomly compared the anesthetic record with the record of drugs dispensed and returned. Further random individual audits were performed in 43 (31%) institutions, and 31 institutions went so far as to analyze discarded controlled substances. Again, there were differences within institutions, depending on anesthetizing location.

Ninety-five responders indicated that their current system was the result of changes, with the majority having implemented change since 1985. Of those not reporting change, roughly 40% were considering doing so in the near future.

Controlled substance abuse was reported in about 1% of the total resident population. The percentage incidence among nonresidents (85 instances) was not reported.

No relationship between accountability and drug dependence for 1989 and 1990 (the only years examined) was found. The authors note that one view of this might be that accountability had no effect on dependence. However, their interpretation was that the lack of comprehensive approaches made it impossible to answer the question they posed.

What then, can we learn from these three reports? First, the survey raises the issue of definition of the goals of a controlled drug administration system (table 1).

Certainly, access to mood-altering drugs must be restricted to those with legitimate need to use them in patient care. However, it should be noted that the subjects of the two case reports did have legitimate access to the drugs. In fact, the best-controlled drug was diverted not by an anesthesiologist but by an operating room nurse, a system administrator. Actually, this is typical when drugs are diverted for personal use, and it is as difficult to thwart as other white collar crime. Diversion often is instituted by those who not only know the system but also *are* the system.

The record of distribution is the most successful and straightforward part of all systems, whereas actual use and actual waste records are weakened by depending solely on the anesthesiologist or certified registered nurse anesthetist. The only reliable cross-check against drug administration, primarily opioids, occurs in the postanesthesia care unit, where drug substitution, *e.g.*, labetalol for opioids, is unmasked by absent postoperative analgesia. Waste verification does *not* mean requesting a nurse to witness that several milliliters of a clear fluid leaves a syringe. Instead, it means analyzing the contents of the syringe. Not only does this require money and time, but simple techniques, such as refractometry, generally are inadequate for analyzing sufentanil in various dilutions.

Although a system can be designed that prevents diversion even by those with legitimate access to the drugs, such a system may be incompatible with efficient care in a busy operating room. Acknowledging this limitation prevents regulatory zealots from implementing increasingly complex steps that accomplish nothing toward a barely achievable goal. On the other hand, diversion of

TABLE 1. Goals of a Controlled Drug Administration System

Access restriction
Record of distribution
Record of administration—usually attempted
Record of waste—frequently attempted
Verification of waste—rarely attempted
Prevention of diversion—for use or sale
Reinforcement of concept of unique nature of mood-altering drugs

drugs by those without legitimate access can usually (but not always) be prevented by fairly simple steps. These measures, familiar to most operating room workers, include a secure central controlled-drug repository, strictly limited access to this repository, frequent (every shift) drug accounting by at least two licensed professionals, and personal identity verification during each drug request/return transaction.

A second issue of interest is whether propofol should be included in the access-restricted system. Because it clearly is a mood-altering drug, a case can be made that it should, as should all such drugs, be restricted. More importantly, should it be accounted for according to the complete goals in table 1? The answer to this depends on one's particular vantage point. The anesthesiologist in the operating room wants nothing else added to the restriction of practice. Operating room nurses would like nothing better than to eliminate their part in control and accounting. Certainly, these nurses have no motivation to add propofol, and possibly other induction agents, to the already cumbersome list of accountable drugs. The operating room manager will vote in favor of control if it provides better utilization reimbursement. The manufacturer will unquestionably want propofol treated exactly as thio-pental and isoflurane lest unique restrictions limit sales. From a possible regulatory viewpoint, a recent paper⁴ examining the subjective effects of propofol concluded that, from a group of ten volunteers with a "light" history of recreational drug use, five subjects liked high-dose propofol, and three did not. Unfortunately, it was not the intent of that paper⁴ to evaluate this drug against others, so we have no comparative data. However, in their discussion,¹ Follette and Farley note that 30 articles mention patient euphoria during recovery from propofol anesthesia. Their observation is consistent with the results of the volunteer study⁴ and with the behavior of their addicted patient.

A third issue pertinent to our specialty is whether the results of the survey suggest some form of an epidemic of chemical dependence among physicians in general and anesthesiologists in particular. Concerning physicians in general, an often-quoted figure is that the incidence of opioid addiction in physicians is 30–100 times that of the general population. In 1986, Brewster⁵ attempted to determine the precise source of this figure and concluded that it originated in Germany sometime in the 1950s, although it has been cross-referenced to numerous authors, Winick in particular.⁶ The actual emphasis of Brewster's paper was that there were no reliable data to support an increased incidence of drug- and alcohol-related problems among physicians. Subsequently, a well-done survey⁷ of 9,600 United States physicians indicates that physicians

are far less likely than the general population to abuse illicit substances, *more* likely than the general population to drink alcohol, and far more likely to consume medications, usually self-prescribed, to deal with life on a daily basis. The end result was that 7.9% of surveyed physicians had abused or been dependent on alcohol or drugs, whereas the corresponding rate for the general population is 16%. Interestingly, and despite an apparent lesser incidence of substance abuse among physicians, this article was accompanied by an editorial by Vaillant, who suggested a trial program of random urine screening of physicians.⁸

The approach suggested by Vaillant⁸ is postemployment drug screening and is therefore most comparable to that used by the military and airlines. However, whereas in the majority of military and a great percentage of airlines, screening occurs in nonprofessionals, physicians represent a very select stratum of sophistication. For example, certain modest measures are necessary to obtain a valid observed urine sample in the general population, but most recovery programs for physicians very bluntly recommend verification of sample source by direct observation. Might such a measure be necessary for screening urine samples of physicians? If so, how, as the drug control survey³ asks, will this system be controlled, audited, and paid for? It can be expected that the prevalence of positive tests will be low, and it is generally accepted that when the prevalence approaches the specificity of a test, the ratio of false positives to true positives will be high. What complex review process will be in place to sort all of this out? Although I do so with trepidation, I therefore do not agree with Vaillant in his call for routine urine testing, because I think it will quickly fall into two categories: an embarrassing intrusion for the majority and part of the game for the abusers, who will develop dozens of ways to evade detection.

With respect to whether there is an epidemic of substance abuse among anesthesiologists, the literature on chemical dependence in anesthesia personnel begins in 1969 with a paper by Garb,⁹ who was himself not an anesthesiologist. Garb briefly reviewed the literature to that time and quoted work by Eddy *et al.*¹⁰ to the effect that "a narcotic drug with rapid onset and brief duration of action is more likely to be abused than one with a slower onset and longer duration." It seems doubtful that any of the principals realized that they were issuing a prophecy of the next two decades in anesthesia. Fentanyl, initially in combination with droperidol, entered practice while the specialty became increasingly scientific, attracted larger numbers of American medical graduates, and grew in quality and numbers. Thus were placed in close proximity certain drugs, with high therapeutic indices, with

an influx of bright young people fresh from the 1960s in America.

The results of this mix should not have surprised anyone, but they certainly did. In the 1980s, several papers¹¹⁻¹³ alluded to the unique problems of anesthesiology. It is to the everlasting credit of the specialty that it chose to face this issue immediately and actively. This prompted the program director with the largest recovery experience in the country to note that "because the anesthesia specialty looks for the problem, it finds it."¹⁴ As a consequence, we are in an epidemic of discovery and treatment, and every program in the United States is aware of this issue. Although there are anecdotal reports, mentioned in the survey, that some might choose anesthesiology because of drug access, the filter for drug abuse in training has grown increasingly fine, and chemical dependency is recognized as a unique occupational hazard. Given these factors, it seems inevitable that anesthesiology would be overrepresented in treatment programs across the nation.

Finally, why does drug abuse occur? At the moment, it seems easiest to characterize drug dependence as a biologically based disease, with a possible genetic predisposition activated by environmental factors. Some argue that it is not a disease.¹⁵ Before the first instance of volitional drug use, I agree that it may not be a disease. After initial exposure, I still find the disease model¹⁶ the most effective, and absolutely the most familiar, way to approach the issue. Certainly, the final answer to this question of "why" remains unknown. Most case histories mirror that of the propofol abuser,¹ in that chemical familiarity long precedes medical training.^{17,18} Some of the factors possibly contributing to drug use early in life include high levels of anxiety, hopelessness and helplessness, peer pressure, role modeling, poverty or affluence, curiosity, family dysfunction, and, the favorite in anesthesiology, availability.

The very system that tells physicians that they are special to be allowed to prescribe these drugs enables them also to believe that they are special enough to personally use and control them. For a while, that may be true, and for some, it may be true forever. Most of us are unwilling to tempt fate by investigating the degree of our own discipline and restraint. The only certainty is personal control before the first drug exposure. After that first trial, a

long-standing internal equation may finally be solved, though not much to our liking.

C. F. WARD, M.D.

Anesthesia Service Medical Group, Inc.
P.O. Box 82807
San Diego, California 92138

References

1. Follette JW, Farley WJ: Anesthesiologist addicted to propofol. *ANESTHESIOLOGY* 77:817-818, 1992
2. Hays LR, Stillner V, Littrell R: Fentanyl dependence associated with oral ingestion. *ANESTHESIOLOGY* 77:819-820, 1992
3. Klein RL, Stevens WC, Kingston HGG: Controlled substance dispensing and accountability in United States anesthesiology residency programs. *ANESTHESIOLOGY* 77:806-811, 1992
4. Zacny JP, Lichtor JL, Coalson DW, Finn RS, Uitvlugt A, Glosten B, Flemming DC, Apfelbaum JL: Subjective and psychomotor effects of subanesthetic doses of propofol in healthy volunteers. *ANESTHESIOLOGY* 76:696-702, 1992
5. Brewster JM: Prevalence of alcohol and other drug problems among physicians. *JAMA* 255:1913-1920, 1986
6. Winick C: Physician narcotic addicts. *Soc Probl* 9:174-186, 1961
7. Hughes PH, Brandenburg N, Baldwin DC Jr, Storr CL, Williams K, Anthony JC, Sheehan DV: Prevalence of substance use among US physicians. *JAMA* 267:2333-2339, 1992
8. Vaillant GE: Physician, cherish thyself. *JAMA* 267:2373-2374, 1992
9. Garb S: Drug addiction in physicians. *Anesth Analg* 48:129-133, 1969
10. Eddy NB, Halbach H, Braenden OJ: Synthetic substances with morphine-like effect. *Bull World Health Organ* 14:353-402, 1956
11. Gravenstein JS, Dory WP, Marks RD: Drug abuse by anesthesia personnel. *Anesth Analg* 62:467-472, 1983
12. Ward CF, Ward GC, Saidman LJ: Drug abuse in anesthesia training programs. *JAMA* 250:922-925, 1983
13. Spiegelman WG, Saunders L, Mazze RI: Addiction and anesthesiology. *ANESTHESIOLOGY* 69:335-354, 1984
14. Talbott GD, Gallegos KV, Wilson PO, Porter TL: The Medical Association of Georgia's impaired physician program. *JAMA* 257:2927-2930, 1987
15. Heather N: Why alcoholism is not a disease. *Med J Aust* 156:212-215, 1992
16. Jellienk E: *The Disease Concept of Alcoholism*. New Haven, Hillhouse, 1960
17. Epstein R, Eubanks EE: Drug use among medical students. *N Engl J Med* 311:923, 1984
18. Richman JA, Flaherty JA: Alcohol-related problems of future physicians prior to medical training. *J Stud Alcohol* 51:296-300, 1990