Drug Intoxication and the Need to Autopsy: A Diagnosis of Exclusion?

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ABSTRACT

The recent surge in drug deaths has focused attention on the diagnosis of drug intoxication as a cause of death. In Maryland, the Department of Vital Records has shown an increase from 649 intoxication deaths in 2012 to 1259 in 2015. Preliminary data for 2016 document 1892 of these deaths. Many of the medicolegal death investigation offices in the United States are facing potential loss of accreditation. There is limited capacity to add more staff due to a lack of appropriately trained pathologists and budget constraints. The diagnosis of this intoxication and the need to autopsy all of these cases is a matter of debate, as many death investigation offices look for alternative means to maintain accreditation. The alternative to adding more staff is to reduce the autopsy caseload. Can this be done without compromising the intent of the medical examiner system and the law? Balancing this with being fiscally responsible may be a very real challenge and one that will test many death investigation systems due to this pandemic of drug deaths. If there is a need to reduce the autopsy caseload, it should be in cases other than where the diagnosis is one of exclusion. *Acad Forensic Pathol.* 2017 7(1): 2-6

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INTRODUCTION

The recent surge in drug deaths has focused attention on the diagnosis of drug intoxication as a cause of death. In Maryland, the Department of Vital Records has shown an increase from 649 intoxication deaths in 2012 to 1259 in 2015 (1). The first two quarters of 2016 document 920 of these deaths (1) and show no abatement for this cause despite aggressive public health and law enforcement initiatives.

The diagnosis of this intoxication and the need to autopsy all of these cases is a matter of debate, as many death investigation offices look for alternative means to maintain accreditation. The alternative to adding more staff is to reduce the autopsy caseload. Can this be done without compromising the intent of the medical examiner system and the law? Balancing this with being fiscally responsible may be a very real challenge and one that will test many death investigation systems due to this pandemic of drug deaths. If there is a need to reduce the autopsy caseload, it should be in cases other than where the diagnosis is one of exclusion.

DISCUSSION

Public health and law enforcement initiatives have been put into place to mitigate this pandemic of drug-related deaths. One such initiative is the education of individuals (e.g., police, prehospital, lay persons) trained to administer naloxone under the overdose response program. To date, 39 083 personnel have received this training (2). These initiatives are reliant on accurate cause of death data to allow for planning and evaluation of the interventions.

At the level of death investigation, this surge in drug deaths has placed already strained death investigation systems in the United States in a precarious position. Many of the offices are facing potential loss of accreditation due to the maximum workload of each practicing pathologist being limited to a maximum of 325 autopsies each per year, with a recommended maximum of 250 (3, 4). For each additional 250 to 325 cases at an office, the institution should add a patholo-

gist. There is limited capacity to add more staff due to a lack of appropriately trained pathologists, facilities, and budget constraints.

In the case of the state of Maryland, the increased workload should result in the addition of four pathologists from 2012 to 2016. To further complicate this surge in intoxication deaths are the increased deaths occurring from other causes and manners. Some of these may well be related to violence often associated with the drug trade. Others may be unrelated and associated with other factors such as affordable gasoline and miles driven, creating additional motor vehicle casualties.

The diagnosis of this intoxication and the need to autopsy all of these cases is a matter of debate, as many death investigation offices look for alternative means to maintain accreditation. The alternative to adding more staff is to reduce the autopsy caseload. Can this be done without compromising the intent of the medical examiner system and the law?

Most statutes call for an investigation to determine the cause of death within a reasonable degree of medical certainty. That level of confidence is the subject of debate and many peer-reviewed publications (5, 6). To further compound this issue is the common use of statistics as a diagnostic tool in sudden death. Statistically, as the population ages, we have data that show an increase in natural deaths, such as cardiovascular disease. As medical examiners, we have used those data to provide a scientific argument for certifying sudden deaths under our jurisdiction without doing an autopsy. We also all recognize that those persons not autopsied, but certified as cardiovascular disease, then add to these data to further prove our so-called accurate scientific assumption.

Accurate death certification serves both the public's health and safety. Examples of processes served by a death certificate or an autopsy report are: new emerging threats to the public's health, the judicial process (both criminal and civil), the families' need to understand the death as part of bereavement, genetic counseling, estate resolution, and insurance claims. The

accuracy of death certification is significantly compromised if an autopsy is not performed (7).

So can we in good conscience ignore these needs and only test the blood for foreign substances and make a decision based on those results alone?

As this pandemic of drug deaths has evolved, we noticed at the Office of the Chief Medical Examiner for Maryland that the age group most affected is the 50- to 60-year-olds. This challenges our previous assumption that these sudden deaths were due to cardiovascular diseases. We have all pondered, or at least given some thought to the age-old concept of “a” cause of death versus “the” cause of death. This question cannot be answered without an autopsy in a case where the diagnosis is one of exclusion such as drug-related, sudden unexplained death in infancy, or drowning. Where can we reasonably turn to identify guidance on this issue?

The National Association of Medical Examiners (NAME) autopsy standards and the NAME checklist speak to this issue. In addition to the accreditation checklist (3), which is a product of the inspection committee and requires board approval, we have the autopsy performance standards. Arguably, as these are debated and approved by the membership, they are a more powerful statement of our professional standards.

Standard B3 provides guidelines as to which medico-legal death investigations need to have an autopsy as part of the process (4). Part of the preamble to the list of cases requiring autopsy states language similar to that used above.

Performing autopsies protects the public interest and provides the information necessary to address legal, public health, and public safety issues in each case (4).

There is language allowing discretion of the pathologist or local guidelines for autopsies on cases other than listed and indicates certain categories where the public’s interest is “so compelling” that an autopsy

should be performed. Item B3.7 is “*apparent intoxication by drugs, alcohol or poison.*” One other category listed is suspected drowning (4).

We can also add sudden death in infancy as a critical category as well. While the use of sudden infant death syndrome as a cause of death is becoming less popular, the definition specifically made this a diagnosis of exclusion. Any case where the cause of death is one arrived at as a process of exclusion mandates the need for an autopsy.

The National Association of Medical Examiners also has another substantial, grass roots type resource. Position papers have a period where the membership may comment, and the Board of Directors must approve the draft. One such article that was authored recently and is still in effect is the one on opioid-related deaths. In this paper, Davis et al. specifically stated that: “*an autopsy provides the most accurate means of determining the cause of death*” (8). Further, the authors indicated that a medical examiner or coroner (ME/C) assume jurisdiction and perform an autopsy to determine the cause and manner of death whenever intoxication is suspected as a possible cause of death (8).

The investigation of the scene of death is as critical a part of the decision-making process and is the subject of another paper in this issue (9).

The facts surrounding the use of these often illicit substances are sometimes occult, and the fact that a third party often provides the history, can complicate our responsibilities. Even in cases with a previous history of use of drugs, we do not have the level of detail we need. What substance(s), source, how often, what dose, and over what period, are questions to which we often do not get appropriate answers. These speak to risk, tolerance, metabolic capacity, and pharmacological interactions. How many die during their first experiment with these substances, or have they been using these substances for years? Now that we are seeing an increased number of older users, it may speak to years of use, at least intermittently, although one cannot exclude a person over 50 years of age having the first exposure to a drug.

The use of statistics and a cutoff age in a decision matrix, allowing a presumption that these deaths are cardiovascular, collides with this new data on the use of drugs in the older age groups. If the scene does not have any indication of drug use and there is no history of such use forthcoming, we could easily improperly certify the death as a natural. Similarly, if we do not autopsy and miss significant disease or occult trauma and rely on the toxicology results, we also generate false results. These false negatives and false positives hurt our communities and are contrary to our governing statutes.

Drug deaths could be considered an environment hazard to those exposed to them, especially, in this era of adulteration of the heroin supply with potent synthetic opioids. Not identifying these and warning the public health and law enforcement machines is similar to missing other environmental hazards (e.g., carbon monoxide death due to a faulty boiler).

Even the fastest forensic toxicology laboratory will not allow for results in advance of making a decision to autopsy. There have been attempts to use screening point of service kits, but many of these are too specific and will miss some of the new emerging substances.

From the aspect of community risk and burden, do we need to identify every case? Hospital pathologists are trained to sample a specimen and obtain representative sections to arrive at a diagnosis in the individual case or sample. Can we reasonably apply this to a community or a cohort of deaths? If we want to satisfy just the public health aspects of this problem to some degree and identify a trend, perhaps this would be acceptable. One will eventually determine the substance at some point, but what may have occurred in the interim, and at what cost to the community and the individuals?

In many situations, a death investigator will have to judge the value of various comorbidities. In the elderly population, we see coronary artery disease that has far exceeded our usual threshold of stenosis for a potential death. In that case, the person has been living with that for a considerable period. The same applies to a seizure disorder that has been present for years.

If we invoke that as the cause of death, we should be asking “why today and not before?” Many drug users have been ingesting the substances for considerable periods of time. Why did it kill today? Without an autopsy to identify comorbidities and their relative risk, we are guessing. In some cases, an apparent drug death may have no comorbidities and negative toxicology. Is that a case where a new substance that is not part of the usual panel detected by the laboratory or is it below the threshold of detection? The efficacy of some of the new synthetic opioids is such that they can kill at very low doses, close to or below the threshold of detection.

Looking at the level of a substance in the blood also can be problematic (8). Falsely elevated or lowered drug levels due to postmortem redistribution are of concern (10). Some drugs are prone to postmortem elevation, and others can be falsely depressed. While postmortem redistribution must be considered, we also must look at the issue of agonal redistribution and the effects of resuscitation and a period of survival. In the event of a rapid injection of an opioid, the respiratory center function is impaired by the bolus. At the same time, the vascular function will continue unabated for a variable time, distributing the substance more widely with dilution and some will be distributed to some degree into other pharmacological compartments. Relying on postmortem blood levels can be very misleading for these reasons and will not substitute for an autopsy. An epidemiological study to look at the number of excess deaths we now have, over those expected if the adulteration of the drug supply had not occurred will provide some clarity in this area. This is the subject of an ongoing project at the Office of the Chief medical Examiner for Maryland.

CONCLUSION

Simply ignoring the accreditation and practice standard limits threatens the recruitment and retention of forensic pathologists. Now, more than at any other time, accurate certification of deaths from a cause that is a major threat to the public's health is critical. These data inform so many potential interventions and also act as an important tool in the evaluation of these in-

terventions. Not fully investigating these deaths with a full autopsy to properly evaluate them completely threatens the intent of a competent medicolegal death investigation system. At a time of crisis it is appropriate instead to increase the resources needed.

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