CASE REPORT

PATHOLOGY AND BIOLOGY

Manoel E. S. Modelli, M.D., Ph.D.; Maciel S. Rodrigues, M.D.; Bruno Z. M. Castro; and Rodrigo S. Corrêa

Self-Induced Fatal Air Embolism: Accidental Autoerotic Death or Suicide?

ABSTRACT: Autoeroticism comprises behavior deviations aimed at producing sexual gratification through the manipulation of one’s own body. The use of asphyxia and the induction of pain (masochism) are well-known examples. “Atypical forms” of such behaviors have appeared in the literature as isolated cases. Fatal air embolism is most common in women (causing abortion), being very rare in men (urethral trauma). The authors present a probable case of air embolism associated with signs of autoeroticism, instrumented by the delivery of air through a system formed by a compressor (typical of those used in refrigerators), a syringe barrel, a segment of latex tubing (tourniquet), and a needle, which was found inserted into the glans penis of an adult male. The hypothesis of accidental death was chosen due to the findings at the scene. The body was decomposing when found, which hampered the conduction of examinations.

KEYWORDS: forensic science, autoeroticism, air embolism, masochism, asphyxia, paraphilias

Paraphilias, formerly called sexual perversions, are attitudes that diverge from those commonly accepted by society. People who practice paraphilias do not have regular sexual activity, that is, their “diverted” preference becomes exclusive. People with such behavior patterns utilize a large variety of devices and adopt, among others, the practices of masochism (sexual satisfaction through physical pain) and autoeroticism, which represent deviant behaviors undertaken in search of sexual gratification through the manipulation of one’s own body. One can include asphyxiology, anesthesiophilia, and electrophilia among these practices (1).

Atypical autoerotic deaths include a variety of mechanisms and means to achieve sexual gratification, the most common practice of such being asphyxia. The satisfaction mechanism in this practice would be the deprivation of oxygen flow to the central nervous system, which, in turn, leads to rapid disturbance of the central inhibitory mechanisms that control sexual activity, resulting in heightened senses and hallucinations of erotic nature (2).

The estimate of autoerotic accidental deaths, based on isolated reports, is of 500–1000 deaths per year (3). In a retrospective study of cases from 1985 to 2009, 38 autoerotic deaths were identified in Alberta, Canada, which corresponds to an incidence of 0.56 deaths per group of 1,000,000 inhabitants. The most commonly practiced methods occur through asphyxia, but there also are cases of electrocution, overdressing, insertion of foreign bodies, and atypical chest compressions (suspension and immersion) (3).

In Germany, there are about 40–80 deaths per year because of such accidents. Incidence in the Hannover area is 0.49 cases per million inhabitants per year. Breitmeier et al. (4) reported 17 cases, all relating to men with mean age of 36.8 years; 12 victims were found in their homes, and income levels and types of occupation varied widely among victims. Five victims were completely naked, four were dressed as women, and two were dressed but with their genitalia exposed. In addition to women’s clothes, other objects were found at crime scenes, including ropes, plastic bags, condoms, rubber items, and other erotic articles. Blood alcohol levels in these men were between 0.1% and 2.5%, and toxicology tests revealed chloroform, ketamine, propane and butane gas, cocaine, and morphine in their bodies. Causes of death included mainly central nervous system injury after strangulation (seven cases) and other types of asphyxia (four cases).

Fatal air embolism is not a rare event, occurring mostly in women who undergo genital showers to rid themselves of unwanted pregnancies. In men, however, the condition is rare. Cooke (5) reported a case of fatal gas embolism resulting from autoinsufflation of the urethra with a Higginson syringe. The right ventricle showed very frothy blood, and the main pulmonary artery and the urethra had numerous petechiae. Urethral injuries caused by repeated passage of urethral probes also can cause gas embolism (6).

Case Report

A 38-year-old man was found dead in his house, already in decomposition state, with no signs of violence. The body was naked, with the exception of slippers. The individual was found lying on a sheet of plywood in semi-sitting position, leaning back on a mattress supported against the wall. His head was bowed and tilted toward the left, resting on a helmet.
body of the victim, on the floor, the presence of insect eggs (flies) was verified, in addition to a mixture of putrefied liquids and blood from the corpse. Many magazines and newspapers also could be seen under the trunk of the body. Close to the subject’s right thigh, a system was found consisting of a compressor (typical of those used in refrigerators) with its output connected to a syringe barrel whose tip was connected to a segment of latex tubing (tourniquet). The other extremity of the tourniquet was tied, and the other tip of the syringe was a needle typical of those used in the delivery of intravenous medication.

Upon arrival on the scene, the compressor was in operation, pumping air, and the bezel and part of the shank of the needle had been inserted into the side of the glans penis of the corpse (Fig. 1).

The items found on the sheet of plywood included, among others, a mirror, aligned with the genital area of the body, male clothes, and a backpack. A piece of cloth was found on the left hand of the corpse and, next to it, a plastic bottle containing ethanol. No evidence of female clothing/artifacts was found anywhere inside the residence. All the belongings of the victim were lined up and preserved, including personal effects, some amount of cash, a motorcycle, and a car parked in the garage.

The autopsy examination revealed the corpse of a 38-year-old man, with darkened skin coloration because of the decay process (gas phase). Brouardel’s posthumous circulation was present on the trunk and thighs, as well as other factors, including blackened and misshapen face, protruding eyes and tongue, distension of genitals, putrefactive blistering throughout the body, detachment of epidermic skin flaps, absence of rigor mortis, and eggs (flies) deposited throughout the entire body. The subject showed no signs of external injury. The opening of the cranial, chest, and abdomen cavities revealed no fractures or blood collections besides the changes resulting from the putrefaction process. The genitalia showed two types of changes upon macroscopic examination: alterations derived from the putrefaction process and also lighter areas, probably caused by the dissemination of air in the tissue (Fig. 2).

Toxicological investigation on-site did not reveal the presence of any poisonous substance or drug. The analysis of site conditions and the autopsy examination led to the following conclusions: (i) the individual died within the place and on a location close to that on which he was found; (ii) the system found (compressor plugged in, connected to a syringe barrel, latex tube, and needle partially inserted into the glans) was efficient enough to produce embolism depending on the region reached by needle; (iii) the system described above was not suitable for efficiently transmitting electric discharges to the body of the victim; and (iv) the characteristics of the aforementioned system, the position of the body, and the alignment observed between the mirror and the genital area of the body indicate that the victim intentionally introduced the needle on the glans penis.

### Background

The victim’s medical history is unknown, and the victim had never expressed any suicidal thoughts to his close friends. There was also no history of sexual disorders or objects that would denote sexual perversions at the residence.

### Discussion

There have been no reports of fatal accidents with autoerotic mechanisms in our services until the present case. Autoerotic deaths are usually not witnessed because they occur in isolated environments, as is usually the case because of the secretive nature of such activity. These events usually involve young, male individuals, and death is usually due to failure of the apparatus used (2).

Autoerotic deaths involve a large variety of mechanisms and means to achieve sexual gratification. The most common practice is asphyxia, and most victims are young males. Other modalities include chest compressions, plastic bags covering the face, use of electric current, inhalation of toxic or chemical gases, and partial or total submersion (7). Koops et al. (8) highlighted three of 40 accidental deaths: a firefighter who hanged himself from a bridge in a peculiar system; a second case involved women’s clothing, on which the victim strangled with an electrical cord; and on the third case, the victim suffered muscular dystrophy and was incapable of moving. He then led a nurse to put plastic bags over his body, close his mouth with tape, and put him in a closed container, where he died by suffocation. The police found various diskettes with fantastic sexual imaginations.

Among atypical practices in autoeroticism, urethral handling through probes is a rare occurrence, and air embolism resulting from such practice is even rarer. Chávez et al. (6) reported the first case of gas embolism of the vena cava postural trauma. The traumatic insertion of a Foley catheter resulted in a major,
symptomatic embolism of the vena cava, confirmed using a computed tomographic (CT) scan. Most foreign bodies found in the genital tract are self-inserted into the urethra as a result of erotic impulses and sexual curiosities (9). According to Sauva-geau (3), atypical methods of autoerotic activity leading to death accounted for about 10% of cases in the literature.

An Italian naturalist, Redi, was the first to describe the death of animals by injection of air into a neck vein in 1667 (10). Presence of air in the neck vein of human male subjects was first reported by Beauchesne during removal of a tumor in 1818 (10). The physiology consists of an obstruction of the right ventricle, thus preventing airflow to the lung. When the air reached the right ventricle, pulmonary arterial pressure increased, and systemic blood pressure decreased (10).

The main causes of gas embolism in the human body are as follows: decompression syndrome (in cases of deep dives) when sudden pressure differences lead to release of nitrogen, which dissolves in the body under high pressure; concentration of nitrous oxide (34 times more soluble than air in the blood); surgery; accidents; and extracorporeal circulation (11). Han et al. (12) have reported a case of massive cerebral air embolism in a man who underwent catheterization of the right internal jugular vein and became obnubilated. CT scan revealed acute infarction with multiple blisters on the side of the catheter insertion. Ridick and Brogdon (13) reported air embolism during kidney dialysis, which is rare because of the protective mechanisms present in the unit.

Fundamentally, there are two types of embolism: pulmonary or venous and arterial. Arterial embolism is the result of the entry of air on the left side of the heart, either coming from the pulmonary veins or due to septal defects. Cardiac damage caused by air bubbles in the coronary and neurological effects of cerebral embolism have both been reported (11). During venous or pulmonary embolism, the air comes into a systemic vein and is taken to the right side of the heart. Small quantities may be asymptomatic, whereas larger amounts can cause heart failure and death (11).

The current conventional postmortem demonstration of air embolism in the heart involves the application of dissection methods for the demonstration of air into the right ventricle. If heart embolism is not suspected, the cardiopulmonary system is not opened under water, which excludes the opportunity to make the diagnosis. Air also may be present in the heart because of putrefaction. Currently, multislice CT has become the diagnostic modality of choice. It allows one to check the path of air through the body (14).

Analysis of the local scene and autopsy, in the case at hand, points to accidental death by fatal air embolism. The mechanism installed by the victim allowed air to enter the body through the cavernous body at great speed, which caused death to occur suddenly because the dead body remained virtually in the same position as when the device was installed in his genitalia, only with the trunk of the body leaning back.

In cases of atypical autoerotic death, determining if the death was accidental or suicidal is quite challenging for the forensic pathologist. Some authors established criteria for accidental autoerotic death: solitary, accidental, and caused directly by the abnormal mechanism aimed at sexual satisfaction (15). Hazelwood et al. (16) have described five criteria for designating these deaths: well-defined self-assistance mechanism, solitary activity, sexual fantasy, autoerotic behavior, and no prior history of suicide.

Conclusion

After considering the following facts: there have been no traces of breaking and entering on the access ways of the residence, there was no indication of acquisition of objects or money from the interior of the house, the keys of the vehicles were in visible and easily accessible locations, the furniture was well aligned, the victim had in his left hand a piece of cloth next to a bottle of alcohol (likely for sepsis), and that the death by injection of air or other substances in the genital region is not a common practice adopted by suicidal individuals, the most likely hypothesis is that of accidental death by air embolism, secondary to a possible attempt to obtain pleasure from manipulation of one’s own body (autoerotism).

References


Additional information and reprint requests:
Manoel E.S. Modelli, M.D., Ph.D.
Federal District Civil Police
Institute of Legal Medicine
SQS 210 Bloco D
Apto 604 Brasília
Brazil, Brasília 70273-040
Brazil
E-mail: manoelmodelli@gmail.com