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Parasomnia Pseudo-Suicide

ABSTRACT: Complex behaviors arising from the sleep period may result in violent or injurious consequences, even death. Those resulting in death may be erroneously deemed suicides. A series of case examples and review of the pertinent literature are provided to increase awareness of the possibility that some apparent "suicides" are the unfortunate, but unintentional, consequence of sleep-related complex behaviors and therefore are without premeditation, conscious awareness, or personal responsibility. The correct cause-of-death determination in such cases may have profound social, religious, and insurance implications for surviving friends and family members.

KEYWORDS: forensic science, suicide, pseudo-suicide, parasomnias, sleepwalking, sleep terrors, REM sleep behavior disorder, sleep-related violence, parasomnia overlap syndrome

Violence and injurious behaviors arising during sleep have been well-documented and may be due to one of a number of conditions including: disorders of arousal (sleepwalking/sleep terrors), REM sleep behavior disorder (RBD), nocturnal seizures, psychogenic dissociative states, and malingering (1–4). Those coming to legal or medical attention typically involve injury or death to others or injury to the victim of the disorder. It is probable that another group, namely those who die as a result of their own violent or injurious behaviors, is misclassified as intentional suicides, while the true cause of death remains unsuspected and undetected.

Interest in this phenomenon was piqued by a number of unsolicited inquiries to our center by surviving family members or acquaintances of "suicides" that occurred during the sleep period and by having clinically evaluated "near miss for death" parasomnias, which had death ensued, would likely have been deemed suicides. The purpose of this report is to increase awareness of the possibility of an inadvertently fatal parasomnia as an alternative explanation for an otherwise apparent "suicide."

Case Studies

Possible Parasomnia-Related Suicides

Case 1: College Student Killed by Semi-Trailer Truck

In 1993, our center was contacted by the parents of a young Iowa man whose death had been deemed a suicide and reported as such on the front page of the local newspaper and on his death certificate. His parents were interested in having the circumstances of his death reevaluated with the specific intent of changing the cause of death on the death certificate from "suicide" to "accidental death due to sleepwalking."

At 4:30 a.m. in February 1993, six blocks from home, clad only in boxer shorts in 30°F weather, this 21-year-old college student ran onto a highway from behind overpass pillars, was struck by a semi-trailer truck, sustained a severe head injury, and was pronounced dead on arrival at a local hospital. Thorough evaluation revealed a history of frequent, complex sleepwalking, no history of recent drug or alcohol use, and no history suggestive of depression. There was evidence that he was optimistic about, and planning for, the future. There was a striking family history of sleepwalking (maternal cousin, father, two brothers, and one sister). He was not a jogger, and, according to reports of family, due to modesty, would never have left the house wearing only undershorts. A few weeks before the incident, he told his college roommate that he was having a recurrent dream in which he was running a foot race with someone from a nearby small town. He had been sleep deprived immediately prior to this event.

Formal review of his history, with particular inquiry as to history of sleepwalking, drug and alcohol use, or evidence of depression obtained from numerous family members and friends, permitted a recommendation to the Iowa State medical examiner that the cause of death on the death certificate be changed from "suicide" to "accidental death due to sleepwalking," which it was.

Case 2: Policeman Who Shot Himself to Death

In September 2000, our center was contacted by a close friend of a law enforcement officer who had apparently committed suicide by a self-inflicted handgun wound to the oral cavity. His friends, colleagues, and family members wondered if the event could have possibly been related to his past history of complex sleepwalking, which had included brandishing weapons.

On the night before the event, he finished his regular patrol as a law enforcement officer at 4 a.m. and went to city council chambers to sleep before having to get up at 8 a.m. the next morning to perform an off-duty job directing traffic at a church (as was customary for him before his Sunday morning off-duty job). Shortly before 4 a.m. he called a colleague and asked to be awak-

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ened at 8 a.m. Shortly after 4 a.m. he called his fiancé, as was his habit. There was nothing unusual about the conversation. At 8 a.m., when his colleague entered the council chambers to awaken him, he was found dead from a self-inflicted handgun wound to the mouth. There was no suicide note.

He had made numerous short- and long-range plans for the future with his fiancé and co-workers. There were no identifiable personal, financial, or employment-related explanations for suicide. He had personally expressed distain toward suicide when a relative had attempted suicide. There was no history of depression or chemical dependency. He had obviously been severely sleep deprived immediately prior to the event. He had seen a psychologist twelve years earlier for a work-related traumatic event during which someone had pointed a gun at his head and threatened to shoot him.

He had a past history of complex sleepwalking dating back to early childhood, and there was a rich family history of sleepwalking. He had sleepwalked out of the house on more than one occasion. He had reported elements of "acting out dreams" during sleepwalking. He had never injured himself or others during sleepwalking, but had punched holes in walls during episodes. He had been discharged from the Marines on the basis of sleepwalking: he had been found sleepwalking—trying to get into a locked gun case (those records were not available). On another occasion, while he was sleeping, his mother made a noise in the hallway, apparently arousing him. When she went into the room where he was sleeping, he was pointing a gun at her.

Our group felt this case was indeterminate since it is impossible to differentiate between purposeful suicide as an impulsive waking act and accidental suicide as an impulsive act during a confusional arousal with diminished mental capacity. It is interesting that he had at least two previous sleepwalking episodes involving guns and that he had personally experienced psychic trauma by having a gun held to his head.

Case 3: Elderly Man who Shot Himself to Death

In June 2002, our center was contacted by a woman whose father had apparently committed suicide during his conventional sleep period. He was 77 years old, active in community affairs and interested in travel and had no history of prior sleepwalking. There was no evidence for any current sleep disorder (other than recent-onset insomnia). He had no serious medical problems. He did not abuse alcohol. He had been bothered by insomnia for the preceding month following return from a trip to Hawaii. There was no history suggestive of depression. He had made numerous plans for the future (three major trips, attending a grandson's graduation, and a birthday party for two granddaughters). He was a devout Catholic and believed suicide was a sin.

On the night of the event, sometime between 3 and 5 a.m., he got out of bed, went to the closet, took a WWII Nazi Lugar revolver out of a box on the top shelf and loaded it with original 50-year-old ammunition that he kept in his underwear drawer. He returned to bed, crawled under the covers, and shot himself in the side of the head. Interestingly, the night of the event, before retiring, he had watched a TV documentary about the "Battle of the Bulge," which was "his" battle. During this documentary, servicemen commented about how traumatic the battle was, how "the lucky ones took a bullet in the head." One recalled being taken prisoner by the Germans who "held a gun to my head, I was a war trophy."

His daughter wondered whether there were documented cases of accidental suicide due to sleep disorders, and if her father could have inadvertently shot himself in a state of incomplete arousal with confusion.

Near-Miss for Suicide

Case 4: Young Engineer who Sustained a Severe Injury by Defenestration

In July 2002, a 24-year-old male engineer was referred to our sleep center after having sustained a severe injury during an episode of frenzied sleepwalking. Since childhood, he was known to yell out occasionally during his sleep. Approximately once or twice yearly he would have a benign episode of sleepwalking, never leaving his bedroom or injuring himself or others. There was no family history of sleepwalking and no personal history of any psychiatric disease or substance abuse.

On the night of the event, he had been sleep deprived and admitted to being "normally anxious" about his upcoming marriage and under stress due to the fact that his employer, a commercial telecommunications equipment company, was under dramatic financial pressure (the company's stock had fallen from $45 to $2 per share the preceding week), with multiple layoffs occurring around him. He went to bed at 11 p.m. and fell asleep at 11:30 p.m. At approximately 1 a.m. he was noted by his fiancé to have gotten out of bed and to have run across the room to a desk adjacent to a window, sustaining bruises on his thighs as he hit the desk. He grabbed at the window blinds. His fiancé began to scream. He stepped onto the desk, smashed through the patio-level window, fell a few feet, and awakened after running three steps to find that he had sustained a severe laceration of his forearm, having severed multiple flexor tendons, a median nerve, and a radial artery, requiring 4 h of surgical repair (Fig. 1). He also sustained minor facial lacerations. He recalls that at the time he ran into the desk he had a profound sensation of fear, impending doom, and panic—a need to escape the room. He recalled his fiancé's screams, but also felt that his recollection was more of a nonspecific "shrieking" in the background that added to his perceived need to escape through the window. A formal sleep study with full electroencephalographic monitoring was unremarkable.

Had he lived in a fourth- or fifth-floor apartment, he would likely have been found dead below a broken window. Stress associated with the impending marriage and severe work-related anxiety could easily have been invoked as contributing to an apparent "suicide."

Case 5: Young University Student who Sustained Severe Injury by Defenestration

In October 2002, our center was contacted by investigators from an eastern university, inquiring as to whether a campus tragedy could possibly have resulted from a sleepwalking episode. A 20-year-old male university junior was found comatose in critical condition at 4:30 a.m. on the ground below his open third-story dormitory window. CT and MRI scans of the brain revealed multiple parenchymal hemorrhages in the frontal and parietal lobes bilaterally. He also sustained an orbital wall fracture, a compression fracture of a lumbar vertebra, and a fractured wrist. Initially comatose, he recovered completely. On the night in question, he consumed a few beers, but was clearly not intoxicated by report of a campus security guard who carried on a casual and friendly conversation with him as he entered the dormitory. He is amnestic for the time between entering the dormitory at 2 a.m. and awakening in the hospital the next day. Thorough investigation by campus authorities revealed no evidence of foul play. There was no history of depression or other psychiatric disease and absolutely no reason to suspect that this episode represented a suicide attempt.

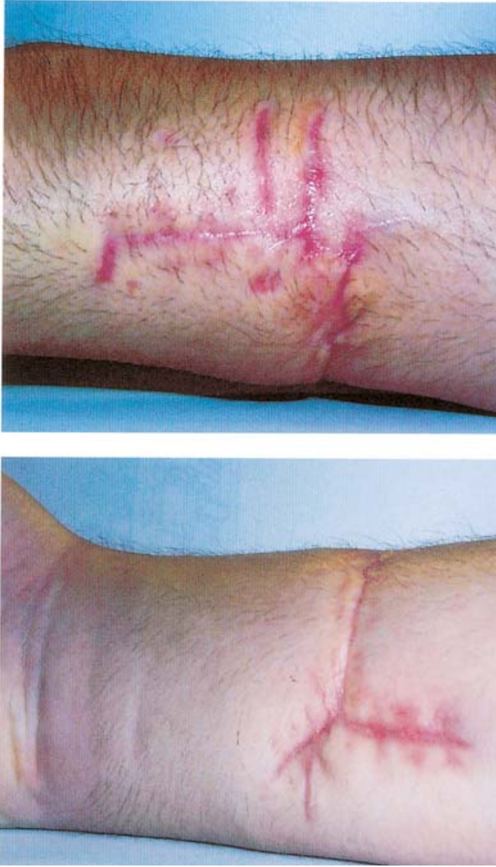

FIG. 1—*Healing lacerations of right forearm sustained by defenestration during an episode of frenzied sleepwalking resulting in severing of multiple flexor tendons, median nerve, and radial artery.*

He had a history of sleepwalking since childhood, averaging 3 to 4 times yearly. These episodes were generally benign, but occasionally frenzied (sitting up in bed screaming frantically, running down a flight of stairs at home, and having to be restrained by family members). There was occasionally remembered dream-like mentation, but when aroused from these spells he was clearly neither completely alert nor fully oriented. He was totally amnestic for some episodes. These events usually occurred in the first third of the sleep period, never more than once nightly, and never during daytime naps. He had been spell-free for as long as 9 months. These episodes were becoming more frequent with increasing age and were possibly triggered by stress and anxiety, but not by sleep deprivation or social drinking. Both parents continued to have occasional sleepwalking episodes as adults, but a fraternal twin and older sister had no history of sleepwalking.

Had the fall been fatal, suicide would have been a most serious consideration.

Implications

Historically, suicide has been stigmatized in the form of shame, sin, and, in some eras, even criminalized (5), resulting in serious social, religious, and insurance implications.

Social and Religious Implications

Many societies and religions have a negative view of suicide, considering it to represent moral turpitude (6). Therefore, the determination of death due to suicide may result in very serious and painful family, social, and religious implications (i.e., not going to heaven) for the bereaved family.

In Islam, though acts of self-martyrdom appear to be exceptions, suicide is said to bring eternal punishment. “He who commits suicide by throttling shall keep on throttling in the Hell Fire and he who commits suicide by stabbing himself shall keep on stabbing himself in the Hell Fire” (Sahih Bukhari 2:446, 2:445).

Both Judaism and Christianity base their rejection of suicide on the Old Testament commandment “Thou shall not kill” (Exodus 20:13, Deuteronomy 5:17). In Judaism, suicide is considered a criminal act, a form of murder. Traditionally, victims of suicide were not allowed a full Jewish burial. There was also debate over whether the customary 7-day mourning period (Shiva) should be observed or whether the Kaddish prayer should be said. In current practice, however, Jewish suicide victims do receive a traditional burial, since recognition of a likely deeply disturbed state of mind is felt to mitigate the culpability of the act.

In Catholicism, suicide is considered a mortal sin. Prior to Vatican II, Catholics who died at their own hands were denied a funeral mass and burial in the churchyard. A similar stance was also common in many conservative Protestant denominations. The Catholic church now permits full funeral rites for victims of suicide unless it has no doubt that the victim was in full possession of his or her faculties and that there were no mitigating circumstances—a scenario difficult to imagine.

Insurance Implications

Labeling a death as suicide may carry serious financial ramifications. Insurance companies have used the determination of death by suicide as grounds to deny full life insurance reimbursement to surviving beneficiaries (7). Most life insurance companies have a suicide clause that limits payments received by survivors to the amount of premiums paid if suicide occurs within two years from date of policy issue. The legal determination of suicide as a cause of death requires clear and convincing evidence with the burden of demonstrating this evidence residing with the insurer. This has important implications for those who appear to have committed suicide but who have actually suffered pseudo-suicide. In 1891, the U.S. Supreme Court stated in *Home Beneficial Association v. Sargent* (8):

> . . . if every hypothesis has not been proved beyond a reasonable doubt, mere weight of the evidence in favor of suicide does not justify the court in directing a verdict of suicide on motion of the insurer (9,10).

Although this statement refers specifically to the right of the insurer to a directed verdict, it serves to emphasize the standard of clear and convincing evidence. All of the above-described cases of possible pseudo-suicide had aspects that might cause a reasonable person to question suicide as the cause of death. Further, the label of suicide requires that the act be shown to be done intentionally. Almost all cases of pseudo-suicide fall under the category of disorders of arousal in which actions are performed without specific intention, including the act of killing one’s self. And while physical and circumstantial evidence is the most important evidence in establishing suicide, there are some cases where motive becomes important. In *South Atlantic Life Insurance Company v. Hurt,* a rancher was found with a gunshot wound to his right temple and a

0.38 caliber pistol near his hand with one empty chamber (10). Despite strong physical and circumstantial evidence, the insured had no motive and was described as:

> . . . a man of the highest integrity, of unusual business ability, possessed of large real and personal property, actively engaged in the successful prosecution of extensive business interests, with a large and happy family . . . (8,9).

The court concluded that accidental shooting could not be excluded as the cause of death.

Similarly, our cases of possible pseudo-suicide lack credible motive, and this lack could easily and legitimately cast doubt on suicide as the legal cause of death. Since pseudo-suicide does not fulfill the legal definition of suicide, it is important that such cases be labeled correctly as this could dramatically affect insurance reimbursement. As physical and circumstantial evidence is the most important consideration in establishing suicide, the assessment of the medical examiner is crucial. Medical examiners should be aware of pseudo-suicide as a potential cause of death and the financial impacts of recognizing a true pseudo-suicide. Similar social, religious, and insurance implications accompany deaths due to autoerotic asphyxia (11–13).

Literature Review

Suicidal acts (successful and attempted) may occur in the absence of depression or psychosis, during states of mental confusion such as epileptic twilight states, delirium tremens, drug-induced automatisms, and other syndromes (14). These states share with disorders of arousal an inability of reflective thinking. The absence of a suicide note may only suggest pseudo-suicide, as in two large series only slightly over one third of deaths deemed bona fide suicides were accompanied by suicide notes (although the overwhelming majority had evidence of psychiatric disease) (15,16).

There is precedent for considering parasomnia-related potentially fatal self-inflicted injuries possibly being mistaken for suicides. One of the earliest examples is that of Elpenor as reported in Homer's *Odyssey* (~800 BC). Elpenor, one of Odysseus's crew, was a young man who became intoxicated and fell asleep on a rooftop. He was awakened by commotion, and instead of going down the staircase, ran off the roof, dying from a broken neck (17).

There are infrequent literature references to severe self-injury (misinterpretable as suicide attempts) or successful suicide committed during diminished awareness associated with sleep-related events. A 45-year-old man with post-traumatic stress disorder (PTSD) awakened during a "nightmare" and thought he saw Viet Cong soldiers outside and then inside his house. He loaded his .22-caliber rifle, thought he saw a soldier, chased him, tripped over furniture, causing the rifle to discharge, shooting himself in the foot (18). In another, a civil engineer stabbed himself four times in his sleep and bled to death. Before he died, he awakened to tell his wife that he had had a strange dream in which he was surrounded by enemies trying to kill him. An evil spirit persuaded him to kill himself (19). A local newspaper reported a sheriff's deputy who dreamed that someone was attacking him, grabbed a pistol from his bedside, and shot himself in the right thigh (20).

Serious injury associated with complex behaviors arising from the sleep period has been well documented. In one series of injurious sleepwalking ($n = 54$), 54% had repeatedly fallen out of bed or run into walls or furniture, 19% had jumped out of windows, 19% had left their homes and driven automobiles, wandered around streets, walked into lakes, or climbed ladders, and 7% had wielded weapons such as loaded shotguns. Many reported fragmented, precipitous images (e.g., a fire, bright light, looming figure, or collapsing roof that prompted immediate escape) or often more elaborate and conventional dreamlike mentation with their nocturnal episodes. The wife of one patient reported:

> He seems to have the strength of 10 men and shoots straight up from bed onto his feet in one motion. . . . The description "vaults explosively" describes it most clearly. There are low windows right beside our bed and I'm afraid he'll go through them some night (21).

As was the case in the "Near Miss for Suicide" cases presented above, leaping through open or closed windows is responsible for a number of actual or potential injuries: a 17-year-old man sleepwalked through a sixth-floor apartment window (a 20-m fall) and was found lying on the grass below wearing only his underwear. He sustained a diaphragmatic hernia, compression fracture of the fourth lumbar vertebra, left ischiopubic fracture, and a left bimalleolar fracture (22). Another patient walked onto the window ledge of his 35th-floor apartment (23).

In one series of patients with the "parasomnia overlap syndrome" (a condition with clinical and polysomnographic features of both disorders of arousal and the REM sleep behavior disorder), 50% (16/32) had either jumped or punched through windows, one sustaining an 80% tear of a triceps muscle and another lacerated hand tendons. Ninety-one percent had repeated injuries to self and/or bed partner including multiple ecchymoses, lacerations, or fractures (24). Another patient frequently stabbed at furniture or the air with knives or swung or threw baseball bats (25). Females may also demonstrate these predominantly male behaviors (26). In many cases of the parasomnia overlap syndrome or sleepwalking, vivid dream-like mentation associated with complex or violent behaviors has been reported (23).

An interesting variation on the parasomnia-suicide phenomenon is the fear of committing suicide during sleepwalking in a patient with waking suicidal ideation who feared acting upon this ideation during the diminished awareness accompanying sleepwalking (27).

Discussion

Current understanding of the physiology of state determination (wakefulness, REM, and NREM) and the fact that wakefulness and sleep may coexist resulting in complex behaviors without conscious awareness provide ample support for the concept that fatal self-inflicted injury masquerading as suicide may result from dissociated states of being (for review, see: (3,4,28,29)).

Violent sleep-related behaviors are certainly far more common than generally appreciated. A recent survey of nearly 5000 adults indicated that 2% reported violent sleep-related behaviors (most likely related to disorders of arousal or RBD). The prevalence of RBD in this series was estimated to be 0.5% (30). In another survey of over 11,000, the prevalence of disorders of arousal in adults was 3 to 4% (occurring weekly in 0.4%) (31). Yet another survey of over 13,000 adults found that confusional arousals occur in nearly 3% of the adult population, and in 13.5% of these, violent or injurious behaviors were reported (32). Clearly, it takes little imagination to suspect that a number of deaths officially deemed "suicides" are actually the unfortunate and inadvertent consequence of unpremeditated parasomnia-induced behaviors.

Implications and Future Directions

It is likely that "suicide" due to inadvertent parasomnia-related self-injury is more common than generally appreciated, but is underreported due to failure to consider alternative explanations and due to the fact that it may be difficult, if not impossible, to establish a true cause after the fact. Clinical assessment of sleep-related violent behavior has been thoroughly reviewed (4,33). In our opinion, sleepwalking, including inadvertent suicidal sleepwalking, can be designated as a "noninsane" automatism (25). Identification of the true cause of death in these cases may have immense meaning to the friends and families of the victims.

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