

Title: Seizure history and alcohol abuse as predisposing factors for out-of-hospital sudden unexpected death

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Background

The role of seizure disorders and alcohol abuse in out-of-hospital sudden unexpected death (OHSUD) may be underestimated due to prior studies’ focus on cardiac causes of sudden death. The World Health Organization (WHO) defines sudden cardiac death as a witnessed death or an unwitnessed death occurring within 24 hours of when the subject was last seen alive.

Purpose

We compared alcohol abuse and seizure disorder in OHSUD victims according to whether or not they met a time-restricted definition of sudden cardiac death.

Methods

From 2013-2015, all out-of-hospital deaths in a predominantly urban region (population 974,289) were screened to identify presumed OHSUD cases among free living adults ages 18-64. Data from death certificates, medical records and post-mortem examinations were reviewed to adjudicate cases of OHSUD and to determine history of seizures and other comorbidities. Seizure history included epilepsy, alcohol withdrawal seizures, and otherwise specified seizure history, excluding isolated seizures at the time of death. Using the sudden death criteria established by the WHO, all adjudicated OHSUD cases were categorized into two subgroups: WHO (witnessed or unwitnessed < 24 h) and Non-WHO (all other cases). The prevalence of seizure disorders and comorbidities were subsequently compared between these subgroups.

Results

Of the 408 adjudicated OHSUD cases, 397 (97%) had medical records, post-mortem examinations, or death certificates available. Of the adjudicated cases, 9% had history of seizures and 22% had a history of alcohol abuse. The prevalence of alcohol abuse was higher among those with a history of seizure compared to those without a history of seizure (50% vs 19% $p < 0.01$). There were nonsignificant trends between history of seizure and lower rates of hypertension (47% vs. 60% $p = 0.202$), dyslipidemia (24% vs 40% $p = 0.066$) and cardiomyopathy (6% vs 14% $p = 0.288$). The prevalence of seizure history among the Non-WHO cases was higher than that among the WHO cases (10% vs 5.4% $p = 0.096$).

Conclusion

Seizure disorder and alcohol abuse were common in out-of-hospital sudden unexpected death victims. Time-restrictive definitions may exclude many victims with history of seizure and alcohol abuse from the classification of out-of-hospital sudden unexpected death. Primary care physicians and cardiologists should be aware of the strong associations between seizure disorders, alcohol abuse, and out-of-hospital sudden unexpected death.

| | Seizure History | % | No Seizure History | % | p-value |
|-------------------------|-----------------|-----|--------------------|-----|---------|
| N | 34 | 9% | 363 | 91% | |
| Average Age | 53.1 | | 53.1 | | |
| Average BMI | 27.4 | | 30.6 | | |
| Female | 11 | 32% | 112 | 31% | |
| Smoker | 16 | 47% | 115 | 32% | 0.0854 |
| Alcohol Abuse | 17 | 50% | 70 | 19% | 0.0001 |
| Cardiomyopathy | 2 | 6% | 51 | 14% | 0.2883 |
| Coronary artery disease | 7 | 21% | 84 | 23% | 0.8337 |
| Hypertension | 16 | 47% | 217 | 60% | 0.2017 |
| Diabetes | 9 | 26% | 104 | 29% | 1.000 |
| Dyslipidemia | 8 | 24% | 145 | 40% | 0.0666 |

Describes all adjudicated cases with medical histories available (N = 397)

| | WHO (148) | % | Non WHO (249) | % | p-value |
|-------------------------|-----------|-----|---------------|-----|---------|
| N | 8 | 24% | 26 | 76% | |
| Average Age | 54.1 | | 52.8 | | |
| Average BMI | 25.7 | | 27.9 | | |
| Female | 2 | 25% | 9 | 35% | |
| Smoker | 4 | 50% | 12 | 46% | 1.000 |
| Alcohol Abuse | 0 | 0% | 12 | 46% | 0.0304 |
| Cardiomyopathy | 3 | 38% | 2 | 8% | 0.0721 |
| Coronary artery disease | 2 | 25% | 4 | 15% | 0.6087 |
| Hypertension | 3 | 38% | 14 | 54% | 0.6880 |
| Diabetes | 1 | 13% | 6 | 23% | 1.000 |
| Dyslipidemia | 5 | 63% | 7 | 27% | 0.0975 |

Describes those with history of seizure (N=33)