Effect of time on characteristics and cause of death in unwitnessed, young sudden cardiac death cases


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Introduction: Around 50% of all sudden cardiac death (SCD) cases are unwitnessed. According to the World Health Organization’s definition of sudden cardiac death, any unwitnessed death is considered SCD if the person was last seen alive and well within 24 hours of death and with confirmed or suspected cardiac cause of death. The length of this timespan has been debated, as the nature of death in unwitnessed cases is less certain compared to witnessed cases. The effect of time on the composition of the group of unwitnessed SCD cases has not previously been assessed.

Purpose: This study aimed to compare clinical characteristics and causes of death among unwitnessed SCD cases last seen alive within 1 hour or 24 hours.

Methods: This nationwide, retrospective study conducted in Denmark included all deceased persons aged 1–35 from 2000–2014. The highly descriptive Danish death certificates were utilized to identify all sudden and unexpected deaths. Through subsequent examination of autopsy reports and discharge summaries, we identified all SCD cases. In addition, witnessed status and time since last seen alive (1 vs. 24 hours) were recorded. Information on comorbidities was collected from the Danish Health Registries.

Results: During the 15-year study period, we identified 857 SCD. Of these, 353 (41%) were witnessed, and 441 (51%) were unwitnessed; 62 (7%) cases had unknown witnessed status. Among the unwitnessed SCD, 75 (17%) were last seen alive within 1 hour, and the remaining 366 (83%) were last seen alive within 24 hours.

Comparison of clinical characteristics and cause of death revealed few but distinct differences. Cases seen within 1 hour were of male predominance (82% vs. 65%, p=0.005). The comorbidity burden was similar, except for epilepsy which was significantly more prevalent among the group last seen alive within 24 hours. Circumstances regarding death also differed among the groups: Cases seen alive within 1 hour were more often awake at the time of death (72% vs. 36%, p<0.001) when compared to cases seen alive within 24 hours, and they were less often autopsied (61% vs. 75%, p=0.02). Among autopsied cases, structural heart disease was more often the cause of death among persons last seen alive within 1 hour (58% vs. 40%, p=0.02). In both groups. The most common cause of death was sudden unexpected death, but the proportion was significantly higher in the 24-hour group (60% vs 42%, p=0.03). Arrhythmogenic cardiomyopathy and thoracic aortic dissection were significantly more prevalent among cases seen within 1 hour (11% vs. 3%, p=0.002 for both).

Conclusions: In this 15-year nationwide study of SCD in Denmark, we found few, marked differences in cause of death and clinical characteristics between unwitnessed SCD last seen alive within 1 and 24 hours. Male sex predominated in cases seen within 1 hour, and the autopsy rate was significantly lower. In the autopsied cases structural heart disease was more common in cases seen alive within 1 hour.