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Mass and the Dangers of Syncope

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Abstract

Introduction
Syncope is defined as a transient, self-limited loss of consciousness with an inability to maintain postural tone that is followed by spontaneous recovery. We revisit situational syncope focusing on one situation, Mass.

Methods
We interrogated our electronic syncope database for key terms associated with situational syncope. From the most commonly encountered situation, Mass, we interrogated the results of tilt testing performed to identify evidence of orthostatic hypotension.

Results
There were 110 cases of situational syncope identified with 56.3% (n=62) taking place at mass. All had tilt table testing performed and 15.4% (n=17) had evidence of orthostatic hypotension.

Conclusion
The multiple sudden changes in position during mass from sitting to kneeling to standing can precipitate an episode of orthostatic hypotension. Consideration should be given as to whether it is safe for older mass goers to be subjected to such significant orthostatic stress.

Introduction

Syncope is defined as transient loss of consciousness due to cerebral hypoperfusion, characterized by a rapid onset, short duration, and spontaneous complete recovery[1]. It has a broad differential as it commonly overlaps with many other conditions. A detailed clinical history and collateral from eyewitness is essential to determine the underlying aetiology of these events. Syncope is common and accounts for 1-2% of annual emergency department presentations[2], and often leads to hospital admission[3].

Orthostatic hypotension (OH) is a common cause of syncope. It is defined a sustained decrease of systolic blood pressure of at least 20 mmHg or diastolic blood pressure of 10 mmHg within three minutes of standing or head-up tilt (HUT) to at least 60 degrees on a tilt table[4]. Common contributing factors to OH include medications, volume depletion and autonomic failure[1].

We have previously described a categorisation of OH based on pathophysiology[5], the AVM classification. This classified OH into arteriolar failure characterised by reduction in total peripheral resistance (TPR) on HUT, venular failure characterised by reduction in cardiac output (CO) on HUT leading to drop in blood pressure despite compensatory increase in TPR and mixed arteriolar and venular failure.

Although identification of OH based on pathophysiology is of use particularly from a therapeutic perspective, we sought to revisit situational syncope, to identify if common situations are a precipitating factor in OH. The goal of this study was to explore one situation in particular, Mass. In the 2016 census, 78.3% of Irish people identified as Catholic[6] and attending weekly or daily mass remains common throughout the country. Table 1 illustrates the number of times and the duration of stance changes during a Sunday Catholic mass. Other services such as wedding celebrations, funeral mass and occasions such as Christmas and Easter can often result in ceremonies of longer duration with longer episodes of standing and more frequent changes of posture.

Table 1: Times and durations of stance changes during mass.

Position	Time
Sit before Mass starts	Person dependent
Stand	4.41 minutes
Sit	3.26 minutes
Stand	2.28minutes
Sit	5.54 minutes
Stand	3.54 minutes
Sit	2.19 minutes
Stand	51 seconds
Kneel	3.59 minutes
Stand	1.39 minutes
Kneel	2.01 minutes
Walk to Communion	Person dependent
Kneel after communion	1.30 minutes
Sit	2.18 minutes
Stand	1.36 minutes
Total	**33.56 minutes approximately**

The aim of this study was to determine the environments associated with situational syncope and particularly to identify the prevalence of OH among those who experienced syncope at mass.

Methods

Ethical approval for this audit was granted by the research ethics committees at University Hospital Limerick and the study was conducted in accordance with the ethical principles as set out by the World Medical Association Declaration of Helsinki and with local committee guidelines.

In this retrospective cohort study, we interrogated our electronic syncope database for key terms associated with situational syncope. All cases identified took place over a ten year period, between 2008 and 2018. Search terms included but were not limited to “Cough” “Laugh” “Micturition” “Bathroom” “Kitchen” “Garden” “Shopping” “Church” and “Mass”.

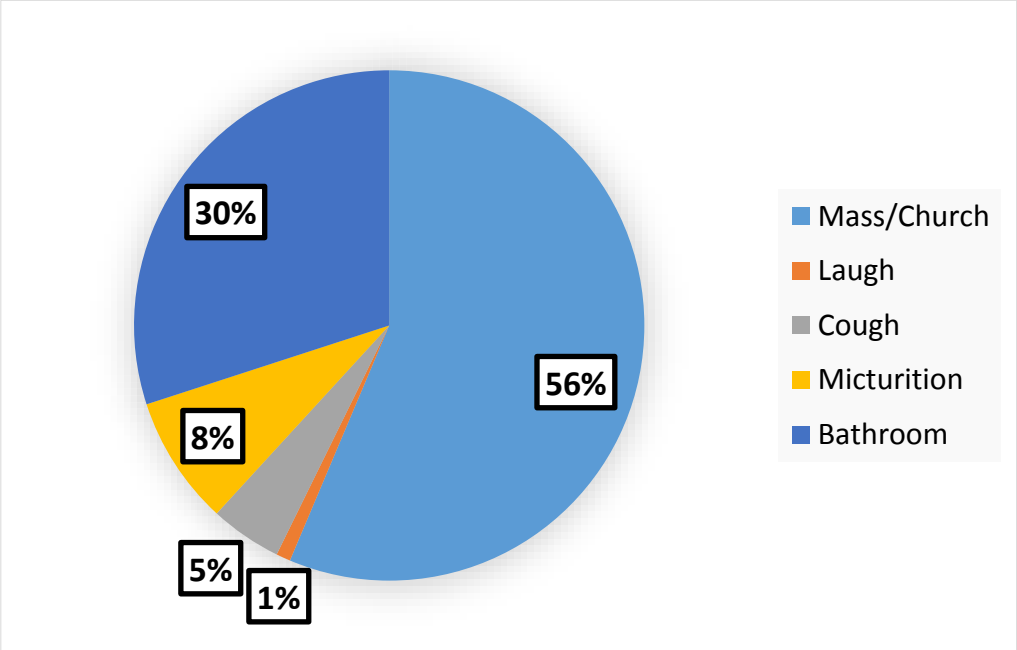
From the most commonly encountered situation we interrogated the results of tilt testing performed to identify evidence of OH. All tilt testing was performed in a dedicated temperature controlled syncope laboratory. Our local protocol is to carry out a head-up tilt to investigate OH and if that is negative to proceed to an active stand. Testing was performed at least two hours post prandially. No medications were administered during testing. Baseline haemodynamic parameters (Blood Pressure, Heart Rate, TPR CO) were established while participants lay on a hydraulic tilt table for at least five minutes. They were subsequently tilted, head up, to seventy degrees over fifteen seconds and kept a semi-erect position for three minutes. Finometer® (Finapres Medical Systems) data obtained during HUT were then interrogated for evidence of OH. The Finometer allows for non-invasive measurement of beat to beat cardiovascular variables.

Results

During the study interval a total of 11,487 HUTs were performed in our syncope laboratory on patients presenting acutely to hospital, referred to the outpatient falls and syncope clinic or as part of a syncope consultation all with a range of presenting symptoms. OH was confirmed in 35.4% (n=4070) of individuals.

Our electronic review identified one hundred and ten cases of situational syncope, with 56.3% (n=62) taking place at mass. The next most common situation was undefined bathroom related activities followed by micturition, coughing then laughing as illustrated in Figure 1. Mass was the most common location for a syncopal event among our cohort, followed by kitchen, shopping centres/shops and the garden. There was no overlap of locations reported among the identified cases.

Figure 1: Breakdown of cases of situational syncope.



On further evaluation of the mass going group 59.6% were female. The group had a median age of 74 years (age range 19-101 years). All had tilt table testing performed. Of the cohort who had a syncopal event at mass, 27.4% (n=17/62) met the criteria for OH on tilt table testing. Based on clinical history of the event eleven subjects went on to have prolonged tilt testing which provoked a vasovagal response in five individuals.

Discussion

In this study, we identified that of those presenting to our service following a syncopal event at mass, over one quarter had confirmation of OH.

Mass attendance involves multiple changes in position, from sitting, to kneeling, to standing up to ten times during a ceremony, with stationary standing episodes occurring for up to four minutes at a time. We suspect that the sudden change in position can precipitate an episode of OH in vulnerable individuals.

Religious service attendance is a common element of the social calendar for many individuals and a syncopal event may impact their confidence to attend. Our mass goers were generally older and mainly female. Attendance at religious service has been reported to be associated with lower mortality[7] however there are many biases associated with this and the perceived benefit is likely more associated with the other traits of attenders including stable relationships, better health practices and wider social circles[8,9].

Our study has limitations. We may not have captured all events which had occurred at mass as our electronic syncope database does not include situation or location as a mandatory input variable. Given this, it was unclear if there were overlapping locations for certain individuals. In this cohort, there was limited available data on medications, as

recording was inconsistent. We also did not capture information on the type of religious ceremony which vary in duration such as funeral masses, marriage ceremonies, Easter and Christmas celebrations.

Despite these limitations, we suspect the multiple quick-paced positional changes can precipitate OH, potentially leading to a significant injurious event and even institutionalisation. Participants attending mass may also have additional environmental triggers including multiple clothing layers and may choose to fast prior to receiving communion host which may increase risk of a syncopal event[10].

In conclusion, consideration should be given as to whether it is safe for older mass goers to be subjected to such significant orthostatic stress.

Declaration of Conflicts of Interest:
The authors have no conflicts of interest to declare.

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