

Case Report

Out-of-Hospital Cardiac Arrest in the Elderly: Unique Considerations and Challenges – A Case Series

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Abstract

Introduction: Out-of-hospital cardiac arrest (OHCA) is a significant public health issue. Developed countries have observed an increasing number of OHCA cases in the elderly population. Emergency medical technicians (EMTs) are facing a growing number of OHCA cases in elderly patients, requiring special attention and consideration. As of 2020, the latest cardiopulmonary resuscitation (CPR) guidelines prioritize chest compressions as the initial course of action in OHCA situations.

Methods: A year-long statistical analysis (2020-2021) of elderly individuals in the pre-hospital system of Hamadan province examined 10 cases of OHCA in the elderly in 2020-21 that occurred after consuming food (postprandial myocardial infarction).

Results: Ten of 90 cardiac arrest cases attended by EMTs occurred in elderly individuals after eating, and despite resuscitation efforts by the EMTs, none of these cases were successful. Consequently, this complication significantly reduces the chances of successful resuscitation in these patients. Therefore, addressing the issue of aspiration in elderly individuals during resuscitation is crucial.

Conclusion: Continued research, collaboration, and adaptation of resuscitation protocols will contribute to advancements in the field and enhance the life-saving potential of elderly individuals who experience cardiac arrest.

Keywords: Out-of-hospital arrest, Emergency medical technicians, Myocardial infarction

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Introduction

Out-of-Hospital Cardiac Arrest (OHCA) poses a significant public health issue, and developed countries have observed an increasing number of OHCA cases in the elderly population (1). As the global population continues to age and the prevalence of chronic diseases increases, emergency medical technicians (EMTs) face a growing number of OHCA cases in elderly patients, requiring special attention and consideration (2,3).

According to recent data from the United States, the survival rate for emergency medical services (EMS)-treated non-traumatic OHCA cardiac arrests in adults is 9.1% (4). With the anticipated aging of the population, OHCA events are expected to increase further, emphasizing the critical need for a comprehensive understanding of OHCA in the elderly population (5,6). Cardiac arrest refers to the sudden cessation of cardiac

mechanical activity as confirmed by the absence of signs of circulation (7). Interestingly, recent studies have shown improved survival rates for both young and elderly patients, attributed primarily to advancements in the “chain of survival,” including shorter response times for cardiopulmonary resuscitation (CPR), early defibrillation, and improved post-arrest care (8). Shortening the time to CPR initiation, performing early defibrillation, and providing better post-arrest care have been instrumental in improving survival outcomes (9,10). As of 2020, the latest CPR guidelines prioritize chest compressions as the initial course of action in OHCA situations. Studies have indicated that early initiation of resuscitation and chest compressions by individuals present at the scene correlates with reduced mortality rates (11).

Notably, one potential cause of OHCA in elderly individuals is postprandial (after eating) cardiac arrest.



Research conducted by Hauser et al. revealed that following a high-calorie meal, there is an increase in cardiac output and blood flow redistribution toward the splanchnic circulation, indicating a dysfunctional sympathetic blood flow response (12).

Further investigation into the reasons for the lack of success in resuscitation revealed that during the initiation of chest compressions and resuscitation, all patients who experienced cardiac arrest after eating experienced aspiration of gastric contents into the airway. Specifically, aspiration occurred during a cycle consisting of five chest compressions at a rate of 100-120 per minute and two breaths at each stage. Consequently, this complication significantly reduces the chances of successful resuscitation in these patients.

Materials and Methods

A year-long statistical analysis (2020-2021) of elderly individuals in the pre-hospital system of Hamadan province examined 10 cases of OHCA in the elderly in 2020-2021 that occurred after consuming food (postprandial myocardial infarction).

Results

Unfortunately, despite resuscitation efforts by EMTs, none of these cases were successful (Table 1). Further investigation into the reasons for the lack of success revealed that during the initiation of chest compressions and resuscitation, all patients who experienced cardiac arrest after eating experienced aspiration of gastric contents into the airway. This aspiration occurred specifically during a cycle consisting of 5 chest compressions at a rate of 100-120 per minute and 2 breaths at each stage. Consequently, this complication significantly reduces the chances of successful resuscitation in these patients (13).

Table 1 indicates that among all cases of CPR in elderly patients who had less than 1 hour after the last oral intake, none were saved due to pulmonary aspiration during chest compression.

Discussion

In the 2015 resuscitation protocol, airway management took precedence over chest compressions, with EMTs utilizing advanced airway devices, such as endotracheal

tubes immediately after initiating CPR. This approach significantly reduces the risk of aspiration following chest compressions. However, the new 2020 protocol of the American Heart Association (AHA) introduced a change in sequence, prioritizing chest compressions before airway management. The alteration in the protocol posed a challenge, as patients experiencing cardiac arrest after a meal were at a heightened risk of aspiration when chest compressions were initiated, regardless of whether performed by laypersons or EMTs (14).

Therefore, addressing the issue of aspiration in elderly individuals during resuscitation is crucial. Further studies are recommended to explore this area and consider the last meal consumed during resuscitation in these patients. For instance, one potential approach could be the simultaneous placement of an endotracheal tube and initiation of chest compressions to decrease the likelihood of food aspiration during resuscitation and to increase the success rate of CPR.

Conclusion

Understanding the unique challenges and considerations associated with CPR in the elderly is essential for improving the survival rates and outcomes in this vulnerable population. Tailored approaches incorporating the latest evidence-based guidelines and advancements in resuscitation techniques will be instrumental in optimizing care for elderly patients with OHCA. Continued research, collaboration, and adaptation of resuscitation protocols will contribute to advancements in the field and enhance the life-saving potential of elderly individuals who experience cardiac arrest.

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Authors' Contribution

Conceptualization: Afshin Khazaei.

Data curation: Afshin Khazaei.

Formal analysis: Afshin Khazaei.

Funding acquisition: Afshin Khazaei.

Investigation: Afshin Khazaei.

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Table 1. The Demographic Characteristics of the Elderly Patients Who Experienced Sudden Cardiac Arrest Following a Meal

Variable	Patients								
	1	2	3	4	5	6	7	8	9
Age	78	66	61	64	73	59	67	64	70
Sex	Male	Male	Female	Male	Male	Female	Female	Male	Male
Comorbidity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CPR duration	25	30	18	24	15	40	25	22	15
Aspiration	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Last oral intake	44	21	35	60	20	25	35	42	10
Outcome	Expire	Expire	Expire	Expire	Expire	Expire	Expire	Expire	Expire

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Competing Interests

This article has no conflict of interest.

Ethical Approval

All clinical data and primary and demographic data of participants were completely confidential to the researchers.

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