High All-Cause Hospitalization Among Those With a Recurrent ASCVD Event: Evidence From a Large-Scale Real-World Database

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Introduction

- Patients with a history of an Atherosclerotic Cardiovascular Disease (ASCVD) event are at an increased risk of future ASCVD events
- Hospitalization costs are the leading healthcare expense among ASCVD patients[1]
- It is unknown how overall all-cause hospitalization rates compare between those with recurrent ASCVD events and those with fewer ASCVD events

Objective

- To examine the association between prior ASCVD event count and hospitalization rate

Figure 1. Schematic of the study design

Methods

- We examined de-identified electronic health records from Maccabi Healthcare Services, a longitudinal nationwide payer-provider health plan, representing one-fourth of the population in Israel
- We included adults who experienced their first nonfatal ASCVD event between ages 40-79 years and between 2006 and 2022
- As shown in **Figure 1**, patients were followed from their most recent ASCVD event until the end of 2023, death, or disenrollment (whichever was earliest)
- Using quasi-Poisson regression, we assessed the independent association between the number and type of ASCVD events and the rate of all-cause hospitalization, adjusting for sociodemographic characteristics and comorbidities
- All-cause hospitalization counts were calculated from periods between consecutive ASCVD events or end of follow-up (since their most recent event) and incidence rate ratios (IRR) reported

Results

- We followed 25,285 distinct patients for an average of 7.0 years, with 129,626 hospitalizations observed (**Table 1**)
- MI were the most common ASCVD events, and most patients had hypertension (**Table 1**)
- Those with multiple arterial bed events and ≥2 IS had the highest HCRU (**Figure 2**)
- Risk of hospitalization was independently associated with the number and type of ASCVD events, after adjusting for patient demographics and other comorbidities (**Figure 3**)
  - After **2** MIs, IRR = **1.16** (1.07, 1.25)
  - After **≥3** MIs, IRR = **1.51** (1.33, 1.72)
  - After **1** IS, IRR = **1.19** (1.13, 1.25)
  - After **≥2** IS, IRR = **1.74** (1.59, 1.90)
  - After PAD, IRR = **1.61** (1.50, 1.72)
  - After multiple arterial bed, IRR = **1.88** (1.76, 2.02)
- Furthermore, successive events of the same type (eg, 3+ MIs vs 2 MIs) were associated with a higher risk of hospitalizations
- Age, low SES, female sex, and various comorbidities were all associated with increasing risk of hospitalization

Table 1. Patient characteristics by type of index event

Variables	Overall N = 25,285	Carotid endarterectomy n = 1,085	IS n = 7,162	MI n = 15,388	PAD n = 1,650
Male, n, (%)	18,357, (73)	626, (58)	4,198, (59)	12,400, (81)	1,133, (69)
Age, median (IQR)	60 (53, 68)	67 (60, 73)	63 (55, 71)	58 (51, 66)	62 (55, 69)
Age group, n, (%)					
40-49	3,481, (14)	53, (4.9)	737, (10)	2,531, (16)	160, (9.7)
50-59	7,748, (31)	187, (17)	1,797, (25)	5,329, (35)	435, (26)
60-69	8,142, (32)	391, (36)	2,339, (33)	4,826, (31)	586, (36)
70+	5,914, (23)	454, (42)	2,289, (32)	2,702, (18)	469, (28)
Year of first event, n, (%)					
<2017	12,700, (50)	490, (45)	3,037, (42)	8,265, (54)	908, (55)
2017-2019	5,729, (23)	231, (21)	1,948, (27)	3,216, (21)	334, (20)
2020-2022	6,856, (27)	364, (34)	2,177, (30)	3,907, (25)	408, (25)
SES, n, (%)					
High	7,874, (31)	329, (30)	2,033, (28)	5,155, (34)	357, (22)
Medium	8,060, (32)	350, (32)	2,283, (32)	4,914, (32)	513, (31)
Low	9,351, (37)	406, (37)	2,846, (40)	5,319, (35)	780, (47)
Comorbidities, n, (%)					
Hypertension	16,753, (66)	862, (79)	5,199, (73)	9,489, (62)	1,203, (73)
Diabetes	11,432, (45)	531, (49)	3,109, (43)	6,806, (44)	986, (60)
CKD	12,364, (49)	645, (59)	3,714, (52)	6,944, (45)	1,061, (64)
COPD	2,630, (10)	172, (16)	700, (9.8)	1,485, (9.7)	273, (17)
Smoking	14,615, (58)	647, (60)	3,723, (52)	9,032, (59)	1,213, (74)

IS, ischemic stroke; MI, myocardial infarction; PAD, peripheral arterial disease, defined as an acute limb ischemia (ALI) or critical limb ischemia (CLI) event; SES, socioeconomic status; CKD, chronic kidney disease; COPD, chronic obstructive pulmonary disease.

Figure 2. HCRU rates per 1,000 person-days by the number and type of ASVCD events

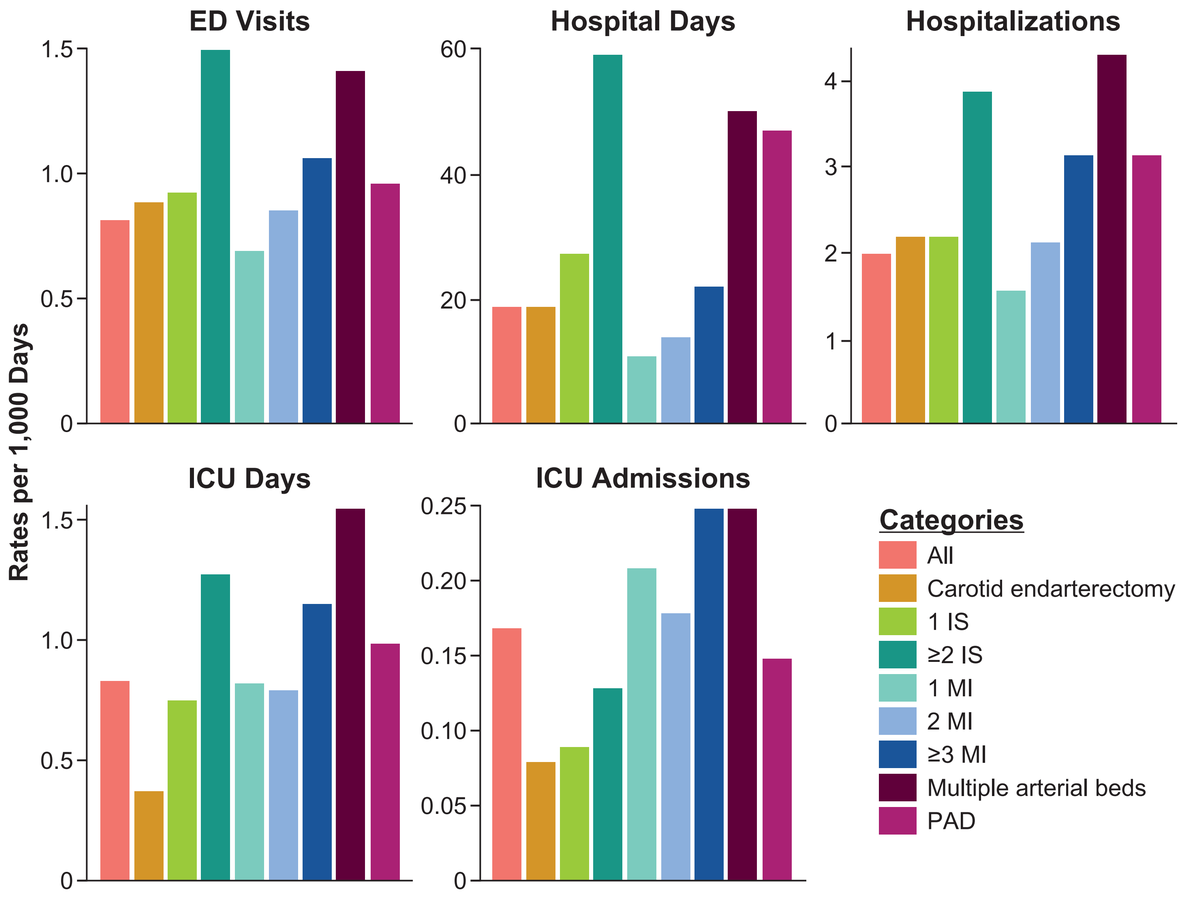
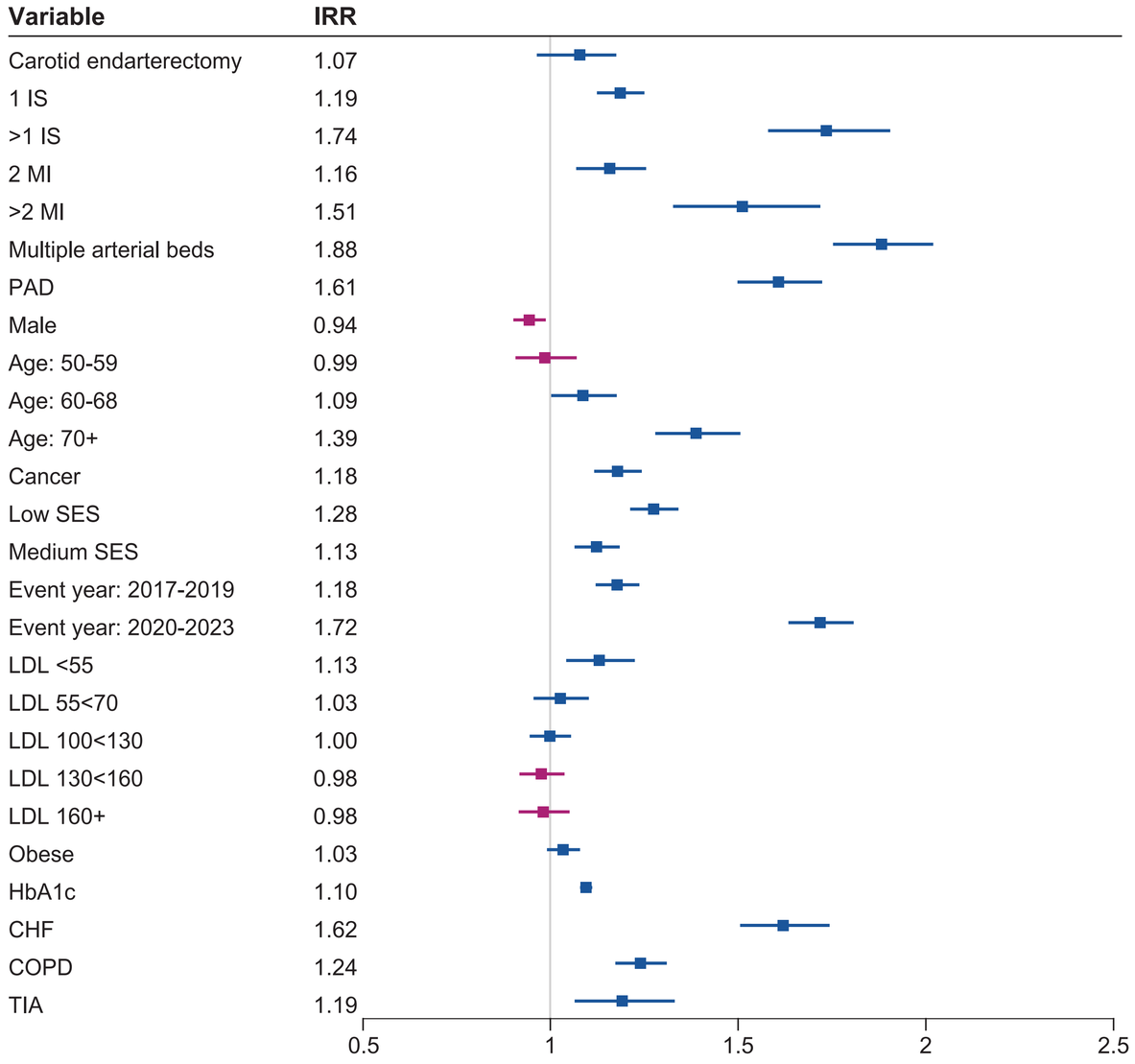


Figure 3. Association between ASCVD events and rates of all-cause hospitalization



Conclusions

- Risk of hospitalization was independently associated with the number and type of ASCVD events, after adjusting for patient demographics and other comorbidities
- Observations underscore the importance of risk reduction among those with a history of ASCVD to improve clinical outcomes and reduce healthcare utilization and costs

References

1. Steen Carlsson K, et al. *BMC Cardiovasc Disord*. 2023;23(1):483.

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