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Original Study

Digoxin and 30-Day All-Cause Readmission in Long-Term Care Residents Hospitalized for Heart Failure

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A B S T R A C T

Background: Digoxin use has been shown to be associated with a lower risk of 30-day all-cause hospital readmissions in older patients with heart failure (HF). In the current study, we examined this association among long-term care (LTC) residents hospitalized for HF.
Methods: Of the 8049 Medicare beneficiaries discharged alive after hospitalization for HF from 106 Alabama hospitals, 545 (7%) were LTC residents, of which 227 (42%) received discharge prescriptions for digoxin. Propensity scores for digoxin use, estimated for each of the 545 patients, were used to assemble a matched cohort of 158 pairs of patients receiving and not receiving digoxin who were balanced on 29 baseline characteristics. Hazard ratios (HRs) and 95% confidence intervals (CIs) for outcomes associated with digoxin among matched patients were estimated using Cox regression models.
Results: Matched patients (n = 316) had a mean age of 83 years, 74% were women, and 18% African American. Thirty-day all-cause readmission occurred in 21% and 20% of patients receiving and not receiving digoxin, respectively (HR, 1.02; 95% CI, 0.63-1.66). Digoxin had no association with all-cause mortality (HR, 0.90; 95% CI, 0.48-1.70), HF readmission (HR, 0.90; 95% CI, 0.38-2.12), or a combined endpoint of all-cause readmission or all-cause mortality (HR, 0.97; 95% CI, 0.65-1.45) at 30 days. These associations remained unchanged at 1 year postdischarge.
Conclusions: The lack of an association between digoxin and 30-day all-cause readmission in older nursing home residents hospitalized for HF is intriguing and needs to be interpreted with caution given the small sample size.
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Heart failure (HF) is the leading cause for hospital readmission for Medicare beneficiaries.[1] Reduction of 30-day all-cause hospital readmission is a focus of the Affordable Care Act.[2] Digoxin has been shown to reduce the risk of 30-day all-cause hospital readmission in real-world older HF patients.[3,4] HF is common in nursing homes.[5] However, whether digoxin is effective in lowering 30-day all-cause readmission in hospitalized HF patients admitted from long-term care (LTC) facilities remains unclear. In the current study, we examined if digoxin use is associated with a lower 30-day all-cause hospital readmission in a propensity score–matched cohort of LTC residents with HF.[6]

Methods

Data Source and Study Patients

Data from the Alabama Heart Failure Project were used for the current analysis, the design and methods of which have been previously described.[3,7–9] Briefly, 9649 medical records of 8555 unique fee-for-service Medicare beneficiaries discharged between 1998 and 2001 from 106 Alabama hospitals with a primary discharge diagnosis of HF were abstracted by trained data abstractors using structured data collection tools.[7] ICD-9 codes for HF were used to identify patients with a primary discharge diagnosis of HF. Of the 8049 Medicare beneficiaries discharged alive, 545 (7%) were admitted from the LTC settings.

Discharge Prescription for Digoxin

The primary exposure in our analysis was the receipt of a prescription of digoxin before hospital discharge. Of the 545 patients admitted from LTC settings, 227 (42%) received discharge prescriptions for digoxin. As mentioned above, data on both admission and discharge use of digoxin were centrally collected by trained chart abstractors.[7] Given the small number of patients admitted from the

Table 1
Baseline Characteristics of Nursing Home Residents Hospitalized for Decompensated Heart Failure, by Discharge Prescription for Digoxin, Before and After Propensity Score Matching

	Prematch (N = 545)			Postmatch (N = 316)		
	Use of Digoxin		*P* Value	Use of Digoxin		*P* Value
	No (n = 318)	Yes (n = 227)		No (n = 158)	Yes (n = 158)	
Age (years), M (SD)	82 (9)	84 (8)	.061	83 (8)	83 (9)	.700
Female	239 (75)	165 (73)	.516	117 (74)	117 (74)	1.000
African American	70 (22)	32 (14)	.020	32 (20)	25 (16)	.306
Current smoker	15 (5)	11 (5)	.945	12 (8)	9 (6)	.498
Left ventricular ejection fraction						
≥45%	103 (32)	46 (20)	<.001	44 (28)	34 (22)	.406
<45%	51 (16)	71 (31)		39 (25)	40 (25)	
Unknown	164 (52)	110 (49)		75 (48)	84 (53)	
Medical history						
Prior heart failure	226 (71)	188 (83)	.002	125 (79)	127 (80)	.780
Hypertension	215 (68)	163 (72)	.295	112 (71)	115 (73)	.708
Coronary artery disease	146 (46)	104 (46)	.982	73 (46)	76 (48)	.735
Myocardial infarction	58 (18)	41 (18)	.958	34 (22)	31 (20)	.676
Angina pectoris	28 (9)	25 (11)	.391	18 (11)	18 (11)	1.000
Left bundle branch block	26 (8)	26 (12)	.199	15 (10)	18 (11)	.581
Percutaneous coronary intervention	23 (7)	16 (7)	.934	11 (7)	14 (9)	.532
Coronary artery bypass graft	38 (12)	28 (12)	.892	18 (11)	19 (12)	.861
Diabetes mellitus	152 (48)	86 (38)	.021	66 (42)	67 (42)	.909
Atrial fibrillation	62 (19)	93 (41)	<.001	51 (32)	45 (29)	.463
Stroke	122 (38)	90 (40)	.762	63 (40)	62 (39)	.908
Chronic obstructive pulmonary disease	106 (33)	89 (39)	.158	58 (37)	62 (39)	.643
Dementia	134 (42)	118 (52)	.023	78 (49)	75 (48)	.736
Clinical findings, M (SD)						
Pulse (beats per minute)	90 (22)	94 (24)	.061	92 (22)	93 (24)	.729
Systolic blood pressure (mmHg)	146 (32)	142 (30)	.072	141 (30)	143 (30)	.585
Diastolic blood pressure (mmHg)	75 (19)	75 (19)	.981	75 (20)	75 (18)	. 901
Lower extremity edema	204 (64)	148 (66)	.801	100 (63)	103 (65)	.725
Pulmonary edema by chest radiograph	262 (82)	192 (85)	.499	132 (84)	132 (84)	1.000
Laboratory values, M (SD)						
Serum sodium (mEq/L)	139 (5)	138 (7)	.311	139 (5)	139 (7)	.569
Serum potassium (mEq/L)	4.5 (0.8)	4.4 (0.7)	.348	4.5 (0.8)	4.4 (0.7)	.328
Serum creatinine (mEq/L)	1.6 (1.1)	1.3 (0.7)	.003	1.4 (0.7)	1.4 (0.7)	.905
Hematocrit (%)	35 (6)	36 (6)	.143	35 (6)	36 (6)	.392
In-hospital events						
Pneumonia	141 (44)	102 (45)	.891	72 (46)	68 (43)	.651
Acute myocardial infarction	11 (4)	17 (8)	.036	11 (7)	10 (6)	.821
Pressure ulcer	87 (27)	59 (26)	.722	45 (29)	39 (25)	.445
Hospital and care characteristics						
Rural hospital	121 (38)	96 (42)	.319	70 (44)	67 (42)	.733
Cardiology consult	95 (30)	81 (36)	.153	60 (38)	50 (32)	.238
Intensive care unit	11 (4)	7 (3)	.809	4 (3)	6 (4)	.520
Length of stay (days), M (SD)	7 (6)	7 (5)	.492	7 (6)	7 (4)	.658
Discharge medications						
ACE inhibitors or ARBs	124 (39)	126 (56)	<.001	80 (51)	79 (50)	.910
Beta-blockers	58 (18)	49 (22)	.332	30 (19)	30 (19)	1.000
Loop diuretics	232 (73)	198 (87)	<.001	133 (84)	135 (85)	.754
Potassium-sparing diuretics	30 (9)	35 (15)	.034	17 (11)	17 (11)	1.000
Potassium supplements	126 (40)	113 (50)	.018	75 (48)	76 (48)	.910

ACE, angiotensin-converting enzyme; ARBs, angiotensin receptor blockers; M, mean; SD, standard deviation.
Values are n (%) unless otherwise noted.