HIGH UTILIZATION RATE OF IMPLANTABLE CARDIOVERTER DEFIBRILLATORS AMONG VICTIMS OF OUT OF HOSPITAL PREMATURE DEATH IN A LARGE RURAL COMMUNITY

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BACKGROUND

- Implantable Cardioverter-Defibrillator (ICD) therapy is indicated for primary prevention of sudden cardiac death (SCD) in patients with LVEF<35% and NYHA class II or III heart failure.
- Utilization rates are thought to be low, especially in socioeconomically disadvantaged communities and racial minorities, which could lead to excess SCD in unprotected patients.
- The majority of Out of Hospital Premature Natural Deaths (OHPND) are attributed to cardiovascular causes.

METHODS

- We identified 1,316 victims of OHPND in 2016 (18-74 years old, who died out of hospital from natural causes excluding cancer), from a total of 12,575 deaths registered in 29 counties of eastern North Carolina (Population 1.4 million).
- We retrospectively reviewed the electronic records of the decedents and identified cases meeting standard criteria for ICD implantation.
- The utilization rate, reason for non-implantation of ICD, and comorbidities were determined by chart review.
- Charlson's Comorbidity Index scores were calculated for included patients.

RESULTS

- 70 potential ICD candidates (age 64±8 years) with LVEF <35% were identified. Demographic categories included: Males (n= 47), Females (n= 23), Caucasian (n=38), African Americans (n=31), Hispanic (n=1).
- 31 candidates (45%) received an ICD, 11 (16%) did not receive an ICD due to comorbid conditions that limited life expectancy, 7 (10%) were lost to follow up, 5 (7%) refused ICD placement, 5 (7%) did not require an ICD because their LVEF improved with medical therapy, 1 (1%) received a Life Vest, and 1 (1%) was yet to commence guideline directed medical therapy. Only 9 (13%) eligible decedents did not receive an ICD.
- Independent sample t-test showed that patients excluded due to limited life expectancy had a higher mean CCI score when compared to patients who met ICD criteria but were excluded for other reasons or did not receive an ICD with a mean difference of -2.5, 95% CI [-4.5 to -0.4], P= 0.014
- Logistic regression analysis showed that compared to patients without CKD, patients with CKD were 62.5 times more likely to be disqualified for an ICD due to limited life expectancy. P=0.011

Among patient with heart failure in whom ICD implantation is indicated, there is an improving rate of utilization. But, advanced comorbidities (particularly chronic kidney disease) affecting life expectancy is a major factor limiting the utilization of ICD

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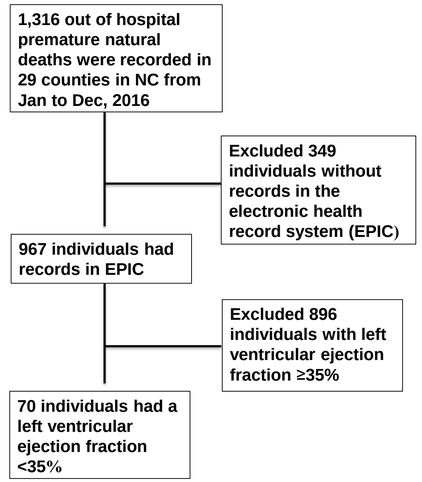
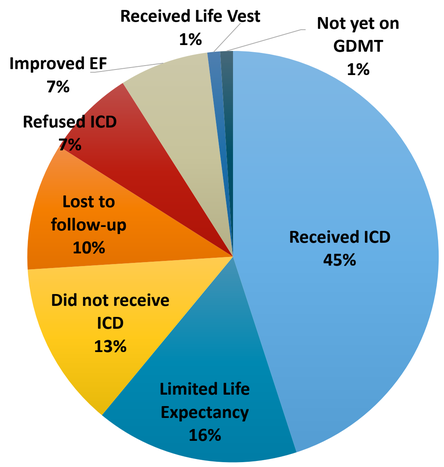
DISCUSSION

- Previous studies have shown low rates of ICD utilization at hospital discharge in potentially eligible patients, and this was attributed to physician non-adherence.
- This study revealed that only a small percentage of patients who qualified for ICD placement failed to receive it in a rural, decedent sample.
- The presence of a tertiary medical center may be responsible for the improved rates of ICD consideration and utilization in this area.
- The largest percentage of patients who were excluded from receiving an ICD was due to life limiting comorbidities (particularly chronic kidney disease) at diagnosis.
- Future research should endeavor to identify at risk patients earlier before they develop advanced comorbidities.

STUDY DESIGN



ICD UTILIZATION



CHARLSON'S COMORBIDITY INDEX AND COMORBIDITY PREDICTORS

Mean Charlson's Comorbidity Index Scores

	N	Mean CCI Score	Standard Deviation
Excluded Due to Limited Life Expectancy	11	7.18	2.714
Met Criteria for ICD Placement (Excluding Limited Life Expectancy and ICD in Place)	22	4.68	2.552
p = 0.014			

COMOBIDITIES IN PATIENTS WITHOUT ICD

Comorbidity	Prevalence (1) among qualified but no ICD* *N = 22 (%)	Prevalence (0) among limited life expect. *N = 11 (%)	P value predictor of qualifying for ICD
Diabetes Mellitus	7 (31.8)	6 (54.5)	0.052
Chronic Kidney Disease	4 (18.2)	7 (63.6)	**0.011**
Chronic obstructive pulmonary disease	8 (36.4)	3 (27.3)	0.526
Atrial Fibrillation/Atrial Flutter	6 (27.3)	4 (36.4)	0.122
Obstructive Sleep Apnea	5 (22.7)	2 (18.2)	0.188
Myocardial Infarction	9 (41.0)	3 (27.3)	0.227

- *Includes: individuals who were lost to follow up, refused ICD, did not receive ICD due to guideline non-adherence
- + Numbers of cases

DISCLOSURE INFORMATION

The authors have no disclosures