

Background

Previous studies have shown an adverse prognosis for patients with transvenous implantable cardioverter-defibrillators (ICD) who receive both appropriate and inappropriate shocks. There is a paucity of data regarding the prognosis of inappropriate shocks in patients with a subcutaneous ICD (S-ICD).

Purpose

To assess and characterize S-ICD inappropriate (IAS) and appropriate shocks (AS) and their impact on mortality.

Methods

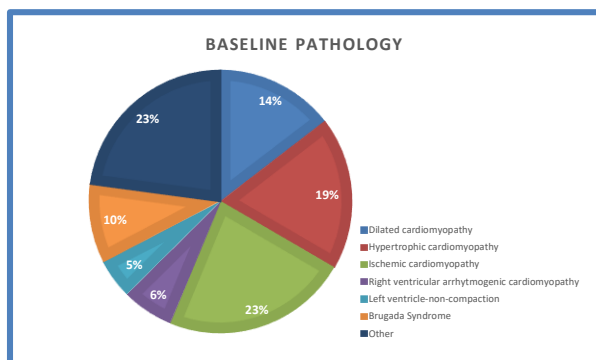
Single center observational registry of 162 consecutive patients who underwent S-ICD implantation for primary and secondary prevention between November 2009 and September 2020. Only follow-up data of at least 6 months was analysed to identify predictors of both IAS and AS and their mortality impact.

Results

A total of 144 patients were included in the analysis. Mean age was 42.2±16.6 years and 75.3% of the patients were male. One hundred and four patients (72.2%) implanted the S-ICD in primary prevention. The most common etiology was ischemic cardiomyopathy (22.9%) followed by hypertrophic cardiomyopathy (18.8%) and dilated idiopathic cardiomyopathy (14.6%).

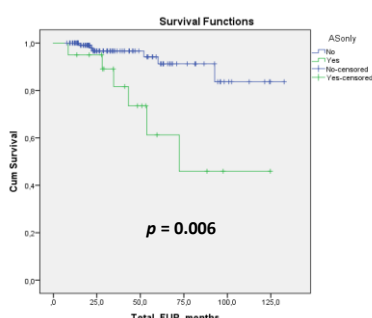
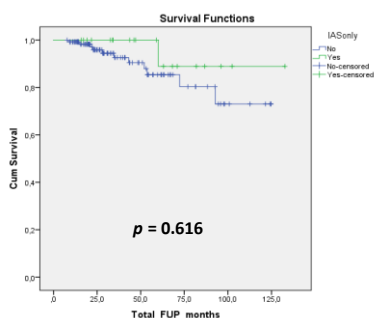
Baseline characteristics of the study population (n = 144)

Age – mean ± SD years	42.2 ± 16.6
♂ - n (%)	108 (75.0)
Primary prevention – n (%)	104 (72.2)
Hypertension – n (%)	38 (26.4)
Atrial fibrillation – n (%)	29 (20.1)
Diabetes mellitus – n (%)	15 (10.4)
Dyslipidemia – n (%)	51 (35.4)
Obesity – n (%)	22 (15.3)
Chronic kidney disease – n (%)	12 (8.3)
Smoking history – n (%)	32 (22.2)
LV systolic dysfunction – n (%)	86 (59.7)
LV ejection fraction – n (%)	
< 35%	61 (42.4)
35-50%	25 (17.4)
>50%	58 (40.3)
Beta-blockers – n (%)	103 (71.5)
ACE/ARB – n (%)	65 (45.1)
Antiarrhythmic drug – n (%)	25 (17.4)



S-ICD performance	Total episodes	N of patients (%)
Therapies delivered	160	48 (33.3)
Appropriate shock	108	29 (20.1)
Inappropriate shock	52	31 (21.5)
T oversensing	12	6 (19.3)
P oversensing	1	1 (3.2)
Ventricular premature beats	4	3 (9.7)
Supraventricular tachyarrhythmia	15	11 (35.5)
Atrial fibrillation	6	3 (9.7)
Noise	14	7 (22.6)

During a mean follow-up of 42.3±29.9 months a total of 48 patients (33.3%) experienced at least one S-ICD shock. Twenty-nine (20.1%) patients received AS due to VT/VF and 31 patients (21.5%) received IAS. Thirty-one (59.6%) of the IAS were due to oversensing/noise/discrimination errors and the remaining due to supraventricular tachycardia.



Patients with AS (HR 4.93, 95% CI 1.58-15.36, $p=0.006$) and higher number of total AS (HR 1.10, 95% CI 1.00-1.20, $p=0.044$) were associated with higher mortality during follow-up. S-ICD IAS therapy did not affect overall mortality (HR 1.71, 95% CI 0.21-14.0, $p=0.616$).

Conclusions

In our sample of patients with S-ICD, receiving an IAS, in contrast to AS, did not correlate with a worse prognosis. Larger studies are needed to confirm this hypothesis and to explain this findings.