Cost Analysis of the Extravascular Implantable Cardioverter-Defibrillator Compared to the Subcutaneous System in Patients at Risk of SuddenCardiac Death in Italy

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INTRODUCTION

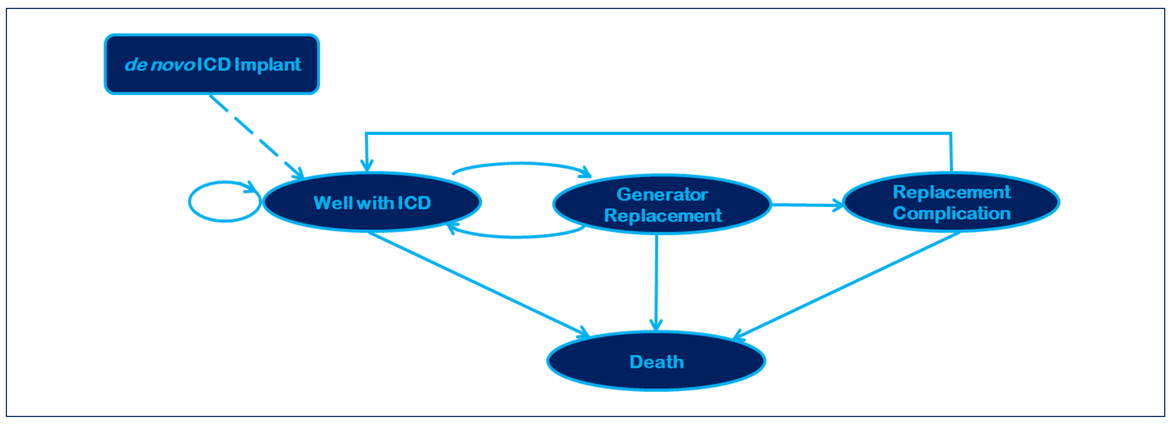
The extravascular implantable cardioverter-defibrillator (EV-ICD) for the prevention of sudden cardiac death (SCD) offers **several advantages** compared to traditional implantable defibrillators[1]. Additionally, the **longer expected battery life of the EV-ICD**, compared to the subcutaneous device (S-ICD), **reduces** the **need** for **replacements** and associated **complications**, contributing to **lower healthcare resource utilization in the long term**.

OBJECTIVE

The objective of this study is to estimate the economic impact of introducing the EV-ICD compared to the S-ICD from the perspective of the National Health System (NHS).

METHOD

- A hypothetical cohort of 1,000 Italian patients was considered, with an average age of 52.5 years (71% males)[2], and the risk of SCD for the cohort.
- A Markov model with four-month cycles was created for the simulation. Demographic and clinical data were derived from the literature and from official Italian demographic data[2-5]
- Technical data provided by manufacturers were used for device longevity (11.7 years for EV-ICD and 7.3 years for S-ICD)[6]
- Implantation, replacement, complication, and follow-up costs were calculated based on DRG tariffs and outpatient tariffs[7-8]
- An annual discount rate of 3% was applied. A sensitivity analysis was conducted to ensure the robustness of the results.



RESULTS

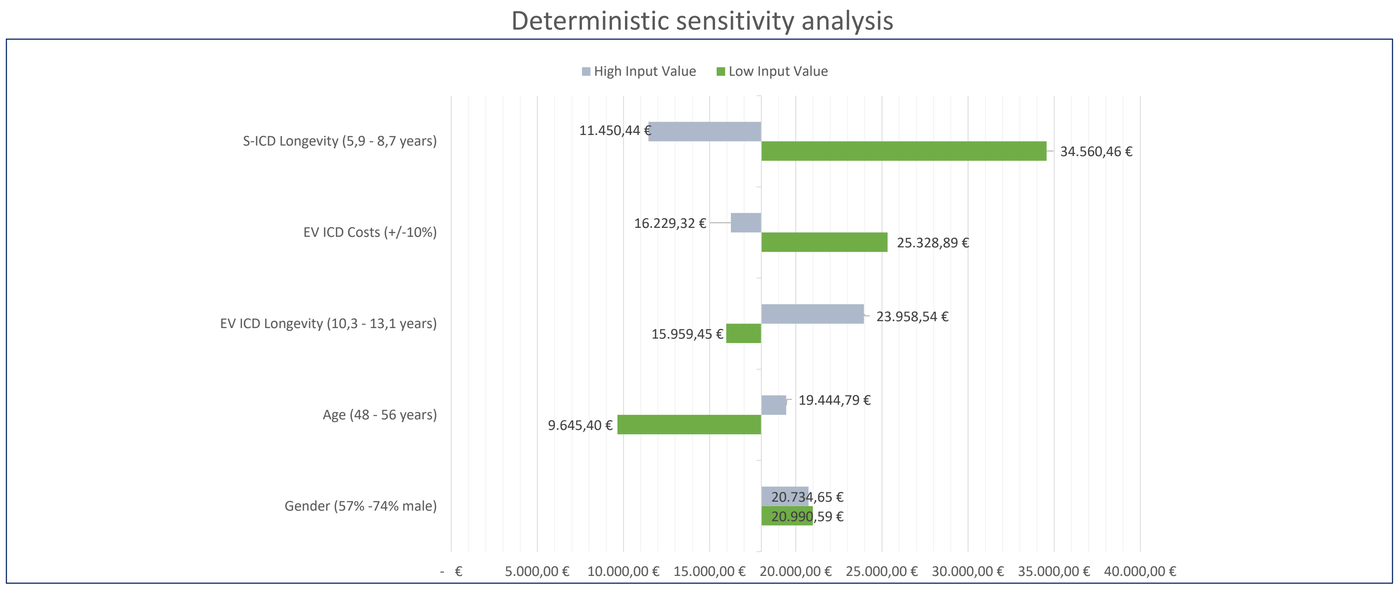
A **reduction of 1.5 replacements** (1.9 vs 3.4) per patient over the time horizon has been observed for the EV-ICD.

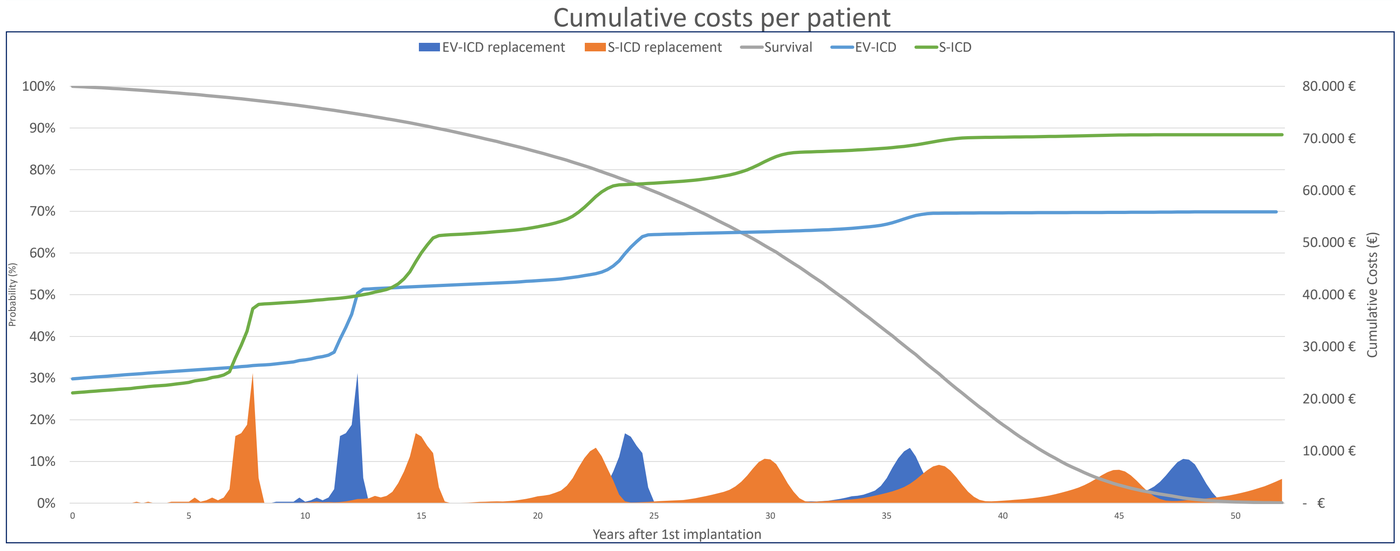
The related **savings are €20,779** vs S-ICD (€68,543 vs. €48,267) with discounted costs.

For **younger patients, the savings increased**, as a consequence of their longer survival / reduced need for replacements. Sensitivity analyses confirmed the robustness of the results.

Probabilities	Value
Mortality – general probabiliy	Input from official Italian demographic Institute[3]
Mortality increase - replacement	0,02%[4]
Mortality increase - complications	0,02%[4]
Complications risk	1,4%[5]

Input	Value
EV-ICD implant; S-ICD implant	21.634 € (DRG tariff) – the DRG tariff 536 as indicated by a regional decree[7,8]
EV-ICD replacement; S-ICD replacement	21.634 € (DRG tariff – total substitution lead + defibrillator was considered) [7,8]
Follow-up	95 € (Outpatient tariffs – 4 controls/year)[9]
Complications	6.465 € (mean DRG tariff 118 or 551 – hypothesis of infection and related pocket revision or substitution of device – not lead)[7]





CONCLUSIONS

The use of the EV-ICD for the prevention of SCD could significantly **reduce long-term healthcare costs** in eligible patients faced with the S-ICD, thanks to the **decreased number of replacements and complications.**

Additional data will be needed to confirm this hypothesis, but the results show that the **value of innovation** must be **assessed by considering the patient's journey beyond the simple upfront costs.**

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