

ICDs in the elderly

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1. Background

ICDs are effective in preventing sudden cardiac death. However, elderly patients aged 75 years or older have been underrepresented in the major clinical trials and the role of ICDs in this subgroup is still not well-defined and controversial.

A risk stratification system has been developed by Goldenberg et al. based on the MADIT II study. ¹ The assessment of benefit of an ICD was based on a simple clinical score system including age, renal function, atrial fibrillation (AF), NYHA class and QRS duration. Maximum benefit from an ICD was seen in patients with 1 or 2 risk factors, while no additional effect on mortality was seen in patients who had none or \geq 3 risk factors.

2. Methods

We retrospectively analyzed all clinical and survival data of all ICD-patients who were \geq 75 years at the date of implantation. All patients were followed in the Erasmus MC, Rotterdam, the Netherlands or the University Hospital, Basel, Switzerland.

Kaplan-Meier survival analysis was performed, and mortality predictors were identified. Mortality was also determined using the modified risk factor model proposed by Goldenberg et al. (with exclusion of age as risk factor).

Mortality of the cohort was compared to a random sample of patients aged 60-70 years stemming from the same database and to an age- and sex-matched cohort of Dutch people. 2

3 Results

Patient profile

Age: 77 ±2 years, range 77 – 85 years, gender: 86% male, 14% female

Reason implantation: 30% primary prevention; 70% secondary prevention

Mean ejection fraction: 31±2%; Underlying pathology: 84% ischemic heart disease;

NYHA-class: 11% NYHA class I, 67% NYHA class II, 22% NYHA class III

Co-morbidity: 17% had no additional risk factor, 37% 1 risk factor; 30% 2 risk factors; 12% 3 risk factors, and 4% 4 risk factors

49% had moderate to severe renal failure (eGFR < 60ml/min/1,73 m²), 27% had AF, 20% diabetic, 13% suffered from COPD, 24% peripheral vascular insufficiency including CVA and 10% had a history of malignancy

Survival (Fig. 1)

Follow-up: mean follow-up time 2.3 ±1.8 years, 35% pts died, 12% of the pts transferred to another hospital, 56% followed.

Median (calculated) survival: 4.2 years;

6.2 years in patients with 0 risk factors, 4.2 years in patients in 1 risk factor and 3.4 years in patients ≥ 2 risk factors

Risk factors for ICD therapy and survival after ICD therapy (Fig. 2 & 3)

ICD therapy: 41% received appropriate ICD therapy (19% primary prevention, 50% secondary prevention),

Median time to appropriate ICD therapy: 101 days (IQR 284 days)

Mortality after appropriate ICD therapy: 51% of the patients with appropriate therapy died versus 30% of those without therapy

Comparison of survival (Fig. 4 & 5)

Survival compared to a group of younger ICD patients (aged 60-70 years): survival is significant better in the younger ICD patients, but the curves only start to separate after 3 years of follow-up

Survival compared to a sex-and aged matched group of elderly persons: overall survival is better in the control group; however in the subgroup of patients without any additional risk factor there was no statistical different survival compared to our control group

4. Conclusions

Elderly patients, as selected in our hospitals, still have an acceptable survival, independent of prevention indication and they benefit from ICD therapy, certainly if there are no clinical risk factors. The presence or absence of additional clinical risk factors should be taken into account when making the decision for implantation.

5. Conflicts of interest

There are no conflicts of interest to report

References: 1. Goldenberg et al. J Am Coll Cardiol 2008: 51 (3): 288-296 2. www.cbs.nl



Fig. 4.: Comparison of survival between the elderly ICD patients and a control group (60-70 years) of ICD patients







Fig. 2: Graph depicting the % of patients without appropriate therapy in function of the time in the whole group (A) and according to the indication of implantation (B)



Fig. 3: Kaplan-Meier curve of survival according to appropriate ICD therapy or not (A) and Kaplan-Meier curve of survival after the 1st appropriate ICD therapy



Fig. 5: Comparison of survival between the elderly ICD patients (A) and according to the number of risk factors (B) and a sex-and aged matched control group of the general population.