Navigating complexities in implantable cardioverter-defibrillator therapy: insights, challenges, and patient-centred approaches

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Part II

Implantable Cardioverter Defibrillator therapy
in the last moments of life

Chapter 4A

Patients With an Implantable Cardioverter Defibrillator therapy in the last moments of life Remain at Risk for Painful Shocks in Last Moments of Life.

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Patients with an Implantable Cardioverter Defibrillator (ICD) are at risk of unnecessary painful shocks at the end of life when tachytherapy is still active. In 2010, the European Heart Rhythm Associations and the American Heart Rhythm Society published statements on ICD-therapy in patients nearing end of life (1,2). Subsequently, the Netherlands Association for Cardiology (NVVC) released the national guideline "ICD/pacemakers in the last phase of life" in 2013. The current study was performed to evaluate the practice of ICD tachytherapy deactivation prior to death over the last 10 years to reveal areas for improvement.

All patients who received an ICD or Cardiac Resynchronization Therapy-Defibrillator at our institution, and who died between 2006 and 2015, were evaluated. Follow-up was recorded in electronic patient files and the survival status of patients was retrieved from municipal civil registries. Patient records were reviewed to identify cause of death, ICD therapy status and type of device at time of death. Causes of death were categorized according to a modified Hinkle-Thaler Classification (3).

Between 2006-2015, 949 ICD patients died (mean age 72±10 years; 734 (77%) males; 577 (61%) primary prevention; median time from first ICD 4.5 (2-7) years). Baseline characteristics of patients withdrawn from tachytherapy prior to death did not differ from those who were not (data not shown). Overall, 321 (34%) devices were deactivated prior to death. A Kruskal-Wallis H test showed that the time from deactivation to death did not significantly differ between the years ($p = 0.12$), with time from deactivation ranging from 1 to 24 days. Time from deactivation was less than 24hrs in 104 (34%) of the patients.

We observed a gradual the proportion of patients withdrawn from tachytherapy over time, to just above 50% in the last 3 years (figure). A logistic regression analysis was performed to evaluate the differences in tachytherapy withdrawal rates over the years, which was statistically significant ($p < 0.0001$). Moreover, the rate of withdrawal doubled within the first four years. Most frequently, tachytherapy deactivation was initiated by the attending physicians in the hospital (n=197, 61%), most often whilst the patient was in a hospitalized setting (n=177, 55%). Most frequent causes of death observed in the 321 patients withdrawn from tachytherapy was terminal heart failure in 38% and malignancy in 24%. Other causes included infectious diseases, renal failure and stroke. This study provides insight in the practice of tachytherapy withdrawal during the last phase of life in a large population of ICD patients throughout the last decade. The gradual increase of tachytherapy deactivation over the last 10 years from 6% to 52% is encouraging.

Nevertheless, a substantial proportion of patients remains at risk for shocks. In addition, time from deactivation to death, has not changed over the years. This allows for the question how further improvement can be achieved. To evaluate whether patients in the last three years had an identifiable terminal stage which could have prompted discussions on tachytherapy withdrawal, all cases of the plateau era were reviewed. Between 2013 and 2015, 141 patients died without prior tachytherapy withdrawal. In retrospect, a terminal stage could be identified in 36 (26%). In 2 of these patients, tachytherapy withdrawal was planned but could not be performed in time. Acute deterioration of the clinical status of a patient appears to prompt ICD deactivation. However, the limited period of time remaining and the subsequent logistical constraints lead to failure of withdrawal. Most important additional improvement is to be expected from recognizing the beginning of the palliative or terminal phase. This stage is easily missed at the biannual (or less in case of remote monitoring) check-ups by ICD caregivers. Early and repetitive discussions, e.g. at first implantation or regular ICD follow-ups, with patient and family on the risks of shocks at the end of life is needed to allow for time to create patient awareness and acceptance of ICD therapy withdrawal.

References

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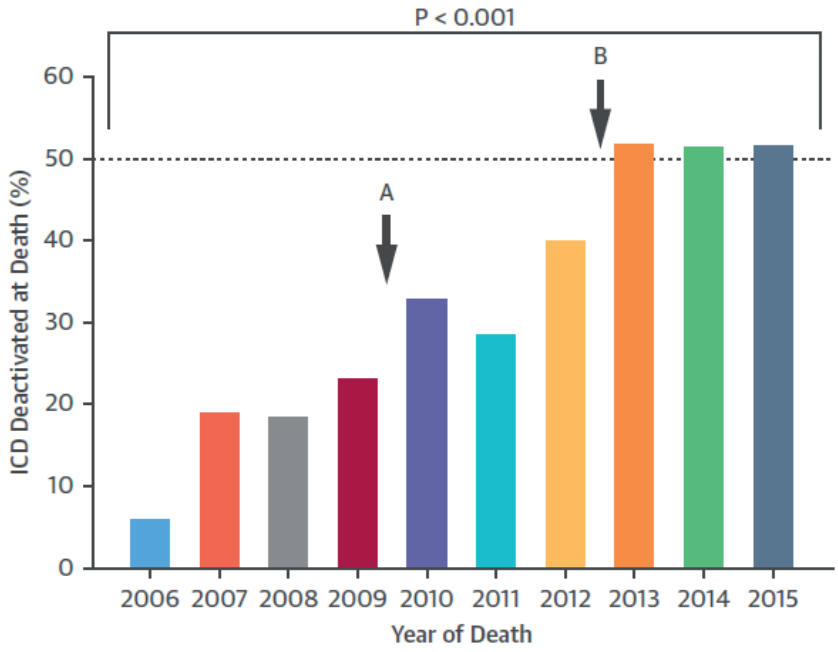
FIGURE 1 **Proportion of Tachytherapy Deactivation in Patients With an ICD Deceased Each Year Between 2006 and 2015**



(A) Indicates 2010 publication of position papers by the European Heart Rhythm Associations and American Heart Rhythm Society. **(B)** Indicates 2013 introduction of the Dutch guideline. ICD = implantable cardioverter-defibrillator.

Figure. Proportion of tachytherapy deactivation in ICD patients deceased each year between 2006–2015. A: 2010, publication position papers European Heart Rhythm Associations and American Heart Rhythm Society. B: 2013, introduction Dutch guideline.