Mortality after implantable cardioverter defibrillators in dialysis patients: a nationwide study

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Background: Although randomized clinical trials have shown that implantable cardioverter defibrillators (ICDs) reduce mortality in selected patients, patients on dialysis are excluded from these trials. Thus, data on mortality risk after ICD implantation in these patients are sparse.

Purpose: To examine all-cause mortality in patients receiving an ICD according to dialysis status and to identify factors associated with all-cause mortality in patients on dialysis.

Methods: Using Danish nationwide registries from 2000–2017, all patients ≥18 years old undergoing first-time ICD implantation were included. Patients on dialysis were identified prior to ICD implantation and followed for up to five years. The cumulative incidence of all-cause mortality according to dialysis status was assessed. Factors associated with all-cause mortality after ICD implantation in dialysis patients were examined using multivariable Cox proportional hazard regression.

Results: A total of 14,681 ICD patients were identified, of which 218 (1.5%) were on dialysis prior to ICD implantation. Compared with ICD patients not on dialysis, those on dialysis were younger (median age 64 years [IQR: 58–70] vs. 66 years [IQR: 57–72], p=0.02), more likely to receive an ICD for secondary prophylaxis (69.7% vs 53.7%), and had more comorbidities including ischaemic heart disease (60.6% vs. 46.3%), diabetes (28.4% vs. 20.4%), and peripheral vascular disease (10.1% vs. 5.6%) (p for all <0.05). The median time to death among ICD patients on dialysis and not on dialysis were 1.3 years (IQR: 0.4–2.8 years] and 2.2 years [IQR: 1.0–3.5 years], respectively.

One-year mortality among ICD patients on dialysis (13.0%) was significantly higher compared with ICD patients not on dialysis (4.7%), p<0.001 (Figure). Five-year mortality was significantly higher in ICD patients on dialysis than those not on dialysis (42.2% vs 23.6%), p<0.001 (Figure).

Factors associated with increased risk of all-cause mortality among ICD patients on dialysis were age ≥65 years at time of implantation (reference: age <65 years) (HR 1.90 [95% CI: 1.13–3.19]), primary prophylactic ICD (HR 1.81 [95% CI 1.08–3.05]), and diabetes (HR 1.87 [95% CI 1.14–3.07]). Sex, ischaemic heart disease, heart failure, stroke, chronic obstructive pulmonary disease, and malignancy were not associated with the risk of mortality (p>0.05 for all).

Cardiovascular causes of death were common both in patients with- and without dialysis, 69.6% and 60.0%, respectively.

Conclusion: Five-year mortality in ICD patients on dialysis was 42% and twice as high compared with ICD patients not on dialysis. Age ≥65 years, primary prophylactic indication, and diabetes were factors associated with increased mortality. Careful evaluation of the potential benefit from an ICD implantation in dialysis patients is important considering the overall high mortality rates.

Patients at risk					
ICD patients not on dialysis	14463	12530	10897	9402	7981	6583
ICD patients on dialysis	218	167	128	102	81	63