**Abstract:**

**Long-term performance of contemporary internal cardioverter defibrillator leads: a single center experience**

**Authors:**
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**Topic(s):**
Implantable Cardioverter / Defibrillator

**Citation:**

**Background**
Internal Cardioverter Defibrillator (ICD) leads have a complex construction within a multilumen design. As we learned from earlier reports, some ICD leads were found to have a higher than expected failure rate, which is due to the complex lead design, the inhospitable environment of the human body, and implantation techniques. Hence, transvenous ICD leads are considered the most vulnerable part of an ICD system. Reported ICD lead survival rates in different series are heterogeneous.

**Purpose**
The purpose of this study was to assess the long-term performance of all transvenous ICD leads implanted in our hospital.

**Methods**
All ICD leads followed-up in our center between Jan 2004 and Dec 2015 were considered for evaluation. Routine in-house follow-up examinations were done every 6 months. All surgical lead revisions were considered endpoints, if a lead failure was the reason for the revision; otherwise, the events were censored. Lead failure was defined as clinical relevant sensing, stimulation or defibrillation problems such as subtle hints for upcoming lead failure such as short VV intervals or lead impedance problems resulting in lead revision.

**Results**
Overall, 634 ICD leads were observed in 608 patients (median patient age 64.4 [IQR 55.5, 72.1] years). The median follow-up time was 3.5 (IQR 0.8 – 6.7) years (2550 patient-years). 32% of the ICD leads had a passive fixation mechanism. The most frequently used leads were Medtronic (MDT) Sprint Quattro (n=282), Boston Scientific (BSC) Endotak (n=114), Biotronik (BIO) Linox (n=76) and MDT Sprint Fidelis (n=58). The overall 5- and 10-year survival rate was 95.6 and 92.8%, respectively. The Kaplan-Meier survival curves of the different leads are presented in figure. A passive fixation mechanism was associated with a higher lead failure risk (HR 6.3, 95% CI 2.6, 15.6, p<0.001) compared to the active fixation. Compared to the MDT Sprint Quattro lead, the hazard ratio for lead failure was 4.6 (1.2, 17.6) for MDT Sprint Fidelis, 4.3 (1.4, 12.9) for BSC Endotak and 1.2 (0.2, 6.2) for BIO Linox (log rank p=0.005). In a multivariable Cox regression analysis including lead model, venous access and fixation mechanism, only the Endotak lead was significantly associated with a higher lead failure rate compared to other ICD lead types (HR 3.7, 95% CI 1.1, 13.2).

**Conclusions**
In our series, overall lead survival was acceptable. In reference to the MDT Sprint Quattro lead, the MDT Sprint Fidelis and the BSC Endotak ICD leads had a higher lead failure rate, whereas no difference was found for BIO Linox leads. The 6times higher risk for ICD lead failure in leads with passive fixation mechanism is remarkable and needs further investigation.
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