

Repetitive inappropriate implantable cardioverter-defibrillator shocks due to insulation failure with externalized conductor cables of a Biotronik Linx SD ICD lead

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We report the case of a 54-year-old patient with repetitive inappropriate implantable cardioverter-defibrillator (ICD) shocks due to externalized pace-sense conductor cables of a Biotronik Linx SD 65/16 ICD lead. This case report is one of few in the literature describing inappropriate shocks due to insulation failure with externalization of conductor cables of an ICD lead from the Biotronik Linx family.

A 54-year-old man with non-ischaemic dilated cardiomyopathy underwent implantation of an ICD for primary prevention in 2007 utilizing a dual-coil Biotronik Linx SD 65/16 lead. He has since had a generator change in 2012 with a St Jude Medical Fortify ST DR 2235-40 defibrillator. He had received several appropriate ICD therapies for ventricular tachycardias in the past. In January 2015, he presented with 17 repetitive ICD shocks. Interrogation of the ICD showed noise resulting in erroneous detection of VF causing repetitive inappropriate ICD shocks. Implantable cardioverter-defibrillator therapies were turned off. Ventricular sensing was 11.3 mV, pacing impedance 490 Ω , and shock impedance 40 Ω , all unchanged from prior testing. Pacing threshold could not be determined reliably because pacing resulted in large amounts of ventricular noise. In the device memory, several episodes of noise resulting in erroneous detection of non-sustained VF episodes had been documented, but this went unnoticed, because no home monitoring system had been used. In the lateral view of a chest X-ray externalization of a conductor cable just proximal to the distal coil was suspected (Figure 1A, arrows). A lead extraction was performed and inspection of the easily extractable lead showed an insulation failure with externalized pace-sense conductor cables (Figure 1B) proximal to the distal coil as the putative source of the noise. A novel single-coil ICD lead was implanted and the patient has done well since.

Unexpected ICD lead failures (e.g. Medtronic Sprint Fidelis and St Jude Medical Riata) have caused serious ICD problems in the past. This case report is one of few in the literature describing insulation failure with externalization of conductor cables of a defibrillator lead

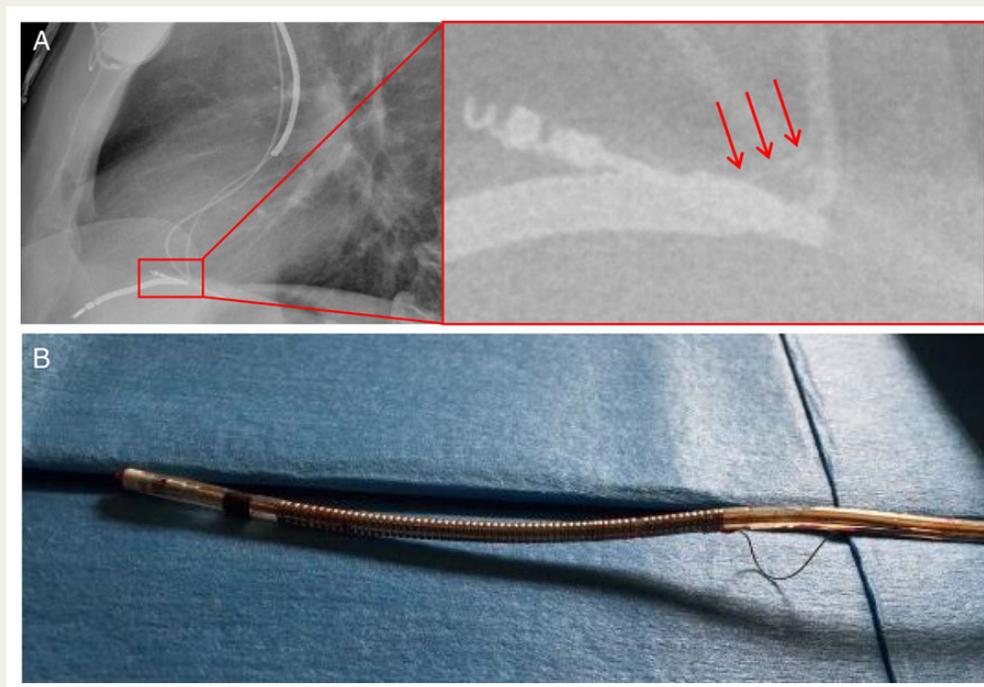


Figure 1 (A) Lateral chest X-ray of the ICD system. In the magnified section, the externalized conductor cable can be seen (arrows). (B) Biotronik Linx SD ICD lead with insulation failure and an externalized conductor cable.

from the Biotronik Linx family.^{1,2} They were launched in 2006 and over 150 000 leads have been implanted worldwide. Although the mechanism of failure remains unclear, a heightened awareness with the Biotronik Linx leads seems warranted. The failing lead in our case was a Linx SD lead, which is in line with the report of Padfield *et al.*,² which also found an increased failure rate for Linx S and SD leads. Compared with the older Linx S and SD leads, an additional outer coating has been added to the newer Linx^{Smart} leads to increase the lead's resilience (similar to the difference between the SJM Durata and SJM Riata ICD lead). However, until a better understanding of the failure mechanism of the Linx S and SD leads is available, we recommend a heightened awareness with all types of the Biotronik Linx ICD leads. This includes the use of a home monitoring system whenever a problem is suspected to timely detect noise sensing or impedance abnormalities as well as fluoroscopic assessment of the entire leads at the time of elective generator replacement.

References

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2. Padfield GJ, Steinberg C, Karim SS, Tung S, Bennett MT, Le Maitre JP *et al.* Early failure of the Biotronik Linx implantable cardioverter defibrillator lead. *J Cardiovasc Electrophysiol* 2015;**26**:274–81.