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Implantation of the subcutaneous implantable cardiac defibrillator using conscious titrated intravenous sedation alone without the need for general anaesthesia: a single centre experience

Authors:
A Mistry¹, R Chelliah¹, R Pathmanathan¹, ¹Glenfield Hospital, Department of Cardiology - Leicester - United Kingdom,

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Background

Implantable cardiac defibrillators (ICD) are used routinely for the prevention of sudden cardiac death (SCD). A transvenous lead connected to an implanted generator has been the standard method of implanting such a device. Recently, the subcutaneous implantable cardiac defibrillator (S-ICD) was introduced which negates the need for transvenous leads. It is intended to provide defibrillation therapy for the treatment of life-threatening tachyarrhythmia in patients who do not have symptomatic bradycardia, incessant ventricular tachycardia (VT), or frequently recurring VT that is reliably terminated with anti-tachycardia pacing (ATP). Currently the majority of these implant procedures are performed under general anaesthesia (GA) which requires the resources of the anaesthetic team as well as exposing patients to the risks associated with GA. At present, there is limited experience using conscious, intravenous, and titrated sedation as an alternative.

Purpose

To assess the safety, feasibility, tolerability and length of procedure using conscious, intravenous, titrated sedation rather than GA when implanting the S-ICD.

Methods

24 consecutive patients from a single centre who were eligible for an ICD for standard indications were offered the S-ICD from July 2014 to July 2016 with routine device follow-up were assessed on 29/7/16. Intravenous Midazolam and Morphine Sulphate were given to achieve adequate conscious sedation. Peri-operative vital signs were monitored throughout. Standard implant techniques (2 incision approach) were used as recommended by the device manufacturer. Defibrillator Safety Margin (DSM) was performed on all patients after implant. Procedural information and complications at the time of procedure and during routine follow-up were recorded.

Results

17/24 (71%) of procedures were performed using intravenous titrated conscious sedation. The mean age at implant was 48 years (+/- 12years) and 11 (65%) were male. 10 patients had a left ventricular ejection fraction (LVEF) of <35% and the remainder had a normal LVEF. All implants were completed successfully and well tolerated. The overall procedural time when using titrated conscious intravenous sedation was shorter compared to GA (62 mins +/-13 minutes vs. 76 mins +/-22 respectively). The mean dose used for intravenous midazolam was 7.0mg (+/-2.8mg) and morphine sulphate was 7.4mg (+/-3.7mg). A single patient required reversal of sedation with Flumazenil (300mcg) and naloxone (400mcg) post-operatively due to oxygen desaturation. Late complications included one patient receiving an inappropriate shock and one patient treated successfully with antibiotics for a superficial wound infection.
Conclusion

The S-ICD can safely be implanted using titrated intravenous conscious sedation. It can reduce overall procedural time and negate unnecessary exposure to GA. This method is feasible and well tolerated by patients.