Title: Detection of silent Atrial Fibrillation by remote monitoring of implantable loop recorders in patients with cryptogenic stroke: Experience in the United Arab Emirates

Category: Arrhythmias and Clinical EP

Abstract

Background: Cleveland Clinic Abu Dhabi (CCAD) is a major stroke centre in the Emirate of Abu Dhabi. Multiple studies have demonstrated that thrombo-embolism due to previously undiagnosed atrial fibrillation (AF) is the likely etiology for a substantial proportion of patients with Cryptogenic Stroke (CrS). Timely detection of AF in such patients has major therapeutic implications usually leading to initiation of oral anticoagulation for secondary stroke prophylaxis. Classical arrhythmia detection tools such as ECG's and Holter monitors have very modest AF detection yields. An Implantable Loop Recorder (ILR) is a prolonged electrocardiographic monitoring tool providing 2+ years of continuous monitoring. The utility of such devices is augmented when their use is enhanced by adding remote monitoring (RM) technology allowing for almost real-time reporting of detected arrhythmias. Previous ILR-based detection studies have noted AF detection rates varying between 9-33% depending on duration of monitoring. The use of such combined technology has been endorsed by international guidelines. CCAD has a dedicated RM service, the largest of its type in the Middle East region, which aids in the detection of AF in CrS patients. The goal of this study is to determine the diagnostic yield of our service to date.

Methods: This was a retrospective study of patients who received an ILR device post CrS at CCAD from September 2015 to June 2019, to evaluate AF detection by RM.

Our patients are enrolled in RM at the time of implant to ensure early detection of atrial arrhythmias. Patients are usually evaluated one week post implant in the Device Clinic for a device and wound check and to provide additional patient education as needed. Subsequent follow-up includes routine in-person evaluation every 3 months and monthly RM transmissions. Patients can send additional manual transmissions if they experience symptoms. Missed transmissions and disconnected monitors are resolved as early as possible by directly contacting the patient. All transmissions are reviewed by trained RM technicians. The responsible cardiac electrophysiologist is alerted immediately of all important events. All device detected atrial arrhythmias were reviewed and adjudicated by the responsible physician. Sustained atrial arrhythmias (≥ 30 seconds) were considered to be positive results for AF. Appropriate and timely interventions, such as urgent clinic visits and initiation of anti-coagulation, were implemented when a confirmed atrial arrhythmia was noted.

Results: A total of 69 consecutive patients with CrS (51 males, 18 females, age range 25-95 years, average age 54 years) were included in the study. Follow up duration ranged from 30 to 1311 days (average 352 days, median 347 days). Device types included 6 (9%) *Confirm Rx* ICM 3500 (Abbott, USA) devices and 63 *Reveal LINQ™* LNQ11 (Medtronic, USA) devices. Relevant comorbidities included hypertension (41, 59.4%), diabetes mellitus (36, 52.2%), hyperlipidemia (49, 71%), coronary artery disease (10, 14.5%) and chronic kidney disease (12, 17.4%). AF was detected in 8 patients (11.6%). False positive results were noted in 14 patients (20%). These were adjudicated by the clinic team and noted to be due to under-sensing, over-sensing, or electromagnetic external interference. False positive results were excluded from the data. Time from implant to detection of first AF ranged

from 11-399 days (average 156 days). Oral anti-coagulation was subsequently initiated in 7 out of the 8 patients with detected AF (88%).

Conclusion: This study demonstrates the utility of implanting ILR devices in a Middle Eastern CrS patient cohort with close monitoring (including by RM). Our study detected significant atrial arrhythmias in 11.6% of patients, at an average of 352 days, leading to initiation of treatment to prevent subsequent strokes. Our detection rate is comparable to rates noted in large international studies at similar durations of monitoring. False positives are common but can be easily adjudicated by a dedicated experienced team. This study further demonstrates that implementation of a dedicated ILR RM-based detection program for patients suffering from CrS in the Middle East region is a viable and worthy strategy. To ensure the effectiveness of such a service, it is necessary to invest in a skilled and dedicated multidisciplinary team and to provide them with clear monitoring and action protocols. The relatively small sample size of the study cohort and the modest duration of monitoring are limitations of this study.