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Sustainable organization of a management model for CIED remote control: data from a single tertiary center

F. Zoppo[1], E. Bacchiega[2], V. Bottazzo[3], A. Brazzolotto[3], C. Carraro[3], L. Lago[3], A. Lupo[3], G. Mugnai[3], E. Piccoli[3], F. Zerbo[3]

[1]Cardiology - Electrophysiology, Gorizia, Italy; [2]Cardiology, Vicenza, Italy; [3]Dept of Cardiology, Mirano, Italy

Introduction: The remote control (RC) of CIED has become necessary, though the human resources and technical facilities needed are limited. In most of Centers, the ratio of RC CIED /CIED with in-office follow up, is continuously increasing and is expected to reach the 100% of CIED remotely controlled.

We sought assess an organizational model based on available facilities and a long-term projection of RC data burden. Pacemakers, ICD and implantable loop recorders were considered.

Methods: The total population served by the Hospital area has been obtained (271.260 citizens), timed at December 31st 2014. By checking our Hospital data files, the total number of followed up CIED patients timed at January 1st 2011 (3995; 1.47% of all population), was compared with the same data timed at January 1st 2015 (3902; 1.43% of all population), in order to the check for the "stability" of that data over time.

At the analyzed time 1582/3902 (40,5%) of CIED were followed by RC.

We have then considered an yearly average of 465 CIEDs implanted/replaced (yearly implants 2012 to 2015) and excluded a roughly 10% of them because not provided of RC facilities (unwilling patients or CIED not RC "ready"); all the other patients were provided with RC. On these basis, we can assume a ratio of RC CIEDs /non-RC CIED, deemed to increase by 10 to 11% per year, to reach the break-even of 100% of RC CIEDs, in 2021 (projection).

The number of RC transmissions (Tx) have been gathered in 5 types of events (Fig. left upper).

The timing of RC patient managing from opening the CIED web site to complete patient file assessment (RC file analysis) performed by expert nurses, was arbitrarily calculated over a sample of 10 Tx per day in 3 different days.

Results: Of 3902 CIED patient, 1582 (40.5%) were RC followed up (3261 pacemakers, 594 ICDs and 47 implantable loop recorder); the CIED brands were represented as follows: Medtronic 685 (43.3%); St. Jude 180 (11.4%), Boston Sc. 330 (20.8%), Biotronik 318 (20.1%) and Livanova (previously SorinGroup) 69 (4.4%).

During the year 2015 we received a total number of 10396 Tx: 128 (1.2%) red alert; 1944 (18.6%) yellow alert, 141 (1.3%) atrial fibrillation; 403 (3.9%) lost Tx (disconnected transmitters or un-compliant patients for remote interrogation) and 7780 (75%) Tx "OK" with NO events. (Fig. right upper).

The projection model at 2021 with 100% RC patients (break-even) shows a total 25990 Tx: 320 red alert; 1944 yellow alert, 352 atrial fibrillation; 1007 lost Tx and 19459 Tx "OK". The 2021 monthly Tx would be 2320 (26 red alert; 405 yellow alert, 29 atrial fibrillation; 91 lost Tx and 1769 (75%) Tx "OK") (Fig. both lower panels)

The RC file analysis was roughly calculated around 3 minutes (116 hours/month); 5.8 hours/business day (Monday–Friday).

Conclusion: The rate of RC followed up CIEDs will inexorably increase by time. The projection management model presented could help to build a sustainable organization.