Remote implantable cardioverter-defibrillator monitoring in a Brugada Syndrome population: a case-control study

Alexandre Maluski (1), Frederic Sacher (1), Vincent Probst (2), Maider Andronache (1), Mathieu Wright (1), Serge Abbey (2), Pierre Bordachar (1), Antoine Deplagne (1), Sylvain Ploux (1), Gilles Lande (2), Pierre Jaïs (1), Meleze Hocini (1), Michel Haïsaguerre (1), Herve Le-Marec (2), Jacques Clementy (1)

Background: The diagnosis of Brugada Syndrome (BS) is typically made in a young otherwise healthy population. In patients with high risk of sudden cardiac death (SCD), the only recommended therapy is an implantable cardioverter defibrillator (ICD), but this can lead to complications. Previous studies have shown that the rate of complication related to ICD is important in this population because young and socially-professionally active. The remote monitoring may simplify or improve their follow-up by checking daily the device system.

Methods: Thirty-five consecutive patients (26 males, 44±11) were implanted for BS with an ICD with a remote monitoring system (Home Monitoring, Hamburg, Allemagne). They were matched for age, sex and follow-up duration with 35 BS patients implanted with an ICD without this capability.

Results: During a mean follow-up of 2.5 years, the use of remote monitoring reduced significantly by 67% the number of cardiology consultations (3 ±2 vs 7 ±3, p<0.001). The HM system induces an economic of 192 per patient per year. Half of the HM patients (48%) had managed to consult only once or twice during this follow-up. So they can maintain a social and professional normal life.

In the HM group, inappropriate shocks were less frequent than in the control group (4 vs 6) although without significant difference (p=0.48). Seventy-three alerts were transmitted by the remote monitoring or 0.07 alerts per patient per month representing a workload of 3.5 hours per 100 patients per year. This early detection of abnormality may have prevented one or several inappropriate shocks in 11% of HM patients by prompt reprogramming of the devices.

Conclusion: Remote monitoring simplifies the follow-up of these young otherwise healthy patients by decreasing significantly the number of cardiology consultations. Remote monitoring optimizes the follow-up with early detection of failures that could potentially be complicated by inappropriate shocks.

Analysis of HCN4 channel function using two conditional transgenic mouse strains

Anne Rollin (1), Mesirca Pietro (1), Matteo Mangoni (1), Joel Nargeot (1), Dirk Isbrandt (2), Hetto Ehmké (2), Jacqueline Alig (2)

Cardiac pacemaking involves several ion channels, which are subtly regulated by autonomic nervous system. The hyperpolarization-activated cyclic nucleotide gated channel, particularly HCN4 subunit, is considered as a major actor for sino-atrial node automaticity. Moreover due to its directly regulation by cAMP, HCN4 channels have been proposed as one of the main responsible for the increase of heart rate after sympathetic stimulation. However its relative importance remains highly controversial.

To investigate the role of HCN channel in cardiac automaticity and sympathetic regulation, we used telemetric ECG recording techniques in two specific mouse strains: one with a conditional complete suppression of HCN4 conductance (HCN4-AYA) and the second with a loss of cAMP-mediated modulation of HCN4 (HCN4-CNBD).

Our results show that in the two strains heart rate is reduced by the same percentage with respect to the wild type. During pharmacological sympathetic stimulation the maximal heart rate was lower in the two transgenic strains than in wild type, but the relative extent of heart rate remains the same for all mice.

Our data confirm the importance of HCN4 for cardiac pacemaking both at rest and during sympathetic stimulation, and that the presence of cAMP is essential for HCN4 function. Moreover, our results seem to indicate that this channel is dispensable for heart rate autonomic regulation.