Archives of Cardiovascular Disease (2014) 107, 253—260

Available online at ScienceDirect www.sciencedirect.com

Elsevier Masson France EM|consulte www.em-consulte.com/en

REVIEW

Cardiac remote monitoring in France

Point sur la télécardiologie en France

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Received 22 October 2013; received in revised form 7 February 2014; accepted 10 February 2014
Available online 4 April 2014

KEYWORDS
Cardiac remote monitoring;
Pacemaker;
Implantable defibrillator

Summary The increase in number of implanted cardiac medical devices and the announced decrease in number of cardiologists have led to remote monitoring being considered as a pivotal tool for patient follow-up. For 10 years, remote monitoring has been the subject of multiple clinical studies. In these studies, reliability and clinical efficacy have been demonstrated, but the use of remote monitoring remains quite limited in France compared with other countries. To explain this delay in uptake, some organizational difficulties and the lack of reimbursement of remote monitoring are often mentioned. The results of medico-economic studies might provide answers about the value of remote monitoring and enable the supervisory authorities to define how its use will be financed. This review provides a global view of remote monitoring in France, and covers the principle, clinical efficacy, organizational and regulatory aspects, and medico-economic data.

Abbreviations: AF, atrial fibrillation; CAD, Canadian dollars; CRT, cardiac resynchronization therapy; GHS, homogeneous hospital stay groups (groups homogènes de séjours); LPPR, List of Reimbursable Products and Services (Liste des Produits et Prestations Remboursables); RM, remote monitoring; USD, United States dollars.

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http://dx.doi.org/10.1016/j.acvd.2014.02.004
1875-2136/

MOTS CLÉS
Télécardiologie ;
Pacemaker ;
Défibrillateur implantable

Résumé La télécardiologie est considérée comme une approche particulièrement prometteuse pour le suivi des patients au regard du nombre croissant de dispositifs médicaux cardiaques implantés et de la diminution du nombre de cardiologues envisagée dans les prochaines années. Depuis 10 ans, la télécardiologie a fait l'objet de multiples études cliniques. Dans ces études, la fiabilité et l'efficacité clinique ont été démontrées. Malgré ces résultats, le déploiement de la télécardiologie reste limité en France en comparaison des autres pays. Pour expliquer ce retard, des difficultés organisationnelles et le manque de valorisation de l'activité de télécardiologie sont souvent mis en avant. Les résultats des études médico-économiques pourraient permettre aux autorités de tutelles de définir des modalités adaptées de financement. Cette revue a pour objectif de faire un état des lieux de la télécardiologie (principe, efficacité clinique, organisation, aspects réglementaires, données médico-économiques).

Background

The number of implantations of electronic implantable medical devices in the cardiovascular area has grown since their introduction in 1958 [1]. In France, 65,000 pacemakers are implanted every year. The number of implantable defibrillators rose from 2700 in 2003 to 13,000 in 2013. These medical devices require regular post-implantation follow-up of patients to ensure that an appropriate response to the patient's condition is transmitted. Monitoring of battery status is also essential. Currently, conventional monitoring (face-to-face four times per year) does not allow real-time follow-up. Technological advances, with the development of implantable devices with automatic remote monitoring (RM) capability, allow constant surveillance.

RM involves the transmission of data on the status of the device, patient variables gathered by the device and, sometimes, disease-related data, over a network from the patient's location via a central database to a hospital or physician's office. RM could also be a solution to the decrease in the number of practitioners envisaged in the coming years as opposed to the predicted increase in the number of patients. The increase in patients can be explained by the ageing of the population and the widening of heart failure indications, thanks to the development of cardiac resynchronization therapy (CRT) devices [2].

Currently, five manufacturers offer monitoring interfaces, which provide follow-up of 20,000 patients in France [3]. These monitoring interfaces exhibit differences. The clinical and organizational impact of RM has already been supported by a large number of publications. Although the implantation of electronic medical devices is currently covered by health insurance, the deployment of RM remains subject to the supervisory authorities of the RM act itself in France, unlike in other countries. Validation of the act may evolve in the coming years and should be the subject of robust medico-economic studies.

This review firstly offers a reminder of the principle of RM. Secondly, the organizational and regulatory aspects of RM will be discussed, followed by medico-economic aspects inherent to RM.

The principle of cardiac remote monitoring

The principle of cardiac RM was first mentioned in the 1970s by Dreifus and Pennock [4]. With the recent progress in telecommunications, RM has rapidly become a powerful tool in the rhythmology department. Initially, active systems were developed but were soon replaced by automatic transmission, which increases patient observance naturally.

Implantable devices with automatic RM capability are equipped with an antenna circuit and transmit daily information as electromagnetic signals to a transmitter located in the patient's home. The transmitter automatically transmits this information after encoding via the mobile phone or landline network to the secure server managed by the manufacturer. The analysis of information is then possible from the cardiology centre due to a secure internet portal. Two different types of data are transmitted to the implant centre. Firstly, data on the medical device integrity are available: battery status; recording and stimulation capacity; and measurement of impedance lead. Secondly, cardiac events in patients are transmitted (see later). All abnormalities are reported by e-mail, facsimile, telephone and/or short message service (SMS) to the health professional in charge of monitoring.

There are currently five manufacturers offering RM systems (Table 1), which operate differently (Table 2), especially in terms of location of data storage and encoding used. The notification of alerts, as well as the management of end of monitoring and registration of new patients, can be configured according to the needs of the rhythmology centre. The Home Monitoring® system does not allow the patient to activate the transmission. With the exception of Boston Scientific, all systems use the mobile network. As transmissions need energy from the device, RM reduces the lifetime of implants by 1—6 months, according to the prosthesis. The Latitude® system avoids this pitfall due to the transmitter querying the prosthesis that supplies the energy.

Data storage is not carried out in France, except for the systems developed by Sorin and Boston Scientific. All systems authorize access by the treating physician. Regarding the rules of confidentiality, many countries allow