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Home Management of the Device Detected Atrial Fibrillation during COVID-19 Pandemic: A Case Report

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Abstract

BACKGROUND: Patients with heart failure (HF) and implanted heart devices constitute a vulnerable category during the coronavirus disease –2019 (COVID-19) pandemic. The remote monitoring function allows the physician to detect atrial fibrillation (AF) in these patients and to prevent thromboembolic complications by prescribing anticoagulants. Under quarantine conditions, such patients can receive fully remote consultation and treatment, which will protect them from the risk of infection, and also reduce the burden on medical institutions.

CASE REPORT: A 56-year-old man presented to the clinic with shortness of breath when climbing the second floor, moderate non-specific fatigue, general weakness, and a decrease in exercise tolerance. The patient received standard treatment for HF for at least 3 months (ACEI, beta blockers, MR antagonists, and loop diuretics) in individually selected adequate doses. ECG on admission showed a QRS of 150 ms, left bundle branch block (LBBB). Echo showed dilatation of all heart chambers, diffuse hypokinesis of the walls with akinesis of the apical, middle anterior LV segments, as well as hypokinesis of the basal, middle apical, and anterior septal segment of the LV. The ejection fraction was reduced to 35%. RV function is reduced. After a detailed discussion with the team, it was decided to do implantation of a cardioverter-defibrillator with resynchronization function, equipped with remote monitoring (Biotronik, and Home monitoring). Date of implantation is June 19, 2014. Due to the fact that the patient was connected to the remote monitoring system, May 5, 2020, he was diagnosed with asymptomatic AF. The episode lasted 1 min 22 s. On the following days of monitoring, episodes of AF were also recorded. The duration of the episodes ranged from a few seconds to 12 h/day. The patient received a doctor's consultation through phone call, his risk of stroke was four when assessed using the CHA_2DS_2VASc scale. In treatment, it was recommended to add antiarrhythmic drugs (amiodarone 600 mg a day) and oral anticoagulants (rivaroxaban 20 mg × 1 time/day). Later, periodic IEGM showed absence of AF.

CONCLUSION: In the context of the COVID-19 pandemic, health-care providers should rethink their approach to managing patients with implanted heart devices. Modern cardiovascular implantable electronic devices allow the physician to monitor the status of patients and immediately respond to situations requiring a change in treatment. Consultations can be carried out completely online.

Introduction

Stroke is an avoidable complication of atrial fibrillation (AF). Subclinical AF, as a finding in the records of implanted cardiac devices, has the same implications as clinical AF [1]. In recent years, there has been an increase in patients with implanted heart devices. A large proportion of these patients are patients with chronic heart failure (HF). Usually, these are older people with concomitant pathology [2], [3].

Hospital visits by such patients during the coronavirus disease –2019 (COVID-19) pandemic may have poor outcomes. This cohort of patients is more severely affected and at risk of death if infected [4]. Therefore, remote management of such patients is now the most appropriate. Timely prescription of anticoagulant drugs, after assessing the risk of stroke, may prevent thromboembolic complications such as stroke [5], [6].

The classification of AF includes permanent and non-permanent forms. In the case when AF is permanent, it is not difficult to register it using a routine 12-channel ECG. Documentation of paroxysmal or persistent forms of AF presents some difficulties, due to the possibility of its asymptomatic course and short-term nature [1]. In this situation, implanted heart devices may be beneficial, allowing long-term monitoring of the atrial rhythm. It should be noted that patients with implanted cardiac devices take antiplatelet therapy to prevent thromboembolic complications. The detection of AF in them will allow for more effective prevention of thrombosis by prescribing anticoagulants [7].

We present a case with completely remote management of a patient with CHF and new-onset AF.

Status | Device settings | Recordings | History | Patient profile | Options

Recordings > SVT

Entry 536 / 588

General	
Episode number	112
Episode type	SVT
Detection	01:05:11
Termination	01:06:33
Duration	1min 22s
Device settings no.	13
Detection	
Mean PP at initial detection [ms]	156
Mean RR at initial detection [ms]	383
Onset [%]	23, fulfilled
Stability [ms]	167
Redetection	---

Therapy	
ATP in VT/VF delivered	0
ATP One Shot delivered	NO
Shocks delivered	0
Shocks aborted	0
Maximum energy [J]	---
Termination	
Mean PP at termination [ms]	182
Mean RR at termination [ms]	534
Remark	
Detection	Atrial fibrillation (PP < RR, RR unstable)

Figure 1: Report of device detected atrial fibrillation

Patient Presentation

A 56-year-old man presented to the clinic with shortness of breath when climbing the second floor, moderate non-specific fatigue, general weakness, and a decrease in exercise tolerance.

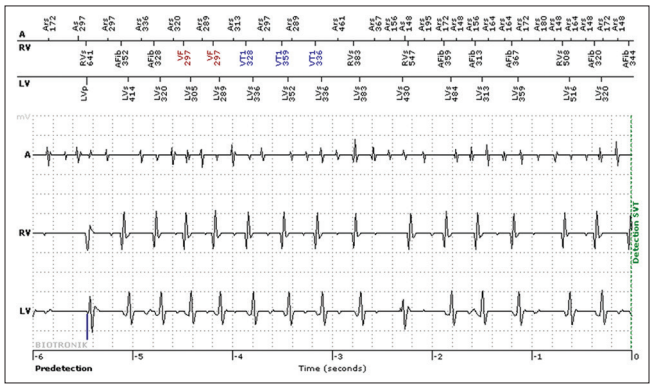

Figure 2: IEGM of device detected atrial fibrillation

Medical history included arterial hypertension for 10 years with maximum BP 200/100 mm Hg, myocardial infarction 8 years before, right coronary artery stenting, circumflex coronary artery bypass grafting, and mammary coronary artery bypass grafting of the anterior interventricular branch.

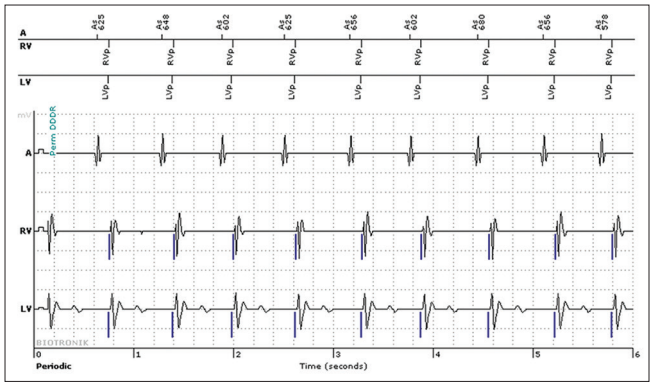

Figure 3: IEGM after treatment

Physical examination on admission showed obesity with body mass index - 35.0 kg/m^2 no edema. Patient's pulse was regular with an average rate of 76 beats/ min. Blood pressure on the both sides was 90/60 mm Hg. The patient received standard treatment for HF for at least 3 months (ACEI, beta blockers, MR antagonists, and loop diuretics) in individually selected adequate doses.

Initial work up

ECG on admission, sinus rhythm with a heart rate of 81 beats/min, QRS 150 ms. LBBB. Biochemical blood test cholesterol - 5.25 mmol/l, triglycerides - 1.18 mmol/l, LDL chol - 3.25 mmol/l, HDL chol - 1.93 mmol/l, glucose - 100.6 mg/dl, Na - 138 mmol/L, K - 4.3 mmol/L, and Pro-BNP-1512 pg/ml 6 min walk test - 320 m. Echo showed dilation of all heart chambers, diffuse hypokinesis of the walls with akinesis of the apical, middle anterior LV segments, as well as hypokinesis of the basal, middle apical, and anterior septal segment of the LV. Global myocardial contractility was reduced. The ejection fraction was reduced to 35%. Moderate mitral and mild tricuspid regurgitation was also identified. RV function is reduced. Doppler ultrasonography of the vessels of the brachiocephalic trunk and legs revealed atherosclerosis of the carotid arteries without hemodynamic disturbances, and hypoplasia of the right vertebral artery. Arteries and veins of both legs are patent.

Diagnosis and management

According to indications for cardiac resynchronization therapy in patients in sinus rhythm from ESC Guidelines, CRT is recommended in chronic HF patients and left ventricular ejection fraction ≤35% that remain in NYHA functional class II, III, and ambulatory IV despite adequate medical treatment. This is particularly

true for patients with LBBB with QRS duration 120–150 ms. After a detailed discussion with the team, it was decided to do implantation of a cardioverter-defibrillator with resynchronization function, equipped with remote monitoring (Biotronik, and Home monitoring). Date of implantation is June 19, 2014. Prescribed treatment after implantation: Perindopril 2 mg/day (initial dose), further 4 mg/ day for 6 days, carvedilol 6.25 mg. 1 tab × 2 times a day (with further increase to 25 mg/day) for 14 days, spironolactone 50 mg. 1 cap × 1 time/day for 5 days, enoxaparin sodium 0.6 ml × 2 times a day, p/c for 4 days, further acetylsalicylic acid 100 mg × 1 time/ day for 4 days, rosuvastatin 10 mg. 1 tab × 1 time/day for 7 days, cefuroxime 750 mg × 2 times a day for 11 days, and chloropyramine 2.0 ml/m for 11 days.

Follow-up

ECG at discharge showed atrial-synchronized biventricular stimulation with HR-74 beats/min. QRS-120 ms. Routine follow-ups did not reveal any heart rhythm disturbances in the patient. Due to the fact that the patient was connected to the remote monitoring system, May 5, 2020, he was diagnosed with asymptomatic AF (Figures 1 and 2). First episode lasted 1 min 22 s. On the following days of monitoring, episodes of AF were also recorded. The duration of the episodes ranged from 8 sec to 12 h/day.

The patient received a doctor's consultation through video call, his risk of stroke was four when assessed using the CHA_2DS_2VASc scale. In treatment, it was recommended to add antiarrhythmic drugs (amiodarone 600 mg a day) and oral anticoagulants (rivaroxaban 20 mg × 1 time/day).

Later periodic IEGM showed absence of AF (Figure 3). Such an important indicator as biventricular pacing was affected with the occurrence of AF in the patient. Namely BiV pacing before AF registration was 94%, during AF it was 79%, and after rhythm restoration this indicator was 98%.

Discussion

In recent years, cardinal changes have occurred in all spheres of life associated with the spread of COVID-19 infection. Quarantine measures were applied in all countries to interrupt the chain of infection. Isolation at home, distance education and work, frequent hand washing, wearing masks, and other measures have been taken to "flatten the curve." This case report shows how we can shield patients with implanted heart devices from unnecessary inpatient visits, thereby reducing their risk of infection while preventing hospital congestion.

During this time of crisis, the load on the medical institution increased, the need arose to transform medical centers to the COVID-hospitals. The health workers faced the need to revise the methods of supervising their patients. Good solution in this case is remote monitoring by phone call. Patients with implanted heart devices are at high risk of death if infected with COVID-19. Thanks to the remote monitoring system, it became possible to give recommendations to such patients without resorting to face-to-face visits.

The world is witnessing an increase in operations on the implantation of heart devices associated with the expansion of the range of indications for implantation in the guidelines. These patients require constant medical supervision and can be consulted in an outpatient clinic without resorting to frequent hospitalizations. Patients with implanted heart devices need regular follow-up at least once every 6 months, as well as additional check-ups if new symptoms occur or existing symptoms worsen [8].

The latest data on the increased mortality of patients with concomitant cardiac pathology from COVID-19 suggest the need to protect these patients in all possible ways, including replacing potentially dangerous offline visits with online consultations. Perhaps online consultation is not a complete substitute for face-to-face visits and there are many aspects that need to be worked on. Nevertheless, in today's unprecedented environment, remote consultations are the most reasonable solution [9].

Remote monitoring allows assessing not only physiological parameters such as heart rate and heart rate variability, but also the patient's activity and thoracic impedance, giving information about the presence of fluid. Remote monitoring of patients with implanted heart devices can, in today's challenging environment, become a tool to reduce the burden on hospitals and, most importantly, reduce the risk of complications in patients with newly diagnosed AF [10].

The debate over the anticoagulation of patients with subclinical AF diagnosed with the device continues. There is no clear recommendation on this in the guidelines [11]. There are several studies showing the risk of stroke in patients with device-detected AF. For example, in the ASSERT study subclinical AF lasting more than 24 h has been associated with an increased risk of stroke and systemic embolism [12]. In the TRENDS study, duration of AF or atrial flutter more than or equal to 5.5 h doubled the risk of thromboembolism [13]. In a study by Perino *et al*., it was found that patients taking oral anticoagulants had a lower risk of stroke. However, this was only true in patients with AF burden of more than 24 h [14]. Several ongoing large randomized trials are investigating the efficacy of new oral anticoagulants in preventing thromboembolic events in patients with subclinical device-detected AF. Perhaps the results of these studies will add clarity to this issue [15], [16]. In our case, when considering the

issue of anticoagulation, both the burden of AF and the scores on the CHA_2DS_2VASc scale were taken into account.

This approach is forced today and requires further improvement, but it will give impetus to the development of telemedicine for future use, even after the lifting of the restrictive measures associated with the pandemic.

Conclusion

The use of remote monitoring technologies allows continuous monitoring of the implanted system and patient indicators, several times reducing the number of scheduled and additional visits to the doctor. Remote monitoring also allows immediately identify or prevent emerging complications, which in some cases help to save the patient's life. The remote patient monitoring system became the most relevant during the COVID-19 pandemic, since patients were not able to come for routine examinations, but they had the opportunity to receive online recommendations.

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