INNOVATIONS IN DIGITAL MEDICINE

User experience for an acute cardiac care department

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Dr. Montalescot reports, research grants for his team to the Institution or, consulting/lecture fees from Abbott, Amgen, Actelion, American College of Cardiology Foundation, AstraZeneca, Axis-Santé, Bayer, Boston-Scientific, Boehringer Ingelheim, Bristol-Myers Squibb, Beth Israel Deaconess Medical, Brigham Women’s Hospital, China heart House, Daiichi-Sankyo, Idorsia, Elsevier, Europa, Fédération Française de Cardiologie, ICAN, Lead-Up, Medtronic, Menarini, MSD, Novo-Nordisk, Partners, Pfizer, Quantum Genomics, Sanofi, Servier, WebMD.
Trying to solve the problem of prolonged ECG monitoring

- Cardionet
- Medtronic Reveal XT or LINQ
- Novacor R. test Evolution 4
- ZIO XT
- Sorin Spiderflash Afib
Cardioskin™

- a 15-lead Wearable ECG recording for continuous, long-term monitoring (2-4 weeks)
- a Secured, Cloud-based interface accessible with a computer for ECG Analysis and Review with Remote Data Transmission
- Online collaborative platform with automated analysis compliant with GDPR

Used by healthcare professional only
**Cardioskin™ – Comfort and Usability assessment – Phase 1**

- **Objective:** assess COMfort and uSabilitY of Cardioskin, based on feedback from patients who have been prescribed a holter exam
- **Where:** Institute of Cardiology, Pitié Salpêtrière hospital
- **Who:** Patients coming for a Holter exam (n=20)
- **When:** November 2018

**Protocol:**
- Patient is trained on Cardioskin (10’)
- Patient puts on the Cardioskin by himself, and wears it for 5 minutes
- Patient removes Cardioskin, then is equipped with a regular Holter device
- Patient gives feedback, with Y/N questions and free comments/remarks

- 75% of patients think Cardioskin is more comfortable than the Holter
- 60% of patients have a strong preference for Cardioskin, for a long-term exam (>7days)
- 25% of patients think they would sleep better with the Holter, compared to Cardioskin
- 10% of patients would prefer replacing electrodes rather than washing the Cardioskin TShirt
More Comfortable than Holter

Discret Compatible with daily activities

Sleep better than with Holter

Easy to recharge

Easy to wash

N=60 Patients had a full cardioskin exam

<table>
<thead>
<tr>
<th>Feature</th>
<th>Patients</th>
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</thead>
<tbody>
<tr>
<td>More Comfortable than Holter</td>
<td>76%</td>
</tr>
<tr>
<td>Discret</td>
<td>66%</td>
</tr>
<tr>
<td>Compatible with daily activities</td>
<td>75%</td>
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<tr>
<td>Sleep better than with Holter</td>
<td>70%</td>
</tr>
<tr>
<td>Easy to recharge</td>
<td>92%</td>
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<tr>
<td>Easy to wash</td>
<td>87%</td>
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</table>
Cardioskin™ – Comfort and Usability assessment

WHICH DEVICES WOULD YOU ACCEPT TO WEAR CONTINUOUSLY?

During 1 day
During 3 days
During 1 week
During 2 weeks
During 3 weeks
Patient’s journey with Cardioskin™

1. PRESCRIPTION

PROVISION OF NURSING CARE*
IN COLLABORATION WITH ON-SITE MEDICAL TEAM

2. RECORDING OF REST-ECG OR HOLTER-ECG (UP TO 15 LEADS)

• TRAINING OF PATIENT
• TECHNICAL SUPPORT
• PATIENT FOLLOW-UP AND MONITORING

3. TRANSMITTING ECG DATA TO THE ONLINE PLATFORM

Requesting an ECG or holter ECG?

4. INTERPRETATION OF ECG BY A CARDIOLOGIST, THROUGH THE WEB INTERFACE

5. MEDICAL REPORT AVAILABLE TO PRESCRIBING PHYSICIAN
Clinical experience with Cardioskin™ - phase 3

58 patients were included from Dec 2018 to June 2019

<table>
<thead>
<tr>
<th>Condition</th>
<th>Min age</th>
<th>Max age</th>
<th>Mean age</th>
<th>M (%)</th>
<th>F (%)</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syncope</td>
<td>31</td>
<td>59</td>
<td>40</td>
<td>2(40%)</td>
<td>3(60%)</td>
<td>5</td>
</tr>
<tr>
<td>Cardiomyopathies</td>
<td>42</td>
<td>44</td>
<td>43</td>
<td>0</td>
<td>2(100%)</td>
<td>2</td>
</tr>
<tr>
<td>Palpitations</td>
<td>22</td>
<td>71</td>
<td>41</td>
<td>5(29%)</td>
<td>12(71%)</td>
<td>17</td>
</tr>
<tr>
<td>AF post-ablation</td>
<td>32</td>
<td>60</td>
<td>50</td>
<td>2(40%)</td>
<td>3(60%)</td>
<td>5</td>
</tr>
<tr>
<td>PFO</td>
<td>32</td>
<td>62</td>
<td>47</td>
<td>11(38%)</td>
<td>18 (62%)</td>
<td>29</td>
</tr>
</tbody>
</table>
• PFO case 1, palpitations

Sinus rhythm
Frequent atrial extrasystoles
No A Fib

Blocked atrial extrasystole
- PFO case 2, numerous notifications by the patient
  - Sinus rhythm
  - Atrial and ventricular hyperexcitability
  - No sustained A Fib
• DAI follow-up, palpitations

Frequent PVC
Unsustained VT
• Pregnant woman, palpitations

Atrioventricular nodal reentrant tachycardia
• Follow-up after flutter ablation, palpitations

Several episodes of atrial tachycardia (150bpm)
One episode is 4hr long
• Post AF ablation follow-up, « angina-type » chest pain

Short, unsustained AF episodes
No significant ST-segment shifts
• Dizziness

Frequent atrial extrasystoles
Short episodes of atrial tachycardia
Frequent PVC
Conclusions

• Cardioskin™ is a patch-free and wire-free system of ECG monitoring

• It provides a 15-lead, high-quality, long-term (2-4 weeks) ambulatory ECG-holter monitoring in real life conditions

• Patients need a cell phone or a home wifi*

• Patients find Cardioskin™ discreet, easier to use and more comfortable than usual ECG-Holter devices

• All recordings are available for visualization or interpretation on a web platform

• Broad diagnostic indications for Cardioskin™

*Cardioskin can also function completely offline (similar to traditionnal holter)
*cellular connection can also be provided with Cardioskin at patient’s home

As a wearable device, Cardioskin offers an easy technological solution for long-term and real-life monitoring