Abstract: P2876

Repeating non-invasive risk stratification tests improves the prediction of outcomes of ICD patients in the EUTrigTreat study.

Authors:
B Vandenberk¹, C Rover², A Dunnink³, T Friede², P Flevari⁴, M Zabel⁵, R Willems¹, ¹University of Leuven, Department of Cardiovascular Sciences - Leuven - Belgium, ²University Medical Center Gottingen (UMG), Department of Medical Statistics - Gottingen - Germany, ³University Medical Center Utrecht, Department of Medical Physiology - Utrecht - Netherlands (The), ⁴Attikon University Hospital, Department of Cardiology - Athens - Greece, ⁵University Medical Center Gottingen (UMG), Department of Cardiology - Gottingen - Germany,

On behalf: EUTrigTreat

Topic(s): Ventricular Arrhythmias and SCD - Epidemiology, Prognosis, Outcome: Risk Factors and Risk Assessment

Citation:
Funding Acknowledgements:
This research has received funding from European Community’s Seventh Framework Program FP7: EUTrigTreat (grant agreement no. HEALTH-F2-2009-241526).

Background:
Non-invasive risk stratification of SCD aims to predict the risk by assessing measures of substrate (LVEF), of triggers (PVCs; T-wave alternans, TWA) and of autonomic function (heart rate turbulence, HRT). However, the value of repeating these tests during follow-up is unclear.

Purpose:
To study the predictive value of repeated non-invasive risk assessment.

Methods:
EUTrigTreat is a prospective trial aimed to improve non-invasive risk stratification in ICD patients. The study protocol included non-invasive testing at baseline and a repeat after 6 to 12 months. The population included ischemic and non-ischemic cardiomyopathies and arrhythmogenic heart disease. Test results were categorized as pathologic (1) versus non-pathologic (0) for LVEF =40%, PVCs > 400 in 24h, abnormal exercise TWA (Cambridge Heart) and abnormal HRT (TO > 0.1% and/or TS =2.0ms/RRI). Time dependent Cox regression modelling was performed for mortality, and a Fine-and-Gray competing risk analysis for shocks, including adjustment for independent predictors in the overall study population (mortality: age, LVEF, history of AF, NT-proBNP, NYHA class, eGFR; shocks: LVEF, secondary prevention).

Results:
A total of 635 patients were included with a follow-up of 4.3 ± 1.5 years, 96 (15%) received an ICD shock and 108 (17%) died. The table shows the results at baseline and with repeating the tests after 8 ± 1 months. Worsening of LVEF compared to a stable LVEF >40% and persistent abnormal HRT were independent predictors of mortality. Improvement in HRT was associated with a lower mortality. Worsened results upon TWA testing was associated with a 3 times higher risk of shocks. A persistent low LVEF was an independent predictor of both mortality and ICD shocks.

Conclusion:
Repeating LVEF, TWA and HRT have the potential to improve risk stratification for mortality and shocks in ICD patients.
Repeating non-invasive risk stratification tests improves the prediction of outcomes of ICD patients in the EUTrigTreat study.

Authors:

B Vandenberk 1, C Rover 2, A Dunnink 3, T Friede 2, P Flevari 4, M Zabel 5, R Willems 1

1 University of Leuven, Department of Cardiovascular Sciences - Leuven - Belgium,
2 University Medical Center Gottingen (UMG), Department of Medical Statistics - Gottingen - Germany,
3 University Medical Center Utrecht, Department of Medical Physiology - Utrecht - Netherlands (The),
4 Attikon University Hospital, Department of Cardiology - Athens - Greece,
5 University Medical Center Gottingen (UMG), Department of Cardiology - Gottingen - Germany,

On behalf: EUTrigTreat

Topic(s):

Ventricular Arrhythmias and SCD - Epidemiology, Prognosis, Outcome: Risk Factors and Risk Assessment

Citation:

Funding Acknowledgements:

This research has received funding from European Community's Seventh Framework Program FP7: EUTrigTreat (grant agreement no. HEALTH-F2-2009-241526).

Background:

Non-invasive risk stratification of SCD aims to predict the risk by assessing measures of substrate (LVEF), of triggers (PVCs; T-wave alternans, TWA) and of autonomic function (heart rate turbulence, HRT). However, the value of repeating these tests during follow-up is unclear.

Purpose:

To study the predictive value of repeated non-invasive risk assessment.

Methods:

EUTrigTreat is a prospective trial aimed to improve non-invasive risk stratification in ICD patients. The study protocol included non-invasive testing at baseline and a repeat after 6 to 12 months. The population included ischemic and non-ischemic cardiomyopathies and arrhythmogenic heart disease. Test results were categorized as pathologic (1) versus non-pathologic (0) for LVEF = 40%, PVCs > 400 in 24h, abnormal exercise TWA (Cambridge Heart) and abnormal HRT (TO > 0.1% and/or TS = 2.0ms/RRI). Time dependent Cox regression modelling was performed for mortality, and a Fine- and Gray competing risk analysis for shocks, including adjustment for independent predictors in the overall study population (mortality: age, LVEF, history of AF, NT-proBNP, NYHA class, eGFR; shocks: LVEF, secondary prevention).

Results:

A total of 635 patients were included with a follow-up of 4.3 ± 1.5 years, 96 (15%) received an ICD shock and 108 (17%) died. The table shows the results at baseline and with repeating the tests after 8 ± 1 months.

Worsening of LVEF compared to a stable LVEF > 40% and persistent abnormal HRT were independent predictors of mortality. Improvement in HRT was associated with a lower mortality. Worsened results upon TWA testing was associated with a 3 times higher risk of shocks. A persistent low LVEF was an independent predictor of both mortality and ICD shocks.

Conclusion:

Repeating LVEF, TWA and HRT have the potential to improve risk stratification for mortality and shocks in ICD patients.

<table>
<thead>
<tr>
<th>Mortality</th>
<th>Baseline 1 (vs. 0) HR (CI)</th>
<th>Worsening 0-1 (vs. 0-0) HR (CI)</th>
<th>Improvement 1-0 (vs. 1-1) HR (CI)</th>
<th>Stable 1-1 (vs. 0-0) HR (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVEF (n=315)</td>
<td>1.85 (1.06-3.24)</td>
<td>3.47 (1.13-10.68)</td>
<td>0.88 (0.40-1.94)</td>
<td>2.22 (1.19-4.15)</td>
</tr>
<tr>
<td>TWA (n=204)</td>
<td>0.62 (0.28-1.37)</td>
<td>0.80 (0.25-2.59)</td>
<td>0.67 (0.18-2.47)</td>
<td>0.59 (0.20-1.77)</td>
</tr>
<tr>
<td>PVC (n=329)</td>
<td>1.26 (0.73-2.16)</td>
<td>0.99 (0.36-2.72)</td>
<td>0.63 (0.26-1.52)</td>
<td>1.38 (0.75-2.55)</td>
</tr>
<tr>
<td>HRT (n=163)</td>
<td>2.57 (0.85-7.77)</td>
<td>4.01 (0.39-41.17)</td>
<td>0.10 (0.01-0.81)</td>
<td>8.71 (1.11-68.24)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shocks</th>
<th>Baseline 1 (vs. 0) HR (CI)</th>
<th>Worsening 0-1 (vs. 0-0) HR (CI)</th>
<th>Improvement 1-0 (vs. 1-1) HR (CI)</th>
<th>Stable 1-1 (vs. 0-0) HR (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVEF (n=338)</td>
<td>1.73 (0.93-3.22)</td>
<td>0.92 (0.13-6.67)</td>
<td>0.26 (0.06-1.08)</td>
<td>2.02 (1.09-3.76)</td>
</tr>
<tr>
<td>TWA (n=256)</td>
<td>0.82 (0.39-1.70)</td>
<td>2.91 (1.04-8.13)</td>
<td>1.31 (0.48-3.59)</td>
<td>1.54 (0.54-4.43)</td>
</tr>
<tr>
<td>PVC (n=366)</td>
<td>1.28 (0.70-2.34)</td>
<td>1.48 (0.54-4.09)</td>
<td>0.54 (0.16-1.81)</td>
<td>1.70 (0.86-3.35)</td>
</tr>
<tr>
<td>HRT (n=188)</td>
<td>1.12 (0.50-2.50)</td>
<td>0.57 (0.13-2.52)</td>
<td>0.73 (0.20-2.64)</td>
<td>1.06 (0.43-2.61)</td>
</tr>
</tbody>
</table>