PFO: UN UNAVOIDABLE INDICATOR OF COMPLEXITY IN MEDICINE

CHRISTIAN PRISTIPINO, MD, FESC, FACC

SAN FILIPPO NERI HOSPITAL, ROMA
25-30%

Patent Foramen Ovale

Fossa Ovalis

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<table>
<thead>
<tr>
<th>Study</th>
<th>Stroke (PFO/no PFO)</th>
<th>Control (PFO/no PFO)</th>
<th>Effect estimate (95% CI)</th>
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</thead>
<tbody>
<tr>
<td><strong>PROSPECTIVE DESIGN</strong></td>
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<tr>
<td><strong>Population-based sample</strong></td>
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<tr>
<td>Primary stroke (time-to-event analysis)</td>
<td>Meissner, 2006 [30]</td>
<td>12:140</td>
<td>29:437</td>
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<tr>
<td></td>
<td>Di Tullo, 2007 [31]</td>
<td>12:164</td>
<td>56:936</td>
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<td></td>
<td>Subtotal (I² = 0.0%, p = 0.806)</td>
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<tr>
<td><strong>Hospital-convenience sample</strong></td>
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<tr>
<td>Recurrent stroke (time-to-event analysis)</td>
<td>Mas, 2001 [51]</td>
<td>13:216</td>
<td>16:304</td>
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<td></td>
<td>Feurer, 2010 [52]</td>
<td>19:254</td>
<td>32:509</td>
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<td>Subtotal (I² = 0.0%, p = 0.325)</td>
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<td><strong>RETRIEVE DESIGN</strong></td>
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<td>Recurrent stroke (rate ratio)</td>
<td>Comess, 1994 [63]</td>
<td>xxx</td>
<td>xxx</td>
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<td>Serena, 2008 [62]</td>
<td>16:297</td>
<td>1:198</td>
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<td><strong>CROSS-SECTIONAL DESIGN</strong></td>
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<td>Cryptogenic stroke (OR)</td>
<td>Rugbjerg, 1997 [38]</td>
<td>3:100</td>
<td>15:43</td>
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<tr>
<td></td>
<td>Sastre, 1998 [39]</td>
<td>38:63</td>
<td>3:100</td>
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<td>Pettys, 1999 [32]</td>
<td>13:100</td>
<td>128:391</td>
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<td><strong>Community-convenience sample</strong></td>
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<td>Cryptogenic stroke (OR)</td>
<td>Jones, 1994 [36]</td>
<td>14:57</td>
<td>31:171</td>
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<td>Cryptogenic stroke (OR)</td>
<td>Force, 2008 [42]</td>
<td>17:45</td>
<td>4:66</td>
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<td></td>
<td>Di Tullo, 1992 [41]</td>
<td>19:26</td>
<td>7:94</td>
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<td>Cabanes, 1993 [38]</td>
<td>36:28</td>
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<td>Cerrato, 2002 [40]</td>
<td>43:63</td>
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<td>Schlueter, 2000 [39]</td>
<td>24:22</td>
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<td>Handke, 2007 [43]</td>
<td>77:150</td>
<td>34:242</td>
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<td>Subtotal (I² = 27.0%, p = 0.223)</td>
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<td>Retinal/cerebral ischemia (OR)</td>
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<td>Chen, 1991 [65]</td>
<td>7:27</td>
<td>15:19</td>
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**HETEROMEGEITY**
19 meta-analyses
On
3 randomized trials!
SV ARRHYTHMIAS & PFO

- 42-52% ATRIAL VULNERABILITY
- 42-52% INDUCIBLE SUSTAINED AT
- \( \approx 10\% \) AF INCIDENCE BEFORE CL.
- 5-8% AF INCIDENCE AFTER CL.
EUROPEAN POSITION PAPER
ON
PFO MANAGEMENT

TO PROVIDE A
BALANCED AND INTERDISCIPLINARY
APPROACH
TO A PERSONALISED PFO MANAGEMENT
IN COMPLEX SYNDROMES
9 SCIENTIFIC SOCIETIES

- EAPCI (PROMOTER AND CHAIR)
- ASSOCIATION FOR EUROPEAN PEDIATRIC AND CONGENITAL CARDIOLOGY
- EUROPEAN ASSOCIATION FOR CARDIOVASCULAR IMAGING – EACVI
- EUROPEAN HAEMATOLOGICAL SOCIETY
- EUROPEAN HEART RYTHM ASSOCIATION – EHRA
- EUROPEAN SOCIETY OF CARDIOLOGY:
  - WG GUCH
  - WH THROMBOSIS
- EUROPEAN STROKE ORGANISATION - ESO
- EUROPEAN UNDERWATER AND BAROMEDICAL SOCIETY

« EXTERNAL CONTRIBUTION »: EUROPEAN ASSOCIATION OF NEUROSURGICAL SOCIETIES
RULE-OUT FA
MODIFIED STACEY DIAGRAM

PROBABILITY OF ASSOCIATION

LOW

HIGH

DISCERNING

MEDICAL

CLOSURE

PROBABILITY OF RECURRENCE
EMPOWERMENT & SHARED DECISIONS

OPEN INFORMED CONSENT
Creating artificial coaches Coaches
Neck/shoulder pain Coach
Physical activity Coach
Stress management Coach

[Images of various devices and graphs related to monitoring and coaching.]
INDIVIDUAL DATA

CLOUD

DYNAMIC
PHENOTYPES

INDIVIDUAL DATA
PERSONALIZED APPROACHES
Structured, stratified and relevant approaches for P4 healthcare:

- Predictive
- Preventive
- Personalized
- Participatory
How will Precision Medicine be Implemented?

Data Sources (%) by Factors to Practice Precision Medicine

1. Microbiome 15%
   - Clinical Data
   - Screening
   - Patient History

2. Omics Data 30%
   - Omics/Dx
   - Others
   - Imaging

3. Advisory Support 20%
   - Remote Care Data
   - Sensors / Wearables

4. Socio-Economics 35%
   - Environmental
   - Exogenous Factors
   - Personal

Consultation

Imaging / Monitoring
Data driven modeling and mining

Finding new relationships (e.g. machine learning)
Detecting changes in time (complex event detection)

- To generate new knowledge on behaviour <> health
- To create personally tuned models
- To detect linked changes in time for multi targeted coaching
IS PFO DIFFERENT FROM THE OTHER MEDICAL CONDITIONS?
ITALIAN ASSOCIATION FOR SYSTEMS MEDICINE AND HEALTHCARE