XVIe Séminaire de Cardiologie Pédiatrique

DOUBLES DISCORDANCES

sous la direction de
Jean Kachaner et Daniel Sidi

avec le concours privilégié de
MEDTRONIC FRANCE
Echo Multidimensionnelle

Un simple gadget ?

Imaginer demain
AVSD

Simpson et Acar EHJCI 2017
3D MV Stenosis

Hadeed et al. JASE 2016
3D TV Ebstein

Hadeed et al. Echocardiography 2014
Interventional catheterization and echocardiography: An indefectible link illustrated by atrial septal defect closure.

Karsenty C¹, Hadeed K², Acar P².
REVIEW

Cardiac imaging of congenital heart diseases during interventional procedures continues to evolve: Pros and cons of the main techniques

Évolution de l’imagerie des cardiopathies congénitales en salle de cathétérisme : avantages et inconvénients des différentes techniques

Sebastien Hascoet a,b,1, Karine Warn-Fresse a, Alban-Elouen Baruteau a,b,1, Khaled Hadeed c,1, Clement Karsenty c, Jérôme Petit c,1, Patrice Guérin c,1, Alain Fraissé c,1, Philippe Acar a,b,1

1Université de Nantes, Cardio-Renal Imaging Unit, INSERM U1063, France. 2INSERM U1063, Cardiovascular Imaging Unit, Nantes, France. 3AMS Imaging, Montpellier, France. 4University Hospital, Montpellier, France. 5Montpellier University, Institute of Cardiology, Montpellier, France.
Fusion Echo-Scopy Echonavigator™
ASD closure
VSD closure
Fontan fenestration closure / opening
Baffle leak / stenosis
Tricuspid / Mitral valve
Aortic valvuloplasty
Feasibility, Safety and Accuracy of Echocardiography-Fluoroscopy Imaging Fusion During Percutaneous Atrial Septal Defect Closure in Children

A) EchoNavigator helps understanding
B) EchoNavigator helps following the procedure
C) EchoNavigator decreases procedure duration
D) EchoNavigator is useful to guide the procedure
Fusion
Ao Valve
Dilatation

Usefulness of echocardiographic-fluoroscopic fusion imaging in children with congenital heart disease

L’apport de l’imagerie de fusion entre échocardiographie et fluoroscopie dans le traitement des cardiopathies congénitales chez les enfants

Khaled Hadeed a,*, Sebastien Hascœü b,*, Clement Karsenty a,*, Mariseea Ratsimandresy c, Yves Dulac c, Gerald Chausseray d, Xavier Alacoque c, Alain Fraise e, Philippe Acar a
Fusion Echo-Scopy

VSD Closure
3D TRUE VIEW
3D Cardiac Printing

Medical scanner

Dedicated Software

3D printing

Image acquisition → Segmentation and 3D surface model → 3D Printing
Cardiac 3D printing for better understanding of congenital heart disease

Khaled Hadeed, Philippe Acar, Yves Dulac, Fabio Cuttone, Xavier Alacoque, Clément Karsenty
3D Echo Printing
MitraClip
Piloting the Use of Patient-Specific Cardiac Models as a Novel Tool to Facilitate Communication During Clinical Consultations

Giovanni Biglino, Despina Konioridou, Marisa Gasparini, Claudio Capeb, Lindsay Kaye Leaver, Sachin Khambadkone, Silvia Schievano, Andrew M. Taylor, Jo Wray

A) 3D models aided learning experience
B) 3D models provide more information than diagrams
C) 3D models provide less information than generic models

Pie charts showing the distribution of opinions on the effectiveness of 3D models in aiding learning and providing information.
<table>
<thead>
<tr>
<th></th>
<th>Printing</th>
<th>Control</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture score</td>
<td>17,34</td>
<td>16,60</td>
<td>0,04</td>
</tr>
<tr>
<td>Diagnosis (/5)</td>
<td>4,42</td>
<td>4,15</td>
<td>0,03</td>
</tr>
<tr>
<td>Treatment (/5)</td>
<td>4.28</td>
<td>3.87</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>
Three-dimensional printed models for surgical planning of complex congenital heart defects: an international multicentre study

Issael Valverde, Gorka Gomis-Ciriza, Tarique Hussain, Cristina Suarez-Meijas, Maria N Velasco-Forte, Richard Byrne, Antonio Ordóñez, Antonio González-Calle, David Anderson, Mark G. Hazenkamp.
3D Printing Surgery

DORV
AVSD
PS

Ao
ASD
VSD
STATE-OF-THE-ART REVIEW

3D Printing is a Transformative Technology in Congenital Heart Disease

Shafkat Anwar, MD, Gautam K. Singh, MD, Jacob Miller, MD, Monica Sharma, MS, Peter Manning, MD, Joseph J. Billadello, MD, Pirooz Eghtesady, MD, PhD, Pamela K. Woodard, MD

3DE Printing ASD
Hybrid 3D

Gosnell et al, J Digit Imaging 2016

+ 2D-3D TTE

+ 3D TEE
Virtual Reality

Lasso et al, JASE 2018
Conclusion
Keep Contact