**1019 Catheter Closure of Atrial Septal Defects**

Sunday, March 07, 2004, 9:00 a.m.-11:00 a.m.
Morial Convention Center, Hall G
Presentation Hour: 9:00 a.m.-10:00 a.m.

**T1019-197**
Anatomic Interaction Between the Aortic Root and the Atrial Septum: An Echocardiographic Prospective Study
Geraldine Bertaux, Jean-Christophe Eicher, Annie Petit, Petir Dobos, Pierre Louis, Jean-Eric Wolf, St Ann University Hospital, Dijon, France, St Ann University Hospital, Brno, Czech Republic

**Background:** Patent Foramen Ovale syndrome is a rare pattern of dyspepsia that may be observed with atrial right-to-left shunting (RLS). A few cases have been reported in association with an atrial aneurysm, but no documented pathophysiologic explanation has been proposed.

**Methods:** We studied 72 consecutive patients (mean age 66.2 ± 10, 68% males) referred for pre-operative assessment of either an aortic valve disease or an aneurysm of the ascending aorta. During catheterisation, a careful search for a patent foramen ovale (PFO) was performed. During multiplane transesophageal echocardiography we measured: maximal diameter of the ascending aorta (AoD), minimal atrial septal dimension (ASd) at the level of the aortic root, and maximal oscillation amplitude of the aortic septum (ASo). We further completed our study including patients with an atrial septal aneurysm were excluded). A PFO was sought by contrast infusion through a brachial vein and through the femoral vein, and the RLS was categorized as grade 1, 2 or 3. The relationships between AoD, ASd, and ASo were studied.

**Results:**
- Mean AoD was 43.4 ± 9 mm (range 30-64).
- A PFO was found in 26% of the patients.

<table>
<thead>
<tr>
<th>Correlation study</th>
<th>r</th>
<th>p</th>
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<tbody>
<tr>
<td>AoD / ASd</td>
<td>-0.49</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>AoD / ASo</td>
<td>0.24</td>
<td>0.041</td>
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<tr>
<td>ASd / ASo</td>
<td>-0.37</td>
<td>&lt;0.002</td>
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**Interpretation:** These results demonstrate that a dilation of the aortic root significantly affects the aortal septal morpholgy by reducing its apparent size, decreasing its tautness, and increasing its mobility. The increased septal mobility appears to be an important risk factor for RLS in the presence of a PFO.

**T1019-201**
Migraine Relief Following Transcatheter Closure of Patent Foramen Ovale
Mark Reisman, Jill T. Jesurum, Merrill P. Spencer, Kimberly A. Krabill, Lance Diehl, John V. Olsen, Christine Smith, William A. Gray, Swedish Medical Center, Seattle, WA

**Background:** Current theory suggests that right-to-left shunt (RLS) through a patent foramen ovale (PFO) permits paradoxical microemboli and neuromediators to bypass lung filtration thereby potentially triggering migraine aura. The purpose of this study was to determine if transcatheter PFO closure in migraineurs is associated with a reduction in migraine frequency.

**Methods:** Between July 2001 and 2003, 120 patients underwent transcatheter PFO closure to prevent recurrent cryptogenic stroke or transient ischemic attack. According to criteria defined by the International Headache Society, 42% (50/120) of patients experienced active migraine symptoms and 28% (34/120) of those reported migraine aura. Following PFO closure, patients were serially evaluated to assess residual RLS and migraine frequency. Contrast transcranial Doppler was used to measure microembolic signals during normal respiration and during calibrated (40 mmHg) respiratory strain. The mean time of follow-up was 4 months after PFO closure.

**Results:**
- Migraineurs with aura (n = 23) experienced a mean reduction in migraine frequency from 7.8 ± 10.9 (pre-closure) to 1.7 ± 4.7 (post-closure) events per month (p < 0.01).
- Migraineurs without aura (n = 9) reported a clinically important reduction in migraine frequency from 11.8 ± 12.7 (pre-closure) to 3.4 ± 8.1 (post-closure) events per month (p < 0.01). Overall, 42% (21/50) of migraineurs experienced complete resolution of migraine symptoms. Additionally, 5 (10%) patients reported a substantial (>50%) reduction and 2 (4%) patients reported a partial (<50%) reduction in migraine frequency. Only 5 (10%) patients reported no reduction in migraine frequency following PFO closure. A significant reduction in RLS was observed following PFO closure in migraineurs with and without aura (N = 44), during normal respiration (146 ± 128 vs. 22 ± 63, p < 0.01) with calibrated strain (270 ± 65 vs. 92 ± 125, p < 0.01).

**Conclusion:** Transcatheter PFO closure results in significant reduction in migraine events. The mechanism of this causal effect warrants further investigation.

**T1019-202**
Effect of Rim Deficiency and Occluder Size on Acute and Mid-Term Results of Transcatheter Atrial Septal Defect Closure in Adults
Maria Heger, Raphael Rosenhek, Harald Gabriel, Thomas Binder, Gerald Maurer, Peter Probst, Helmut Baumgartner, University of Vienna, Vienna, Austria

**Background:** Although a rim of <5 mm around the defect was originally considered mandatory for transcatheter atrial septal defect (ASD) closure, defects with <5 mm rim to the aorta are now accepted. Whether this may be associated with damage of the aortic wall, higher likelihood of residual shunt, of the occurrence or worsening of aortic regurgitation (AR), AR or other unfavorable effects especially when using larger sized occluders has not been studied.

**Methods:** All pts in whom ASD closure was attempted between 1998 and 2002 were included (n=111, 80 female, 52±17yrs, Amplatzer occluder, mean follow-up [FU] 2.2±1.2 yrs). Sufficient rim was present in 36 pts. (group A), 48 pts. (group B) had only a small rim (<5mm to the aorta) and 27 pts. had no rim to the aorta (group C). FU studies were performed at 3, 6, 12 and every month thereafter.

**Results:**
- The procedure was successful in all pts. (occluder size 25±5mm, range 9 to 30mm).
- No major complications occurred. Minor complications were: transient ST-elevation (2), transient AV block (1) and transient SVT (4). At last FU, no relevant residual shunt was present in any pt., while 5 pts. (group A: 3; group B: 2) had mild shunts (Qp/Qs 1:3). Mild AR was present in 20 pts. prior to intervention. In only 1 pt. an increase to mild-to-moderate AR was found (group C). Six pts. (group A: 3; group B: 2; group C: 1) presented with a new finding of trace or mild mitral regurgitation (MR) which was common prior to intervention (71 pts.). In 4 pts. an increase to mild-to-moderate MR was observed (group A: 1; group B: 3). Trace MR was an inconsistent finding disappearing in 6 pts. and occurring in 17 pts. (group A: 6; group B: 7; group C: 4).

**Conclusion:** ASDs with small and even missing rim to the aorta can safely be closed with Amplatzer occluders. Neither a deficient rim to the aorta nor the use of larger occluders appears to result in an increased likelihood of residual shunt, of the occurrence or worsening of AR and MR or of other adverse events.

**T1019-203**
Stability of the Amplatzer Septal Occluder Device: Importance of the Atrial Tissue Rim
Arkush K. Chhabra, Babak Arzabak, Hitoshi Anzai, Michael Fishbein, Catherine Dao, Vicki Chan, Richard Gaster, John Moore, Jonathan Tobias, University of California- Los Angeles, Los Angeles, CA

**Background:** Percutaneous closure of secundum atrial septal defects (ASD) with the Amplatzer Septal Occluder device requires an adequate rim of septal tissue to stabilize the device. The amount of septal tissue and aortal rim necessary for stabilization has not been quantified.

**Methods:** An artificial ASD was created in fresh autopspied hearts through a right atrial incision. ASDs (12 to 40 mm in diameter) were created and 9 sizes of Amplatzer (12 through 40mm) were inserted. The force required to pull these devices through the ASD was measured in 260 attempts with a handegde ergometer. In 9 hearts, sequential 30-degree segments of atrial rim 7 mm wide were removed, and the force required to pull the device through the atrial septum was re-measured.

**Results:** The force required to pull an Amplatzer device through a given ASD size with an