Current Status of Renal Artery Angioplasty and Stenting in Children and Adults: When Is It The Treatment Of Choice And What Is Its Future?

Potential conflicts of interest

- Royalties
  AngioDynamics, Inc
  Cook, Inc

<table>
<thead>
<tr>
<th>AGE AT ONSET</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 WKS. TO 17 YRS.</td>
<td>14 PATIENTS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MODE OF PRESENTATION</th>
<th>MAIN</th>
<th>BRANCH</th>
<th>MAIN &amp; BRANCH</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASYMPTOMATIC</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>CONGENITAL GU DISEASE</td>
<td>6</td>
<td>4</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>CONGENITAL HEART DISEASE</td>
<td>7</td>
<td>4</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>HEADACHE</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>NOSE BLEED</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>CONGESTIVE HEART FAILURE</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>STROKE</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

PEDIATRIC RVHTN

- H & P
- ROUTINE LAB STUDIES
- PLASMA RENIN ACTIVITY
- RENAL VEIN RENIN
- SPLIT RENAL FUNCTION

- RAPID SEQUENCE IVP
- RADIUOCIDE SCAN
- CTA
- ? US/MRA?
- ARTERIOGRAPHY

SUSPECTED RENAL VASCULAR HYPERTENSION IN CHILDREN

MAIN and BRANCH RENAL ARTERY STENOSIS

DIAGNOSTIC ARTERIOGRAPHY

AORTOGRAM

DO NOT ATTEMPT PTRA or BE VERY GENTLE in SUSPECTED MID AORTIC SYNDROME!!!

- CRANIAL/CAUDAL ANGULATION
11 MOS OLD BOY DIFFUSE MAIN and BRANCH RENAL ARTERY STENOSIS ARTERITIS

Pre PTRA

11 mos, hypertensive boy
- a 2 wks BP 180/120
- a 4 mos CVA Resolved
- a 10 mos CVA
- a 11 mos BP 160/100 to 220/140 (on meds)
- a 11 mos BUN 35
- Cr 1.2

Post PTRA

11½ mos boy (1 wk post PTRA)
- BP 110/60 to 120/70 (off meds)
- BUN 9
- Cr 0.8

4 yo GIRL, BP 150/95

Pre PTRA

1 week Post PTRA
4 yo GIRL, BP 140/85

SELECTIVE MAGNIFICATION, OBLIQUE and CAUDOCRACRANIAL VIEWS

4 yo GIRL

12 yo HYPERTENSIVE GIRL

SELECTIVE LEFT RENAL ARTERIOGRAM

TAKAYASU'S ARTERITIS, 12 yo BOY

PRE PTRA

POST PTRA

PRE PTRA

POST PTRA

PRE

1 ½ yrs POST
### PEDIATRIC PTRA BP RESULTS
**FOLLOW UP 4-88 MOS (mean 41m)**

<table>
<thead>
<tr>
<th>TECH. RESULT</th>
<th>PTS</th>
<th>CURE n(%)</th>
<th>IMPR. n(%)</th>
<th>FAIL n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUCCESS</td>
<td>12</td>
<td>6 (43)</td>
<td>6 (43)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>PARTIAL SUCCESS</td>
<td>1</td>
<td>0 (0)</td>
<td>1 (7)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>FAIL</td>
<td>1</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (7)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>14</td>
<td>6 (43)</td>
<td>7 (50)</td>
<td>1 (7)</td>
</tr>
</tbody>
</table>

### CORAL
**REVISED STUDY DESIGN**

**INCLUSION CRITERIA**
- **HYPERTENSION** ≥ 155 mmHg ON 2 OR MORE ANTIHYPERTENSIVE MEDICATIONS
- **ONE OR MORE RENAL ARTERY STENOSIS**
  - ≥ 80% - <100% BY ANGIOGRAPHY
  - ≥ 60% - < 80% BY ANGIOGRAPHY WITH ≥ 20 mmHg SYSTOLIC PRESSURE GRADIENT

**PROTOCOL**
- ONLY US SITES (OUS SITES RECRUITED)
- ENROLLMENT TO BE COMPLETED IN 2007-2010
- MANDATORY USE OF DPD (OPTIONAL)

### CONCLUSIONS
- CORAL: "RENAL ARTERY STENTING DID NOT CONFER A SIGNIFICANT BENEFIT... IN PEOPLE WITH ATHEROSCLEROTIC RENAL ARTERY STENOSIS AND HYPERTENSION OR CHRONIC KIDNEY DISEASE."
- **SOS:** THE CORAL RESULTS APPLY ONLY TO THE POPULATION STUDIED WHERE HEMODYNAMIC SEVERITY/SIGNIFICANCE OF STENOSIS WAS NOT EVALUATED OR UNCERTAIN IN MOST PATIENTS AND WAS NOT CONFIRMED BY PRESSURE GRADIENTS.
- CORAL, ASTRAL and STAR PROVED THAT STENTING INSIGNIFICANT and INCIDENTAL RENAL ARTERY STENOSIS DOES NOT CURE THE DISEASE!
- **HELLO, DRIVE-BY-STENTING!**

### LEVEL 1 PROSPECTIVE RANDOMIZED TRIALS
- ASTRAL
- CORAL
- LEVEL 1 EVIDENCE ?!

### RESULTS
- POOR TRIAL DESIGN
- POOR INCLUSION CRITERIA
- SLOW RECRUITMENT
- POOR RESULTS MEANINGLES and MISLEADING OUTCOMES

### THANK YOU FOR YOUR ATTENTION