Treatment of Obstructed BT Shunts: Stent Therapy

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PTFE (Gore-Tex) graft as an AO-PA shunt has been performed since 1970’s. Modified BT shunt (3.5 mm) is the most commonly used AO-PA shunt for Norwood Stage I and for other CHD requiring PBF. BT shunt obstruction is rare but lethal, when present in SV.
CHIF Data: BT shunt

- Dates: 2000-2010
- Total: 295 patients
- Age: 1-60 days (m=8 days)
- Sex: Female=125 Male=169
- Size: 3.5 mm PTFE graft (3-4mm)

Congenital Heart Institute of Florida (CHIF)
Cardiac Diagnosis

Total=295

“SV” Physiology=196 (66%)
BT Shunt Obstruction
Requiring Intervention

- Total: 19 patients (6.4%)
- **18 patients had SV anatomy (10.8%)**
- Stent= 18 (balloon angioplasty=1)
- 1 patient underwent 2 BT stenting procedures (2 months apart for recurrent obstruction)
- Age: 9-131 days (m=46 days)
- POD: 5-119 days (m=25 days)
- Sex: Male=10 Female=9
- Wt: 2.6-6.2 kg (m=3.8 kg)
- ECMO = 3 patients (1 patient twice on ECMO)
Distal Shunt Stenosis
(n=13)
Types Shunt Obstruction
Complete (n=3)
Proximal Obstruction/Stenosis
(n=2)
Mid Shunt Stenosis

(n=1)
Technique

1. Diagnostic angiogram
   a) ECMO
   b) Retrograde
   c) Antegrade

2. Fully Heparinized
   (100 u/kg)
Coronary Wire Placement

Lossy compression - not intended for diagnosis
Distal PA Patency

Lossy compression - not intended for diagnosis
Coronary Balloon
Angioplasty/Thrombotomy
Post Balloon
Stent Position
Stent Deployment
Post Stent Implantation
Vascular Approaches to Stent Deployment

**Retrograde (13):**
- Most commonly utilized approach.
- More direct and less tortuous approach than antegrade.
- Less likely to cause arrhythmia.

**Antegrade (1):**
- Less vascular complication, but even 014 wire placement may cause significant TR and neoAI i.e. hemodynamic instability.

**Carotid Cut down (4):** Most direct pathway. Useful in extremely small infants.

**ECMO Cannula (1):** If no vascular approach is available.
Post Stent Management

1. Heparinize overnight (50u/kg bolus with continuous infusion 15-20 u/kg/hr)

2. Continue with ASA in PO fed patients

3. In patients with thrombotic shunts, ASA + Plavix (0.2 mg/kg) or ASA + Lovenox
Complications

1. Retroperitoneal hematoma (1)
2. Femoral artery compromise requiring heparinization >24 hr (4)
3. PRBC Transfusion during the procedure (9)
4. Arrhythmia requiring treatment (3)
5. No death during the procedure
Results

- 30 day Mortality: 0
- Total PreGlenn Mortality: 4/19 (21%)
- * Total Long-term Survivors: 15/19 (79%)

* Definition of *Long-term*: survival to Bidirectional Glenn stage
Conclusion

1. BT shunt stenting procedure is an effective palliation for shunt obstruction.

2. A bridge to Bidirectional Glenn (hemi-Fontan) in reducing overall first stage mortality
Incidence of Shunt Obstruction

![Bar chart showing the number of patients with shunt obstruction from 2000 to 2010. The number of patients increases significantly in 2010.]

- **Number of Patients (Y-axis):** 0, 1, 2, 3, 4, 5, 6, 7

- **Legend:**
  - Blue bars represent the number of patients.