Arterial Duct Stenting in Low-weight Newborns with Congenital Heart Disease and Duct-dependent Pulmonary Circulation

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Arterial duct stenting is a reliable alternative to surgical shunt in patients with CHD and duct-dependent pulmonary circulation who are unsuitable for primary repair or in whom there is anticipated spontaneous improvement of oxygen saturation as the PA resistance decrease.
However, no data are so far available in low-weight newborns who are the subset of patients at higher surgical risk and in whom stent re-dilatation might be useful to tailor the pulmonary blood flow to the patient’s growth.
AIMS

- To assess feasibility and results of AD stenting in low-weight (<2.5 kg) newborns (Group I)
- To compare these data with normal-weight newborns (Group II) who were considered at standard risk for this procedure
Arterial Duct Stenting in Low-weight Newborns

n= 75

- age 26±44 days (range 1-74)

- weight 3.2±0.9 kg (range 1.2-5.2)

- low-weight (<2.5 kg)(Group I): 15

- normal-weight (Group II): 60

- PAIVS/PV stenosis (n= 27); ToF (n= 23); Ebstein anomaly (n= 4); Complex CHD with PA (n= 21)
Group I (n= 15)

- age 9±6 days (range 1-26)
- weight 2.1±0.3 kg (range 1.2-2.5)
- complexity-adjusted Aristotle score 13.9±1.7 (Level 4/6 of complexity for surgical palliation, p<0.0001 vs Group II)
- no difference in terms of CHDs and duct size and morphology vs Group II
Feasibility: 93.4% (vs 91.5% p=NS)

Procedural time: 156±67 min (median 125)(p=NS vs Group II)

Fluoroscopy time: 30±18 min (median 23)(p=NS vs Group II)

Unconventional vascular entry (carotid or axillary artery): 42.9% (p<0.002 vs Group II)
conventional vascular entry in straight ducts...
- AD diameter from $2.1 \pm 1.4$ to $3.4 \pm 0.4$ mm (median 3.2) ($p < 0.0001$ vs pre-; $p = \text{NS}$ vs Group II)

- O2 saturation from $82 \pm 6$ to $92 \pm 5\%$ ($p < 0.0001$ vs pre-; $p = \text{NS}$ vs Group II)
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- **Minor complications:** 29.9% (p=NS vs Group II)
- **Procedural mortality:** 0%
- **Need for surgical shunt:** 14.3% (p=NS vs Group II)
- **In-hospital mortality:** 16.7% (vs 1.9% in Group II, p<0.05)
- **In-hospital stay:** 31±20 days (p<0.001 vs Group II)
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14 LW neonates

- Redilatation (4 pts)
- B-T shunt (2 pts)
- In-hospital death (2 pts)
- Surgical repair (5 pts)
- Waiting for surgery (6 pts)
- Spontaneous cure (1 pt)
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NAKATA INDEX

# p<0.05 vs pre-
Arterial Duct Stenting in Low-weight Newborns

McGOON RATIO

* p<0.05 vs pre-

AD stenting
Arterial duct stenting is a feasible, effective and low-risk palliation also in low-weight newborns.

It is an effective bridge toward spontaneous improvement whenever short-term pulmonary blood flow support is anticipated or lower-risk surgical repair.
The stented duct allows for a significant growth of the pulmonary arteries also in this subset of high-risk patients.

However, this mini-invasive option is still more demanding and challenging than in normal-weight newborns.