Angiography of the Branch Pulmonary Arterial Tree

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Total Quality Management

• William Edwards Deming

• US Engineer

• Quality Improvement

• 14 Point Plan
14 Point Plan

1. “Base your management decisions on a long-term philosophy, even at the expense of short-term financial goals.”

DEVELOP A PHILOSOPHY IN YOUR LAB
14 Point Plan

5. “Build a culture of stopping to fix problems, to get quality right the first time.”

QUALITY TAKES PRECEDENCE. YOUR TEAM SHOULD BE EMPOWERED TO QUESTION THE PROCESS AT ANY TIME
14 Point Plan

6. “Standardized tasks and processes are the foundation for continuous improvement and employee empowerment.”

ALWAYS DO THINGS THE SAME WAY. YOU AND YOUR TEAM WILL GET BETTER AT THEM!
14 Point Plan

7. “Use visual control so no problems are hidden.”

Sort: Sort out unneeded items
Straighten: Have a place for everything
Shine: Keep the area clean
Standardize: Create rules and standard operating procedures
Sustain: Maintain the system and continue to improve it
14 Point Plan

9-11. “Add Value to the Organization by Developing Your People”

RESPECT YOUR EXTENDED NETWORK OF PARTNERS
14 Point Plan

12-14. “Continuously Solving Root Problems Drives Organizational Learning”

BECOME A LEARNING ORGANIZATION THROUGH RELENTLESS REFLECTION AND CONTINUOUS IMPROVEMENT
Angiography

Knowing Your Equipment

- Imaging system and set-up
- Single Plane vs Biplane
- Views
- Coning and Filters
- Catheter Position and Type
- Contrast
- Advanced Imaging Modalities

Knowing Your Patient

- Size/Weight
- Likely Access
- Diagnosis
- Co-morbidities
- Data required
- ?Intervention
Know Your Anatomy!

- **Course**
  - Antero-posterior
  - Supero-inferior

- **Relationship to other structures**
  - Aorta
  - Bronchi
  - Pulmonary Veins

- **Extrahilar vs Intrahilar**

- **Segmental Anatomy**
Previous Evaluation

- CXR – Differential Blood Flow
- TTE – Limited views in adults
- LPS – Flow differential (Radiation)
- CT – Best spatial and temporal resolution
- MRI – Differential flows
Need for Pulmonary Angiography

• Diagnostic
  – Pre-Glenn
  – Pre-Fontan
  – Post-Fontan
  – Tetralogy Patients
  – Pulmonary Hypertension

• Intervention
  – Branch PA Narrowing
    • Tetralogy
    • Post Arterial Switch
    • Post Sano Shunt (LPA)
    • S/p LPA Sling
  – Complex Diffuse Branch Narrowing
  – Pulmonary AVM’s
Views – PA and LAT
LAO/Caudal
LAO/Cranial
Tetralogy of Fallot – Bilateral Stenting
Stent Positioning
Bilateral Stent Inflation
Final Assessment
Transcatheter Pulmonary Valve Replacement
“Telescoping”

Anatomical Challenges

RPA

LPA
RPA Narrowing
Self-fashioned Covered Stents

Branch PA Stenting in Adults
Multi-track – Be Careful...
Leave Alone or Covered Stent?
Final Result - Angiogram Through Long Sheath
Digital Subtraction

• Useful for AVM’s

• Discuss with your team to ensure correct sequence

• Difficult to Export!
3DRA - Fontan

Courtesy: Darren Berman
3DRA – Image Processing

Courtesy of Gregor Krings, Utrecht, Netherlands
Advanced Angiography
Advanced Angiography and Overlay
Summary

• Structured Approach

• Have your “Go-To” views

• Maintain these views for Interventions

• Advanced Imaging is the Future
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