Starting an Extraction Program

Getting your ducks in a row…

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Disclosures

• Research Grants
  • Medtronic Inc.
  • Boston Scientific Inc.
  • St. Jude Medical Inc.

• Consultant
  • St. Jude Medical Inc.
  • Spectranetics Inc.
Who are the ducks?

1. Physician
2. Staff
3. Equipment
4. Support

The First ‘Doc’

- Experience in all aspects of lead implantations and extractions
  - Typically a high volume CIED implanter
  - Knowledge of indications
  - Familiarity with all technical aspects of extractions
Operator’s Experience

- Complete **procedural success** improves dramatically
  - after first 10–20 procedures\(^1\)
- **Lower complication rates** with ≥30 cases
  - Continue to decline with up to 400 cases\(^2\)
- **Medicare ICD database review:**
  - Decreased mechanical complications with ≥10 implantations per year
  - Reduced infections with ≥30 implants per year\(^3\)

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\(^1\) Bracke FA. Learning curve characteristics of pacing lead extraction with a laser sheath. PACE 1998; 21: 2309–2313.

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Operator’s Experience

“Given the relationship demonstrated between lead extraction experience and safety and efficacy; and since these techniques are much more technically demanding and are associated with a much larger opportunity for failure and complications, it was the consensus of the writing group that a volume of extraction procedures, similar to those required for device implantation, should be required.”

Minimum Training Volume

• Physicians being trained in this technique should extract a **minimum of 40 leads** as the primary operator under the direct supervision of a qualified training physician.
• Recommend the extraction of a minimum of **20 leads annually** per operator.
• Physicians who have already extracted over 40 leads as a primary operator and maintain the minimum volume of 20 leads extracted annually are considered as meeting the training and volume requirements.
• The trainer of physicians learning lead extraction should have extracted **75 leads**.
• All should be performed with an **efficacy and safety record** that is consistent with published data.

Volume vs. Proficiency

• The number of procedures does not guarantee proficiency
• A **quality-oriented database** should be maintained at each institution
• Given the learning curve for this procedure, it is recommended that as a physician and a center's experience grows, so can the degree of difficulty of the cases increase.
• There is a community of lead extractors who are available for ongoing mentoring. When beginning a new program, a mentor or mentors should be identified.
Other Team Members: Supporting Staff

1. EP Lab or OR scrub Nurse (with primary operator)
2. Nurse anesthetist familiar with procedure
3. Circulating (‘non-scrub’) nurses (at least 2)
4. Fluoroscopy tech for troubleshooting
5. Echocardiography tech for emergent echo

Other Support

1. Anesthesiologist
2. CT surgeon
3. Echocardiographer
4. Blood Bank
5. Administration

Readiness for emergent open-heart surgery
Equipment

1. Good quality fluoroscopy
2. Anesthesia machine
3. Echo machine (TTE and TEE)
4. Surgical tools
5. Extraction tools
   - Mechanical and powered sheaths
6. Groin station (all kinds of snares and other tools)
7. CIED Implantation equipment

Tools for Chronic Lead Extraction
Need for other tools

Off-Label Use of Tools to Retrieve Lead Fragments
Other Challenges
Other Challenges

[Medical images related to other challenges]
And Still Other Challenges…

Other ducks to consider…

Teaching and Training

• Teaching and educating:
  – Physicians in the community
  – Cardiologists caring for patients with CIED
  – Patients

• Training of new explanters
  – Hands-on cases
  – Simulators
  – Observation
Beyond Lead Extraction: Lead Management

• When we implant a patient we are assuming responsibility for his/her well-being for future implantations to come
• Lead survival is very dependent on implantation techniques
  • Fidelis failure ranging from 1% to 20+
• Complications at the time of lead extraction are function of choices made at the time of lead implantation.

Beyond Lead Extraction: Lead Management

• Device Choice: Single vs. dual vs. triple chamber
• Lead choice:
  – Single vs. dual coil ICD lead
  – Active vs. passive fixation
• Site of implantation:
  – right vs. Left
  – High incision or Low incision
• Vein of choice: cephalic vs. axillary vs. subclavian
• Decisions at implantation:
  – Remove superfluous leads
  – Do not cut and retract superfluous leads
  – Avoid tunneling
  – No excessive flushing
Recap

1. Team approach
   - Primary operator, nurses, techs
   - CT surgery, Anesthesia support
   - Imaging support: Echo and Fluoro
   - Hospital support: Administration and blood bank

2. Spectrum of Tools
3. Spectrum of Techniques

Final Words of Wisdom

- Start a Lead Management Program not just and extraction program
- Do not start with extremely difficult cases
  - Refer very difficult cases early on
  - Build experience and confidence before you tackle more difficult cases
- Ask for advise
  - Pick up the phone and call
- Plan, train, and practice for emergencies
- Track your own performance (Registry with outcomes)
Questions?