Experience with Detachable Tip Microcatheter

Johanna T. Fifi, M.D.
Assistant Professor of Neurology, Neurosurgery, and Radiology
Icahn School of Medicine at Mount Sinai

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Disclosures

- Consultant - Microvention
Team

- Alex Berenstein, MD
- David Altschul, MD
- Srinivasan Paramasivam, MD
- Santiago Ortega-Gutierrez, MD
Detachable tip microcatheter

- Apollo™ onyx delivery detachable tip microcatheter
  - Single lumen end hole microcatheter
  - 0.013 inches
  - Detachment lengths - 1.5 cm and 3 cm
**Detachment of the microcatheter**

- The required detachment force is about 33 grams. It is less than $\frac{1}{3}$rd the force required to break the next weakest bond in the catheter.

- Gentle and continuous traction – Mechanical detachment
  - Reduce the slack in the system
  - Initial traction related stretching of the microcatheter.
  - Detachment of the microcatheter / release of the microcatheter from the embolic cast.
Reflux

Reflux Tolerance

✓ Reflux is acceptable on distal tip.
✓ Leave a gap of at least **1.25mm** between the Onyx™ LES reflux and the proximal marker band. Excessive reflux may result in difficult catheter removal.

✗ Do not reflux past the proximal marker band!

Source: IFU P/N 70556-001 05/2013
Why do we need a detachable tip micro catheter?
Onyx Embolization

- Proximal plug around the catheter is usual during onyx injection.
- The catheter needs to be removed from the embolic cast at the end of embolization.
- Excessive reflux can lead to:
  - Retained microcatheter
  - Aggressive attempts at removal can lead to complications like vessel rupture and hemorrhage.
- Incidence Unknown.
nBCA embolization

- Goals:
  - Good penetration.
  - Prevention of proximal reflux - prevent catheter retention and non-target embolization.
  - Flow and operator dependent – Fear of catheter entrapment.
  - Prolonged contact with polymerized nBCA lead to retained catheter or vessel injury.
  - Incidence unknown
Our experience

- Between March 2013 and March 2014, detachable tip microcatheters were used in 16 patients under FDA approval for compassionate use.

- 39 catheterizations in 19 procedures.

- The patients were aged between 3 months and 18 years.
Our experience

- Since April 2014, we have been using it under physician sponsored IDE.

- In 7 patients, 13 catheterizations were performed.

- In total 52 catheterizations and embolizations performed.

- In most instances the 1.5 cm detachable tip microcatheter was used.

- Since June 2014, the Apollo has been FDA approved.
Our initial experience

- Embolic agent:
  - Onyx was used 18 times and
  - nBCA was used 33 times.

- Catheter detachment rate:
  - Three times with onyx (17%) and
  - 18 times with nBCA use (55%).

- Inadvertent and premature detachment:
  - One
<table>
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<th>Diagnosis</th>
<th>Injections</th>
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Vertebral Pial Fistula
High concentration nBCA
Detached Tip
Right Parietal complex Pial AVF – previously treated by multiple NBCA embolizations.
End of Second embolization with Onyx – Right Middle Cerebral Artery

End of second embolization by Onyx injection with Apollo microcatheter – Right Middle Cerebral Artery.
Right Parietal complex Pial AVF – completely treated following the use of Apollo detachable tip Microcatheter. The Glue and Onyx cast from previous embolizations is visible.
Advantages

- Trackability and Navigability – As good as or better than any wire guided microcatheter.
- Used through a 4 Fr guiding catheter for nBCA and 5 Fr guiding catheter for Onyx injections.
Advantages

- Onxy injection - reflux limit is known.
- nBCA injection –
  - Controlled injection of high concentration nBCA (80 – 90% for high flow fistulas).
  - Permissible reflux
  - Intermittent injections to allow better control of the glue cast.
- Aggressive injection, better penetrability.
Advantages

- Controlled catheter retrieval under fluoroscopy guidance.
- Less pressure used for catheter removal.
- No incidence of vessel rupture or hemorrhage.
Disadvantages

- The detachment zone is relatively stiff compared with the rest of the microcatheter.
Beware of normal branches arising from deattachable segment.
• Inadvertent detachment of the tip.
Conclusion

- Results in more penetration especially in high flow fistulas using nBCA.
- Catheter retrieval is more controlled and less traumatic.
- Our initial experience is encouraging and it is an useful tool to have.
- Multicenter experience is essential before ascertaining its safety and efficacy.
Thank you