

Endovascular Options For The control Of Submissive and Massive Hemoptysis: It Is Lifesaving: Coils Are Required

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Causes of Hemoptysis

- Tertiary Referral Centers: Bronchiectasis, Infection, Lung Ca
- Developing Countries: Tuberculosis and its Sequelae
- Additional causes: Sarcoidosis, Autoimmune Dis, Coagulopathies, Pul AVMs, Pul Pseudo-aneurysms/aneurysms, PE
- Cryptogenic Hemoptysis- No known cause (20%)

Hemoptysis
 90% BA
 10% Other

Bronchial Arteries: Anatomy, Function, Hypertrophy, and Anomalies

Orthotopic- Superior Endplate of T5 and Inferior T6

Ectopic- Undersurface of Aorta, Distal Descending Thoracic Aorta, Subclavian Artery, Brachiocephalic Trunk, Thyrocervical Trunk, Internal Mammary, Coronary

Left BA commonly directly off Aorta
 Right BA typically off Intercostal (ICBAT)

The spinal cord has, on average, from 7 to 8 radiculomedullary arteries. The largest of all radiculomedullary arteries is called the great anterior radiculomedullary artery or artery of Adamkiewicz.

US Dogma: BAE should be performed with Particles to assure success, limit recurrence and allow for reintervention in case of recurrence

Type	Occurrence (%)	No. of Left Bronchial Arteries	No. of Right Bronchial Arteries
1	40.6	2	1
2			
3			

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Spinal Arterial Anatomy

The reality is that the number of radiculomedullary and radiculopial arteries is as directly related to the actual anatomy as it is to the equipment with which it is imaged. Better machines always means more vessels. Plus the fact that life does not read books.

Anterior Spinal Infarct has been reported in 0.0 to 6.0% of BAE

- Reflux into Aorta
- Inadvertent embolization of non visualized spinal arteries

Spinal Cord Infarction after Bronchial Artery Embolization for Hemoptysis: A Nationwide Observational Study in Japan

Hideo Ishikawa, MD • Hiroaki Ohno, MD, MPH • Naoki Onishi, MD • Keigo Morita, RN, MPH, PhD • Hideo Yamagata, MD, PhD

Radiology 2021; 298:673-679 • <https://doi.org/10.1148/radiol.2021202500>

Complication	All Patients (n = 8563)	Coil Group (n = 1577)	GS Particle Group (n = 6561)	NBCA Group (n = 425)	P Value
Spinal cord infarction	16 (0.19)	1 (0.06)	12 (0.18)	3 (0.71)	.04

Note.—Data are numbers of patients, with percentage in parentheses. GS = gelatin sponge, NBCA = N-butyl-2-cyanoacrylate.

Conclusion: With use of a nationwide real-world inpatient database, the results of this study demonstrated that the actual prevalence of spinal cord infarction as a complication of bronchial artery embolization (BAE) for hemoptysis was 0.19%. Patients who underwent BAE with coils had a lower prevalence of spinal cord infarction than patients who underwent BAE with gelatin sponge particles or N-butyl-2-cyanoacrylate.

27. Ishikawa H, Hara M, Ryuge M, et al. Efficacy and safety of super selective bronchial artery coil embolization for haemoptysis: a single-centre retrospective observational study. *BMJ Open* 2017;7(2):e014805.

31. Ryuge M, Hara M, Hiroe T, et al. Mechanisms of recurrent haemoptysis after super-selective bronchial artery coil embolization: a single-centre retrospective observational study. *Eur Radiol* 2019;29(2):707-715.

Mechanisms of recurrent haemoptysis after super-selective bronchial artery coil embolisation: a single-centre retrospective observational study

Misaki Ryuge¹ · Masahiko Hara² · Takanori Hiroe³ · Naoki Omachi¹ · Shojiro Minomo⁴ · Kazushi Kitaguchi¹ · Mihoko Youmoto¹ · Norihiro Asakura¹ · Yasushi Sakata⁵ · Hideo Ishikawa¹

Conclusions Recanalisation was the most common mechanism of recurrent haemoptysis after ssBACE. Our results provide interventionists with indispensable insights.

Key Points

- Recanalisation was the most common mechanism of recurrent haemoptysis after super-selective bronchial artery coil embolisation, followed by development of new haemoptysis-related arteries
- These trends could be modified in several situations such as with antiplatelet or anticoagulant medications
- Recurrent haemoptysis could be managed by 2nd series super-selective bronchial artery coil embolisation with a procedural success rate of 97.7% without any major complications.

31. Ryuge M, Hara M, Hiroe T, et al. Mechanisms of recurrent haemoptysis after super-selective bronchial artery coil embolisation: a single-centre retrospective observational study. *Eur Radiol* 2019;29(2):707–715.

Revisiting Spinal Cord Infarction after Bronchial Artery Embolization

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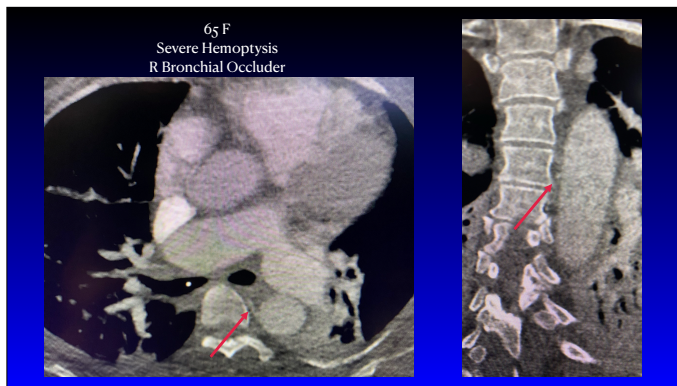
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<https://doi.org/10.1016/j.jvir.2023.03.007>

Author's Response: Revisiting Spinal Cord Infarction after Bronchial Artery Embolization

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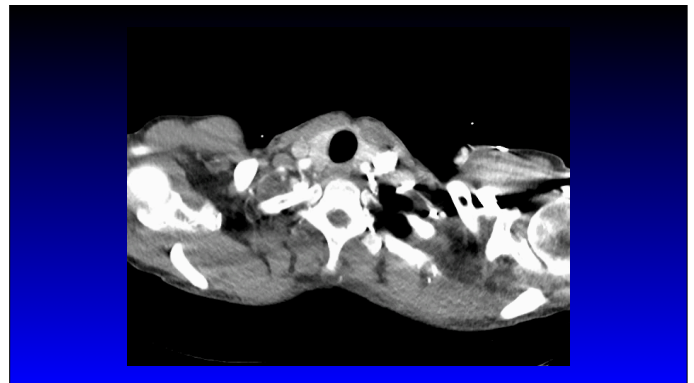
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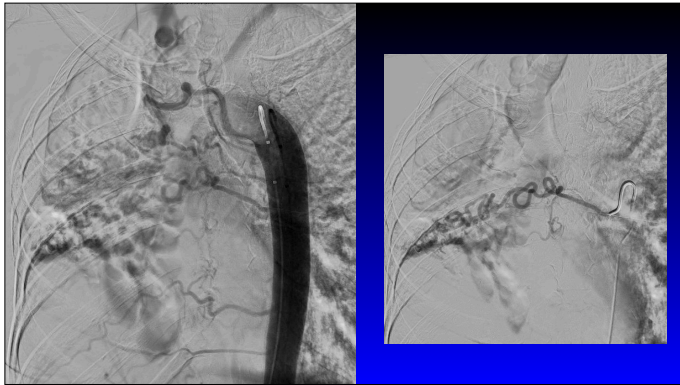
- US Dogma: Bronchial artery embolization for hemoptysis- Do not use Coils
- Consider changing the Dogma- Based on the above studies:
 - If coils control hemoptysis and recurrent hemoptysis and the incidence of spinal infarcts are truly lower, why not use Coils



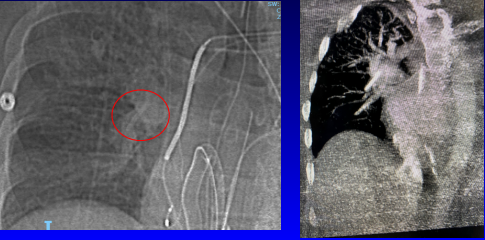
Improved Coil Embolization Technology

Microcatheters
Coils
Packing coils






• 55 M cardiomyopathy (LVEF 10%), decompensated heart failure, inotropic support, pLVAD and RVAD.
 • During CVC placement in the ICU, distal ~3 cm of CVC dilator broke off during removal, CVC placed.
 • Follow up CXR- dilator tip in segmental right pulmonary artery
 • IR consulted for foreign body retrieval

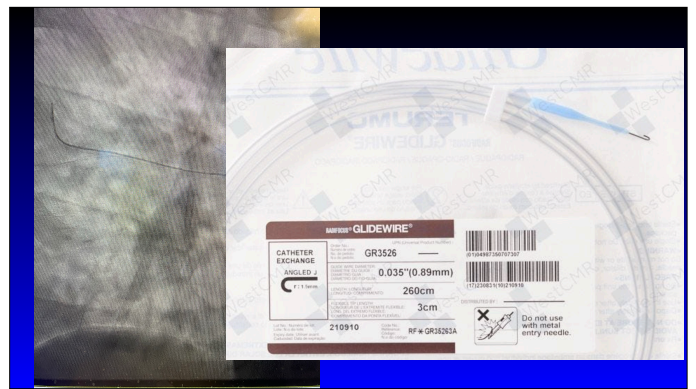
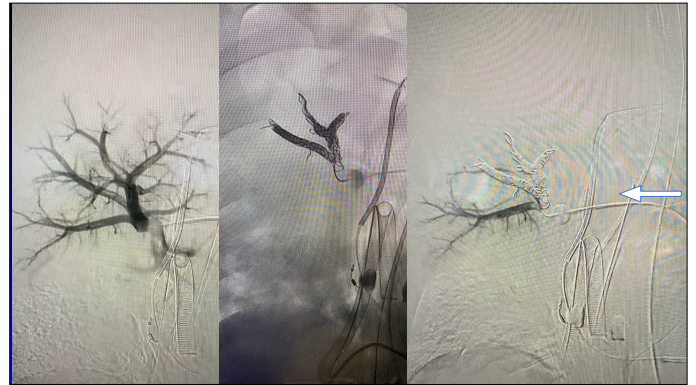


- ? Necessity
- CT suggested
- FB central
- Reluctantly agreed



Massive Life Threatening Hemoptysis begins





Conclusions

- Bronchial Artery Angio/Embolization is an important intervention in the management of Hemoptysis
- Spinal Ischemia is the most feared complication
- We should reconsider (re-evaluate) the best/safest embolic agent
- New Coil technology allows us to treat primary and recurrent hemoptysis successfully with the least risk of Spinal Ischemia
- Do not use straight or angled glide wires in PA, Always use tight J wire