How to Reduce Procedural Complications of LAAO Procedures?

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Conflicts of Interest

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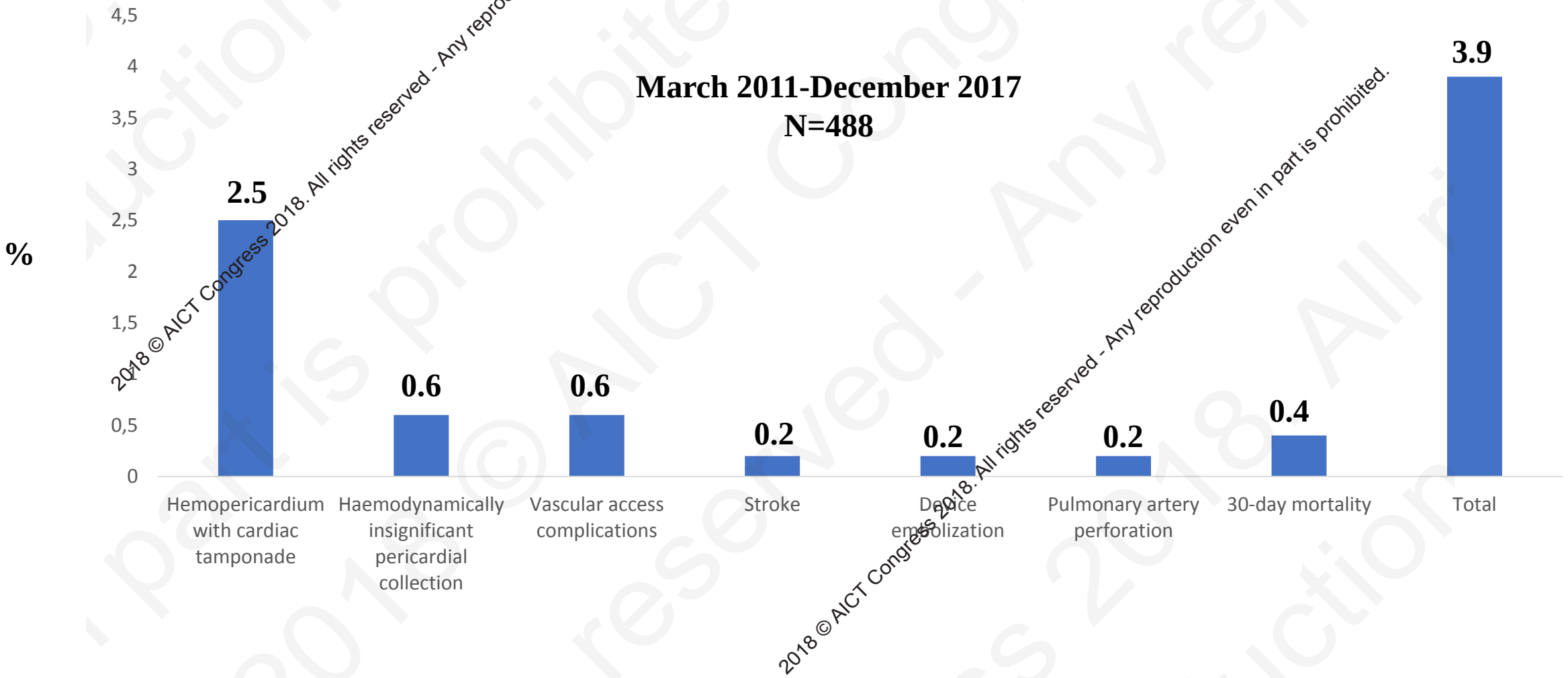
Peri-procedural Complications of LAAO-From LAAO Registry of Hospital Authority in HK



Haemopericardium With Cardiac Tamponade

- 1 GW perforation of LAA
- 1 RA perforation by ICE catheter
- 1 delayed presentation, 2 days after procedure and 1 day after discharge
- 5 (42%) required open heart repair

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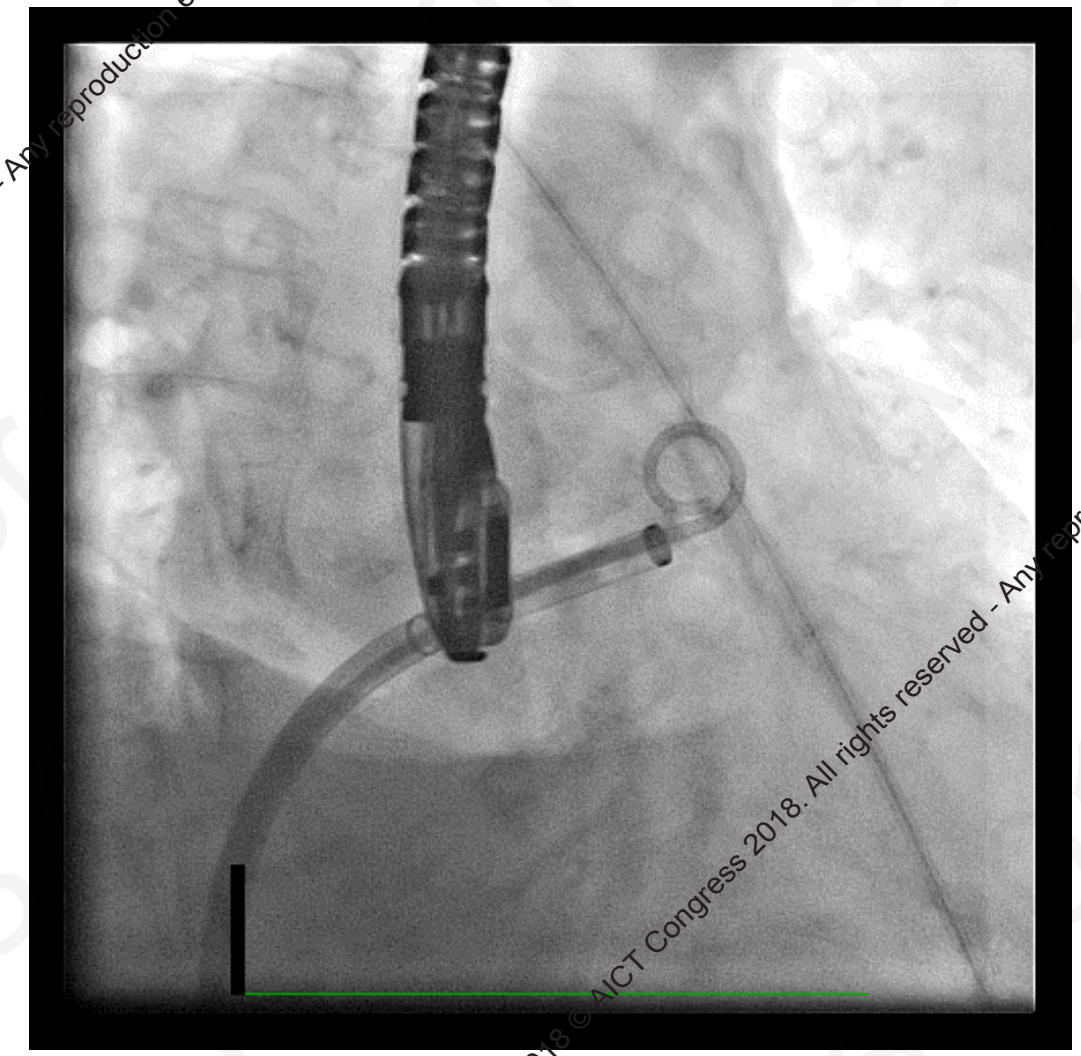
Prevention of Cardiac Tamponade

- Very cautious and respect LAA as a thin-walled fragile structure (0.5-0.8mm thick myocardial tissue) and prone to perforation
- TEE or ICE-guided transseptal puncture
- Pressure monitoring for transseptal puncture
- Correct device sizing

Always and Only Use a Pigtail Catheter to Approach the LAA



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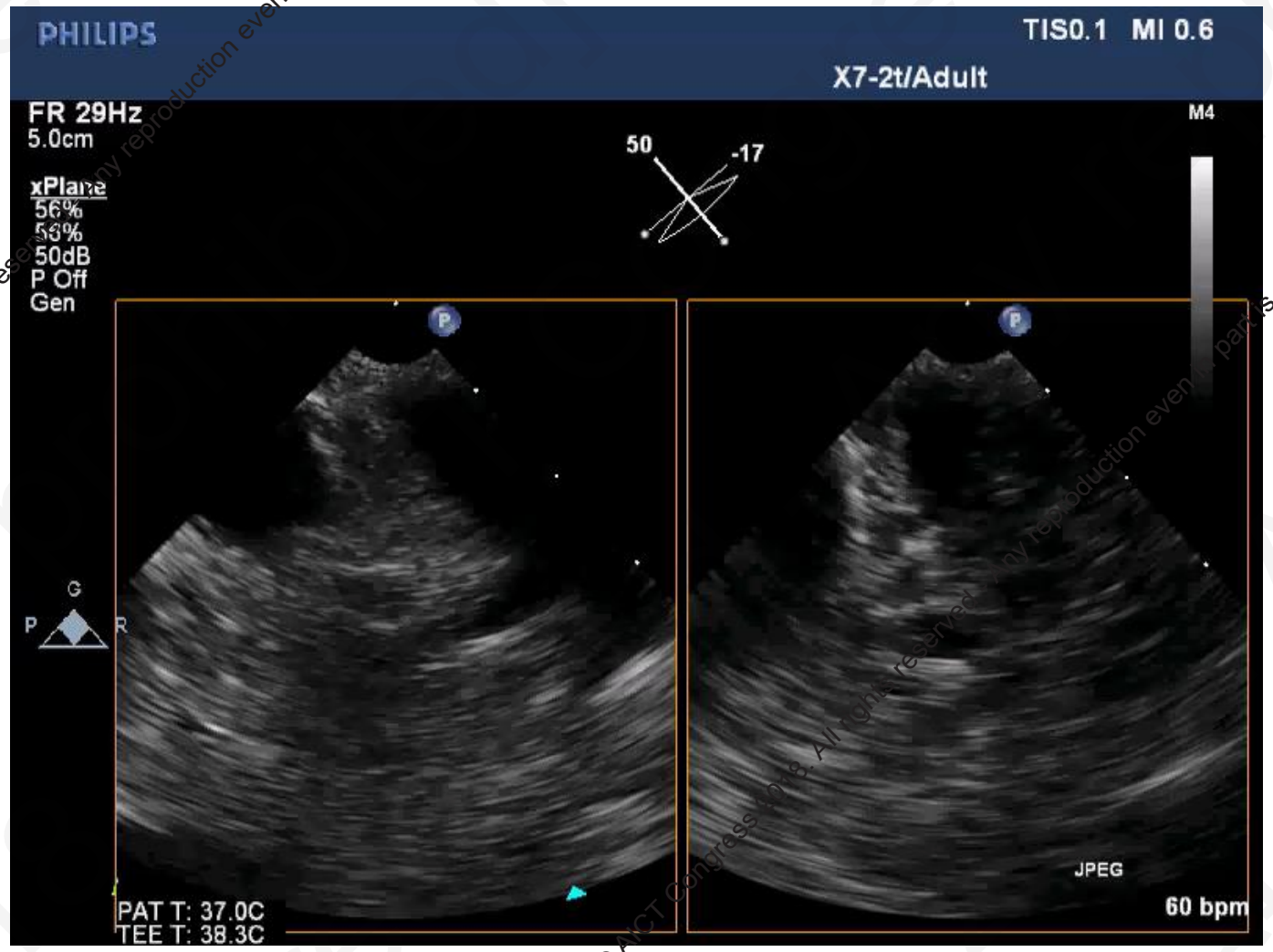
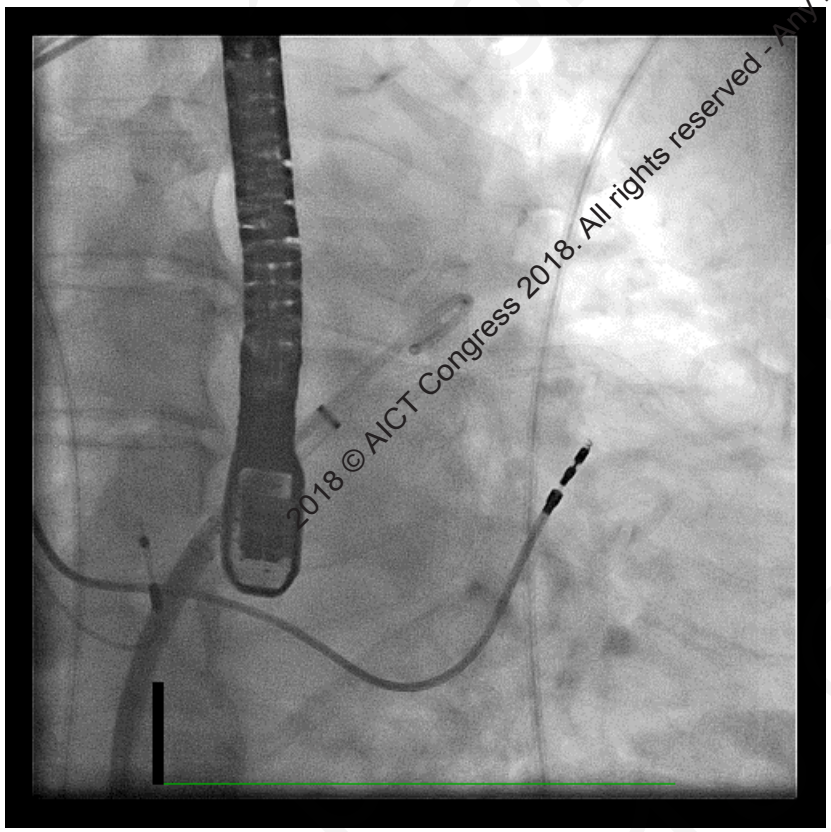
Device Oversizing

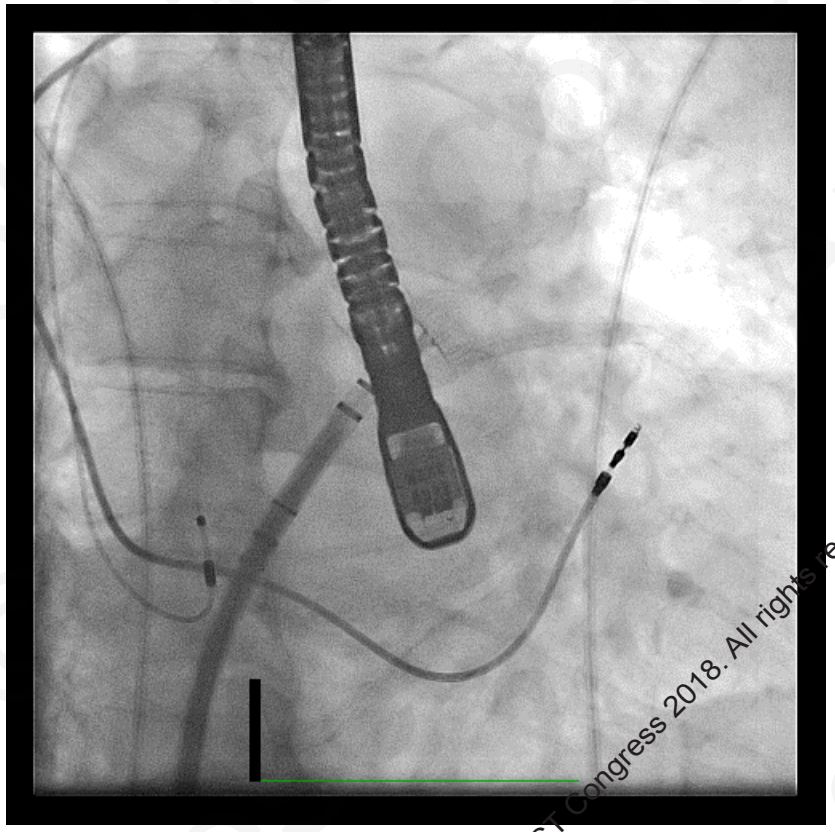
LAA size 13-16mm

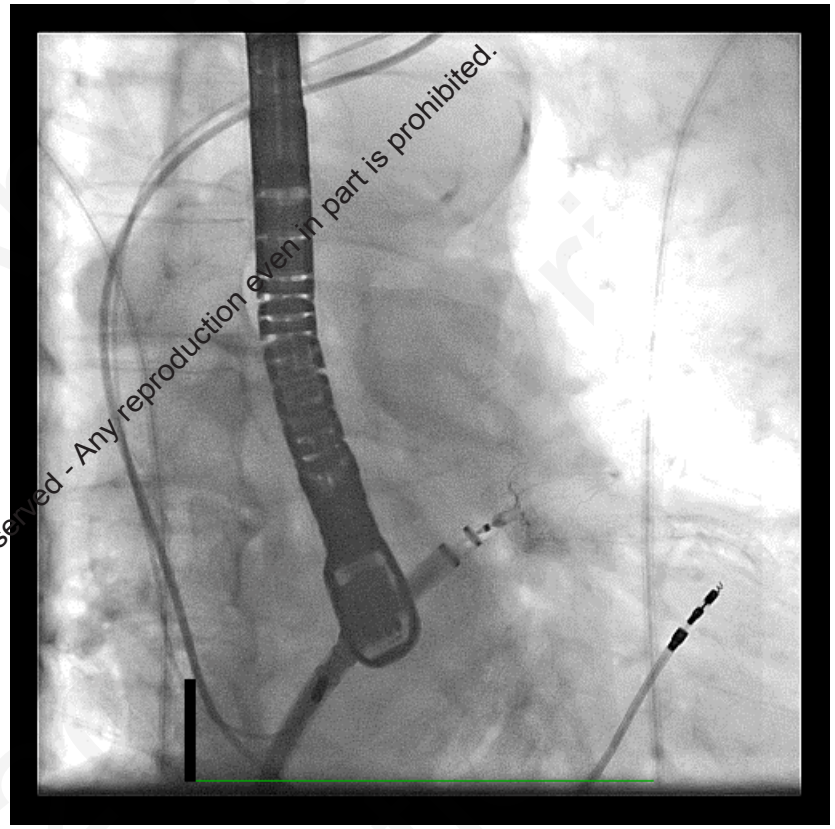


Device Oversizing

Watchman 21mm





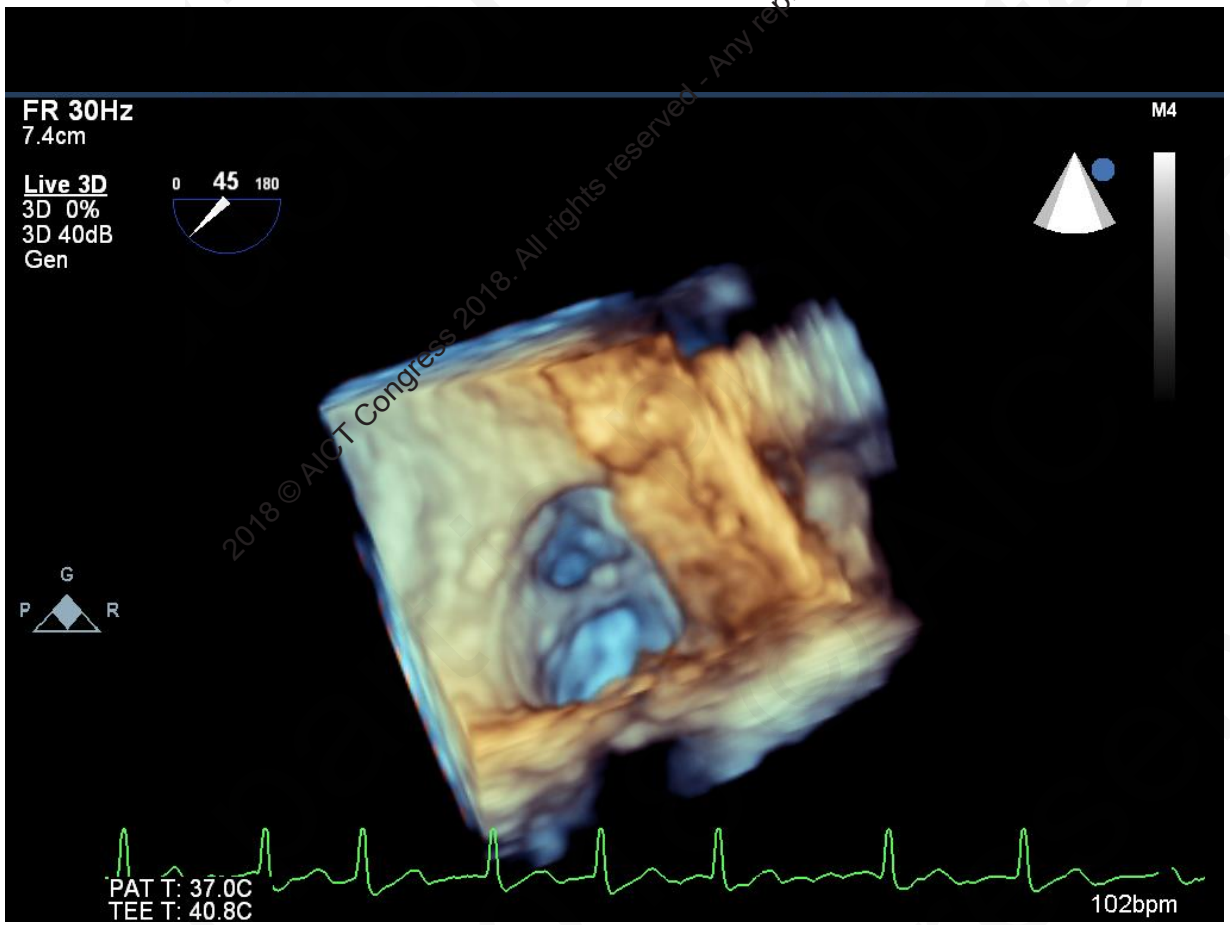


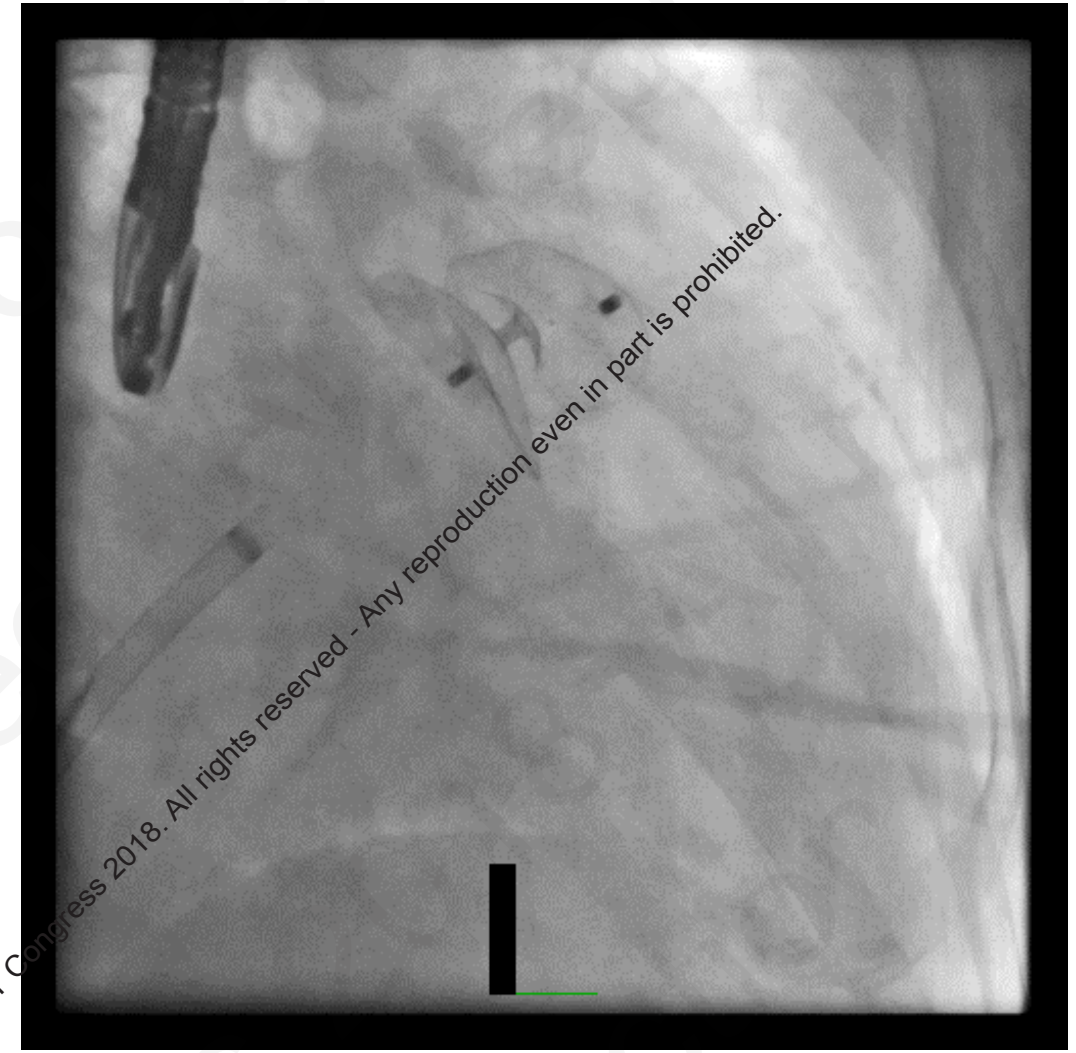
Prevention of Device Embolization

- *42% required surgical retrieval*
- Appropriate device sizing
- Follow closely device release criteria
- Adequate hydration to maintain a high normal LA pressure (>10mmHg)

Dislodgement of ACP

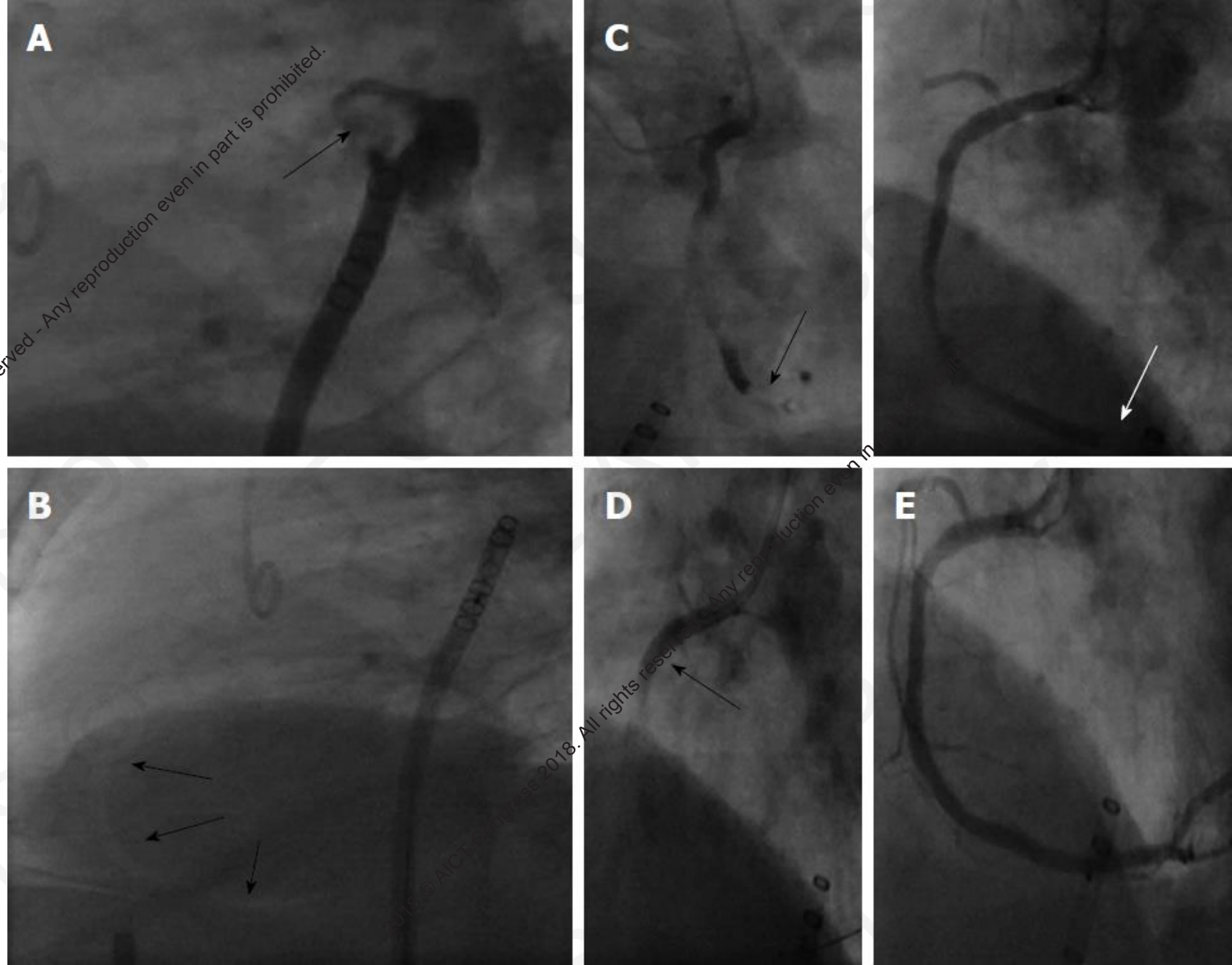
LAA size 19-21.4mm
ACP 28mm implanted





Dislodgement of ACP

Air Embolism

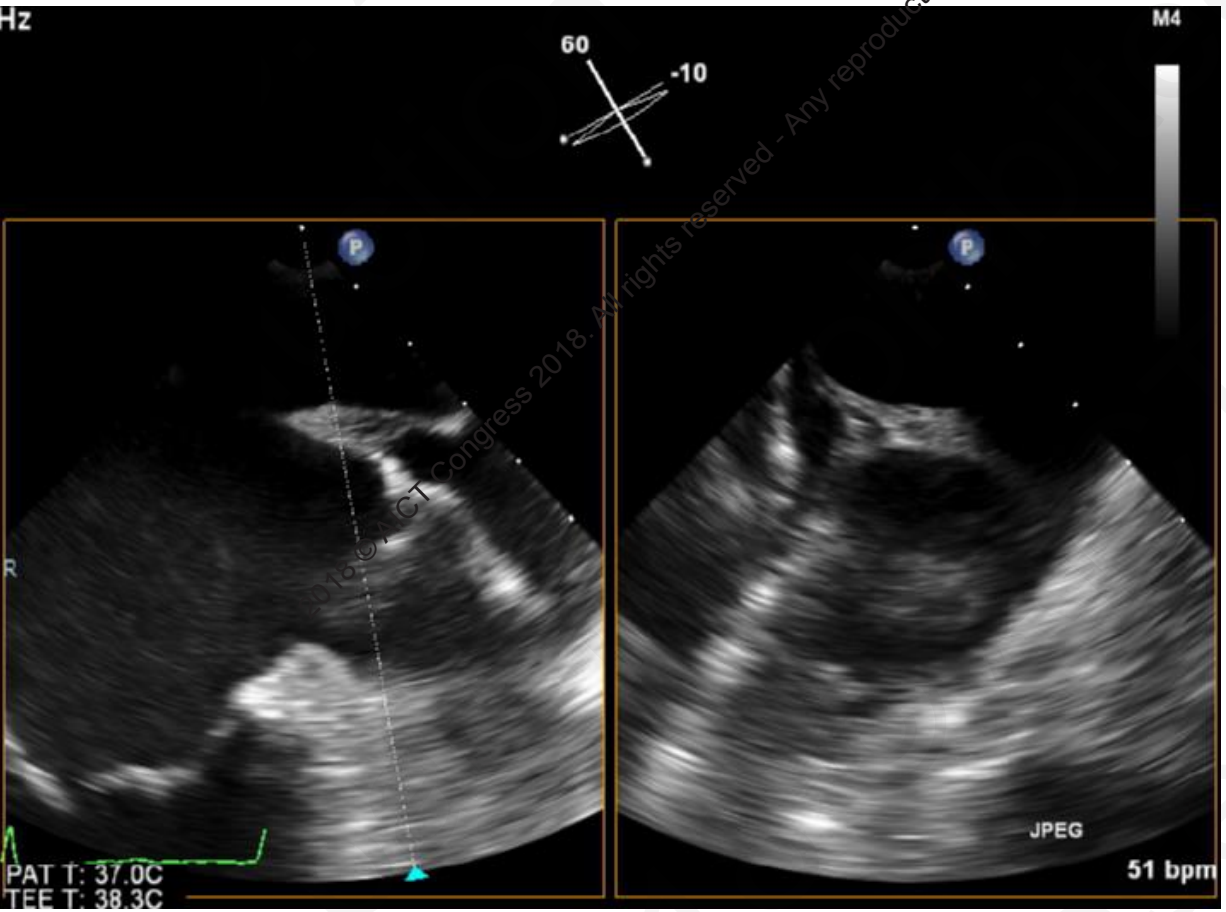


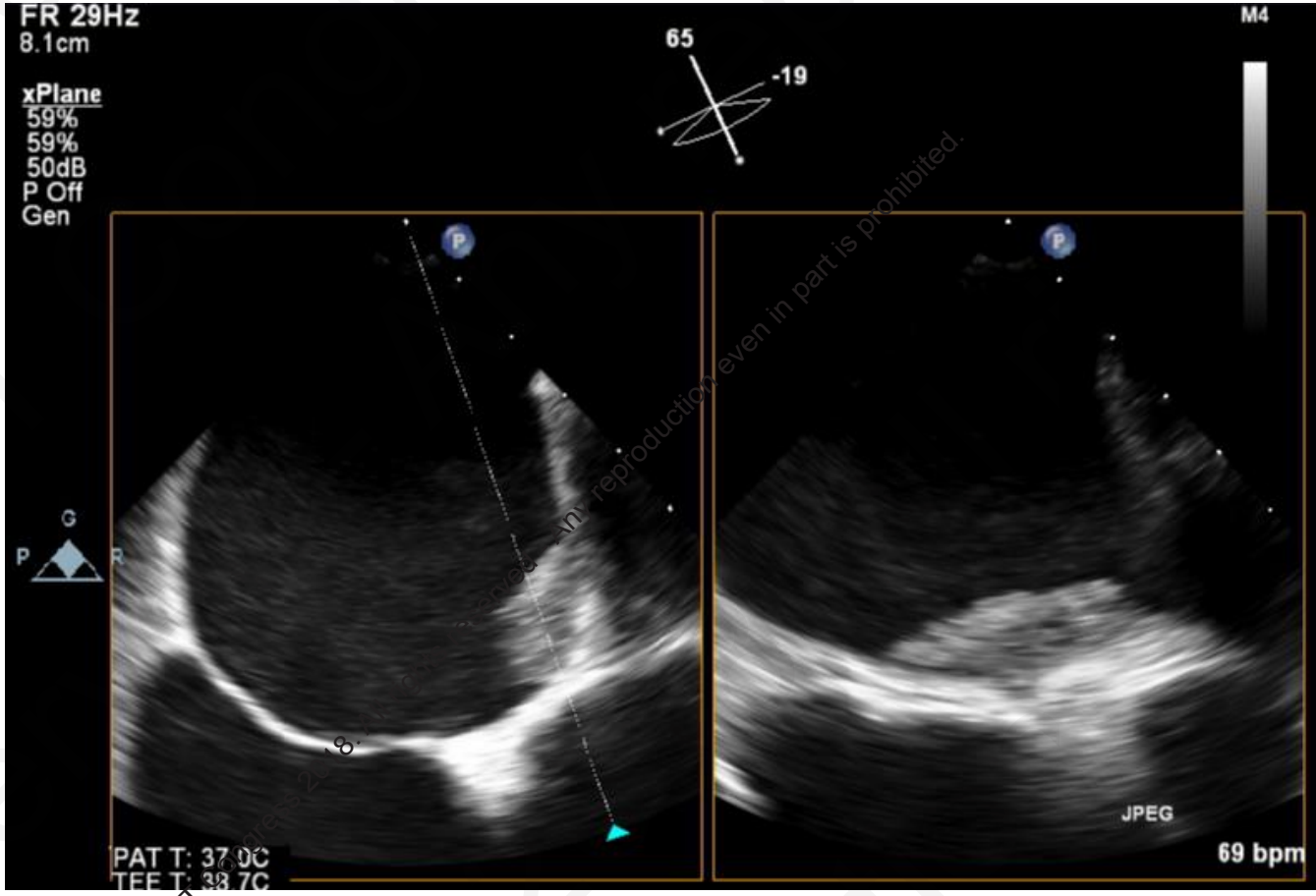
Mobius-Winkler S, et al. Percutaneous left atrial appendage closure: technical aspects and prevention of periprocedural complications with the Watchman device. World J Cardiol 2015;7(2):65-75.

Prevention of Air Embolism

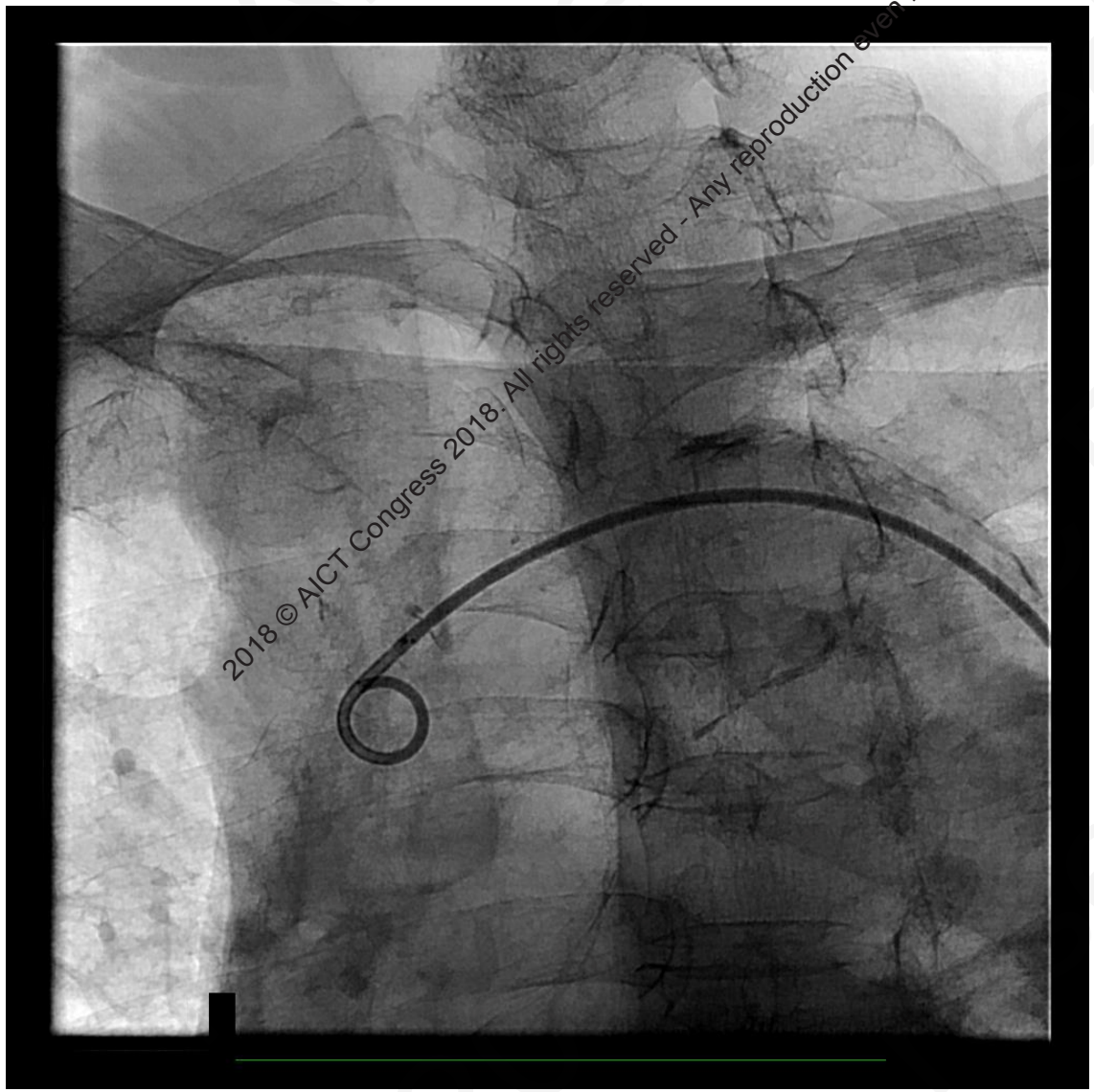
- *Reported incidence up to 5%*
- Meticulous de-air steps
- Adequate hydration to maintain a high normal LA pressure (>10mmHg)

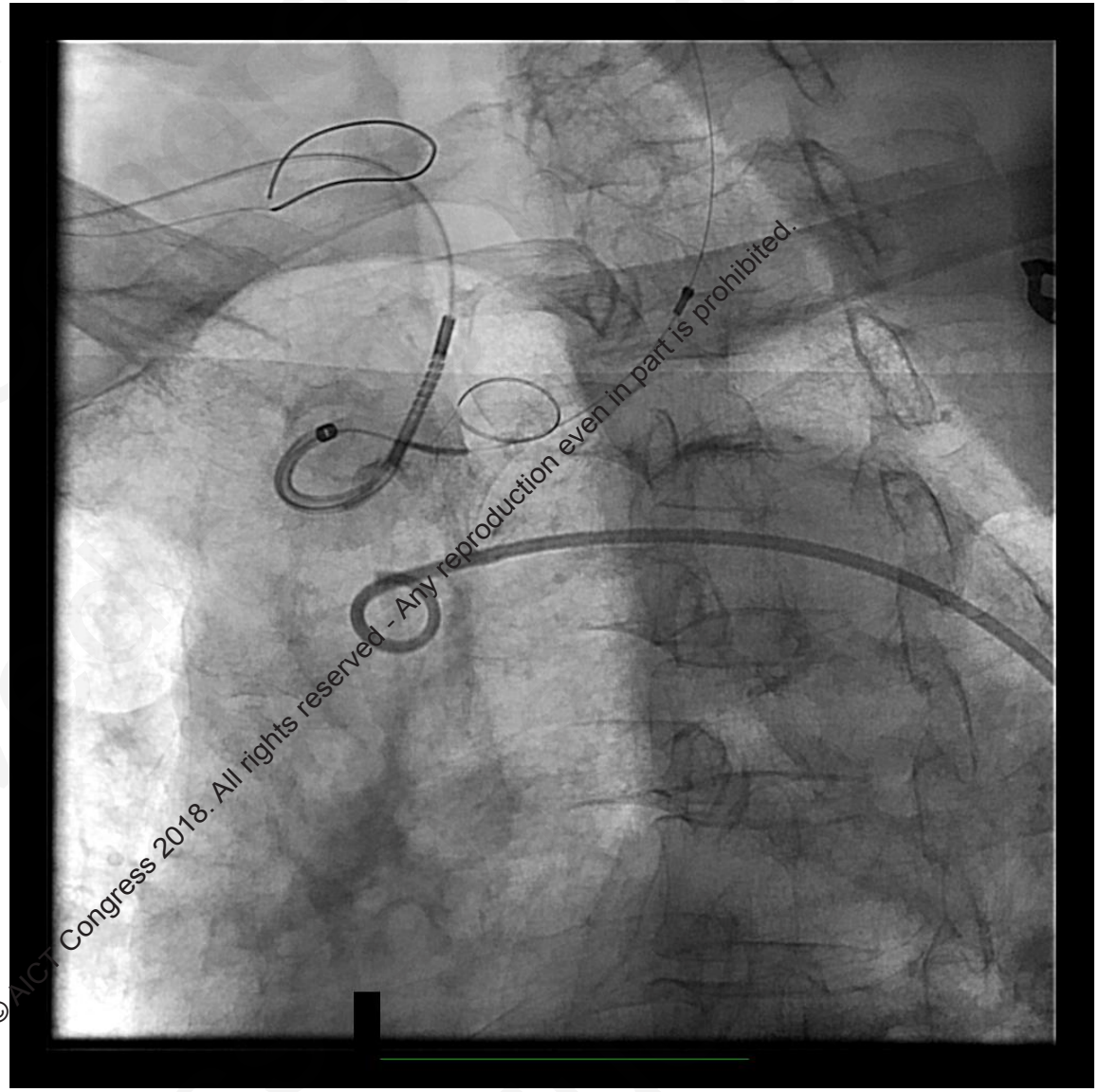
LA and LAA Thrombus



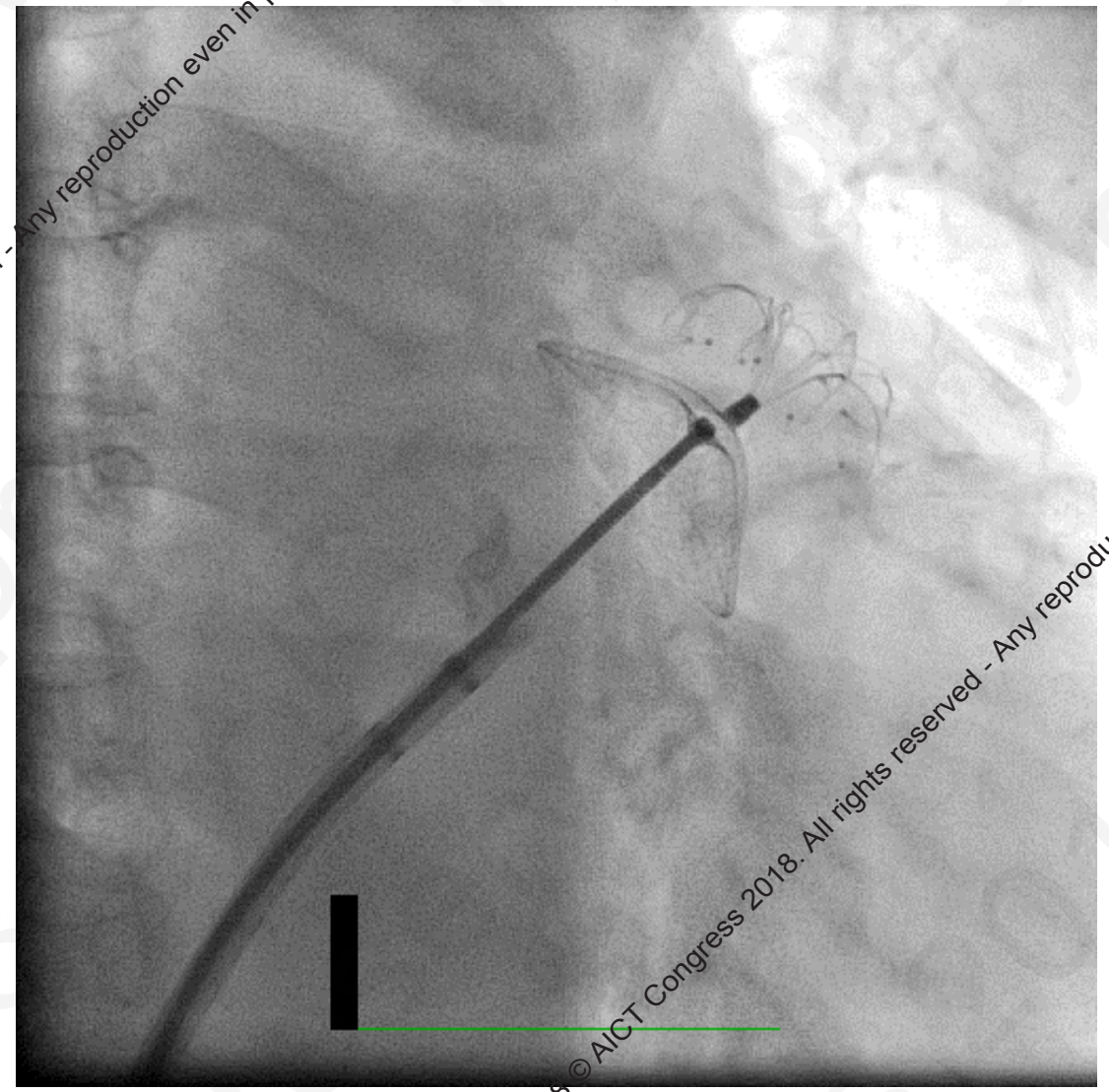


Sentinel Cerebral Protection System in a Bovine Aortic Arch





LAAO With Lambre Device



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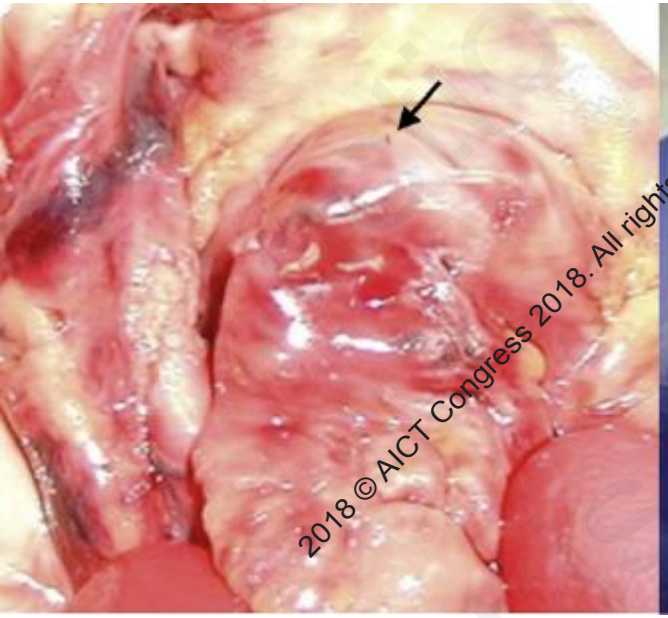
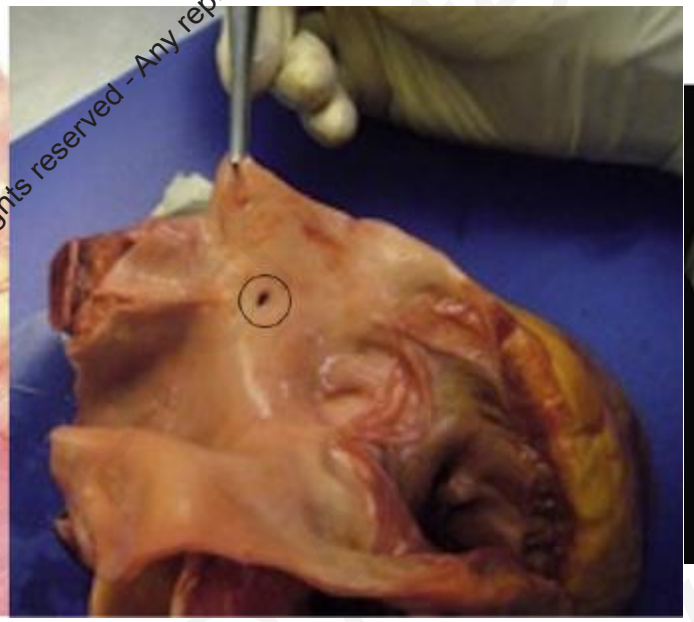
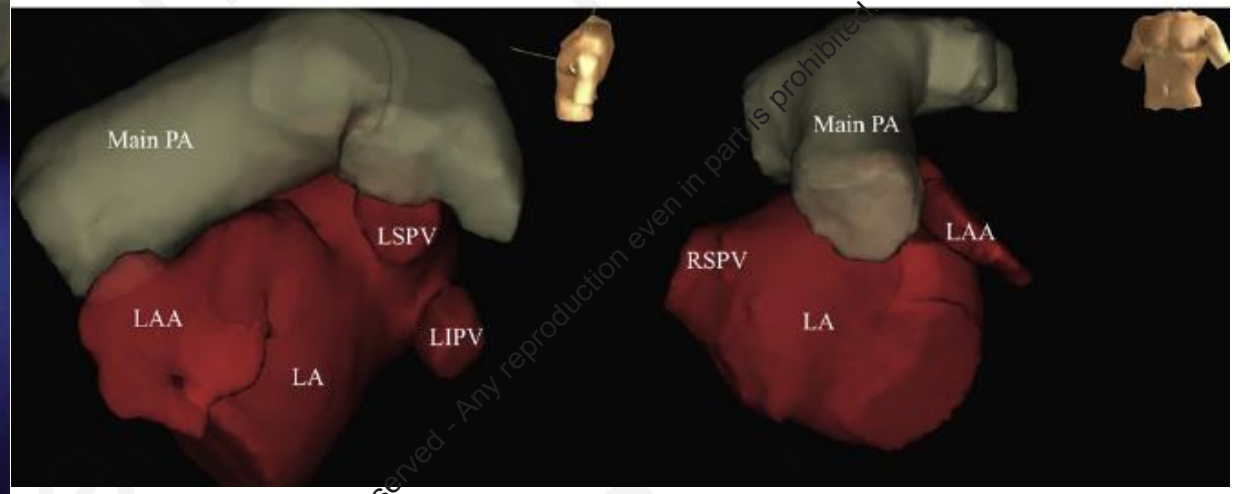
Pulmonary Artery Perforation





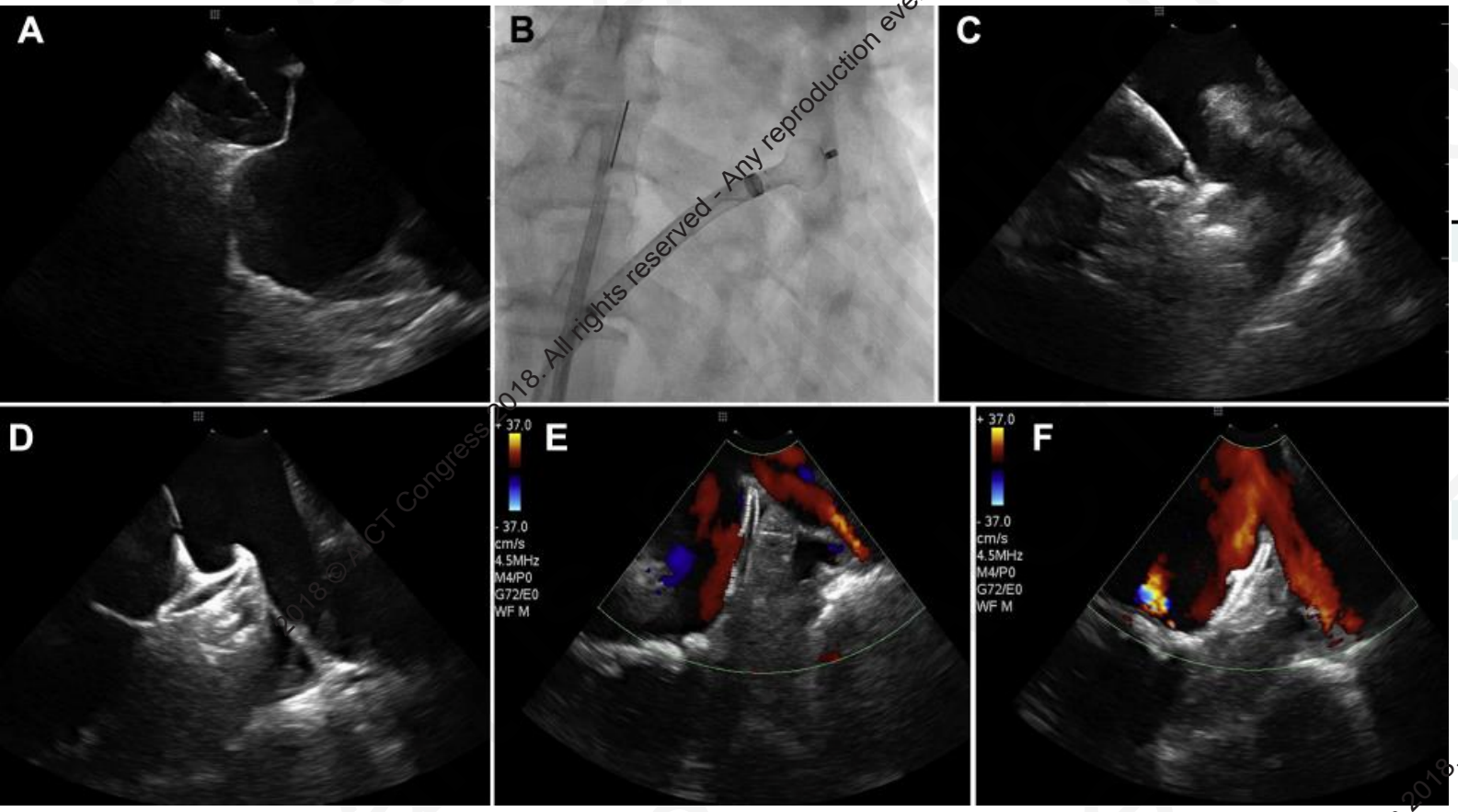


Hanazawa K et al. Close proximity between pulmonary artery and left atrial appendage leading to perforation of the artery, tamponade and death after appendage closure using cardiac plug device. Int J Cardiol 2014;175:e35-36.

Summary

- Be cautious
- TEE or ICE-guided transseptal puncture
- Pressure monitoring for transseptal puncture
- Correct device sizing
- Always and only pigtail catheter to approach LAA
- Meticulous de-air steps
- Adequate hydration to maintain a high normal LA pressure (>10mmHg)
- Follow closely device release criteria
- Consider cerebral protection system if necessary

ICE-guided LAAO

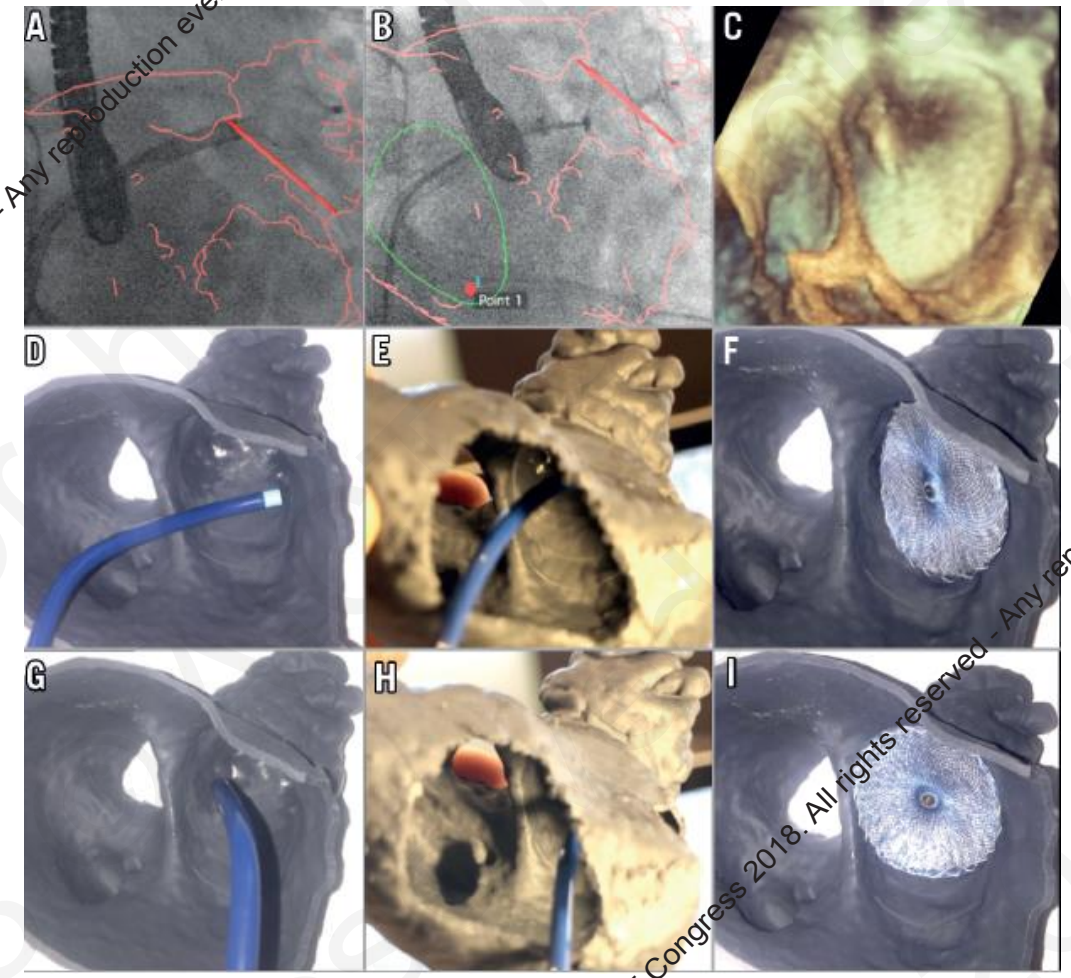


0.6% complications related to GA/TEE (esophageal tear from TEE probe, tongue laceration, airway trauma and post-procedure respiratory failure)

	TEE (n = 107)	ICE (n = 109)	p Value
Major complications	5 (4.7)	2 (1.8)	0.28
Device embolization	1 (0.9)	0	
Pericardial effusion with tamponade	0	2 (1.8)*	
Ischemic stroke	1 (0.9)	0	
Hemorrhagic stroke	1 (0.9)	0	
Major extracranial bleeding	2 (1.9)†	0	
Death	0	0	
Access-related complications	1 (0.9)	4 (3.7)	0.37
Access-site hematoma >6 cm	1 (0.9)	3 (2.8)*	
Pseudoaneurysm	0	1 (0.9)	

Korsholm K et al. Intracardiac echocardiography from the left atrium for procedural guidance of transcatheter left atrial appendage occlusion. JACC: Cardiovascular Interventions;10:198-206

LAAO Implant Simulation With 3D-Printed LA Model



Ciobotaru V et al. Left atrial appendage occlusion simulation based on three-dimensional printing: new insights into outcome and technique. Eurointervention 2018;14:176-84.

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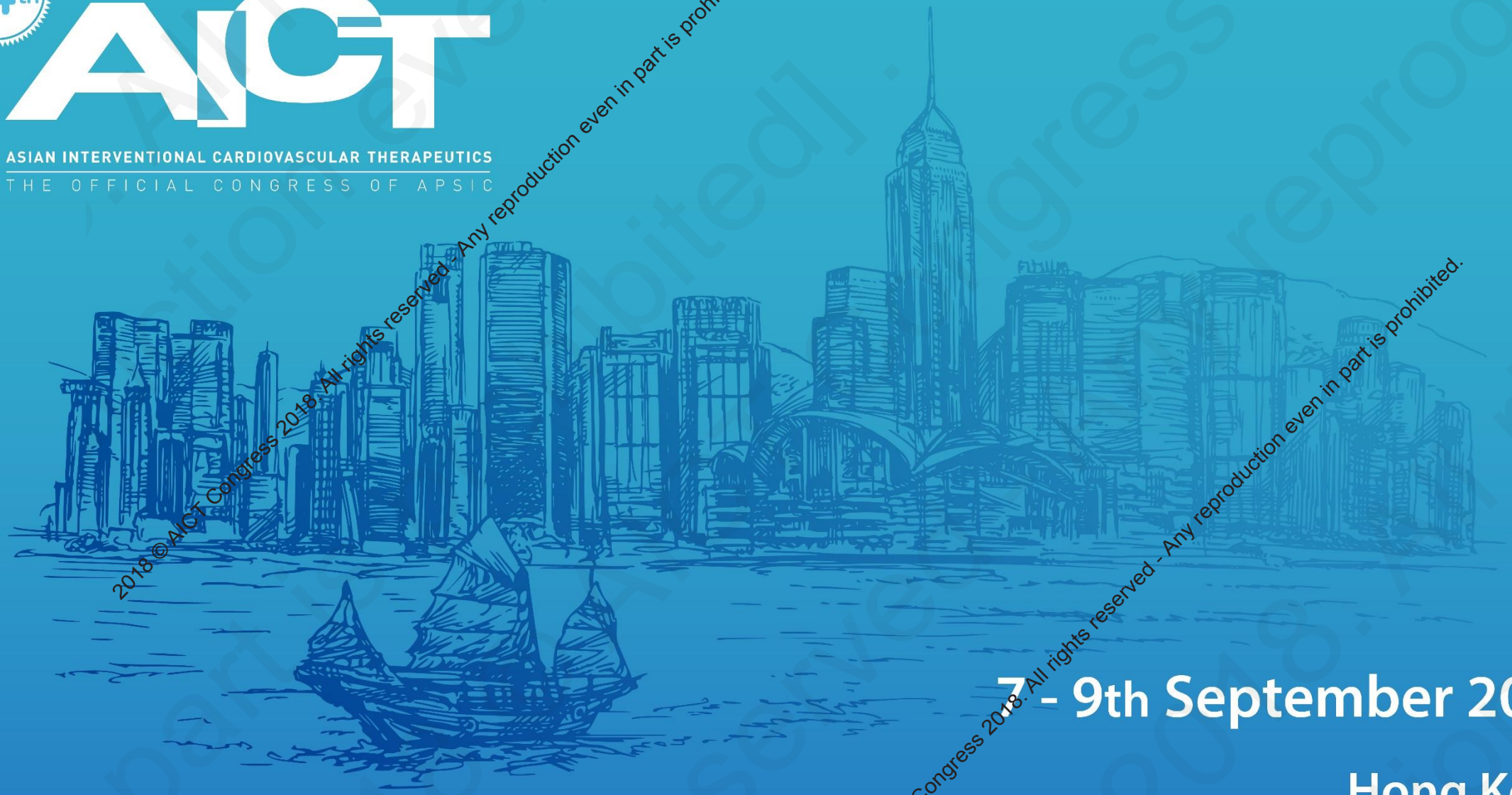

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