Supplementary material

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Supplementary Table S1. Currently available LAA Occlusion devices.

Device	Design and specific features	Delivery -system	Sizes	LAA sizes	Device sizing	Imaging landmarks	Advantages	Caveats
Single-lobe endocardial LAAO devices.								
Watchman 2.5 (CE mark 2005, FDA 2015)	Parachute-shaped 10-strut nitinol frame. PET membrane coverage. 10 fixation anchors. Recapturable.	14 Fr. Single, double or anterior curve.	5 sizes: 21–33 mm	Ostium: 17–31 mm. LAA depth ≥ ostium width.	10%–20% longer than maximal LAA ostium diameter.	Ostium: measured from the left circumflex artery to a point 1–2 cm within the left upper pulmonary vein ridge. Depth: measured from the plane of the LAA ostium to the LAA apex.	Long-term evidence from randomized controlled trials. Reproducible results.	Requires deep LAA intubation with delivery sheath for deployment.
Watchman FLX **(CE mark 2019)**	Parachute-shaped 18-strut nitinol frame. PET membrane coverage.	14 Fr. Single, double or anterior curve.	5 sizes: 20–35 mm	Ostium: 14-31.5 mm.	10%–30% longer than maximal LAA ostium diameter.		Allows for implantation in shallow LAA. Reduced risk of distal perforations.	Limited long-term evidence.

	18 fixation anchors. 10-20% shorter length. Atraumatic distal end with fluoroscopic marker. Recess of delivery cable screw. Recapturable.						Advancement within the LAA in a "ball" configuration.	
WaveCrest **(CE mark 2013)**	Nitinol frame. Outer ePTFE membrane and inner Polyurethane foam. 20 anchoring points. Retractable distal anchors. Recapturable.	12Fr. Single or double curve.	3 sizes (22, 27, 32 mm)	Ostium: 14–32 mm.	The smaller device size is chosen so that the longest measured diameter does not exceed the nominal device size and the average of the longest and shortest diameters is ≥3 mm below the nominal device size.	Ostium: measured from the left circumflex artery to a point 1–2 cm within the left upper pulmonary vein ridge.	Small, shallow LAA anatomies.	Limited evidence.

Lobe and disc endocardial LAAO devices								
ACP Amplatzer **(CE mark 2008)**	Flexible braided Nitinol mesh filled with polyester fabric. 6 pairs of anchors on the lobe. Recapturable.	9–13 Fr. Double curve (45°×45°). 	8 sizes (16–30mm)	LZ: 12–28mm. Depth ≈ 10mm.	10–20% larger than maximal LZ diameter.	LZ: measured 10–12 mm distal to the plane connecting the pulmonary vein ridge to the circumflex artery (i.e. LAA ostium), at an angle perpendicular to the neck axis. Depth: measured from the LAA ostium plane towards the back LAA wall.	Extensive evidence from large registries.	First-generation device. Less stability than Amulet.
Amulet Amplatzer **(CE mark 2013)**	Flexible braided Nitinol mesh with polyester fabric. 6 to 10 pairs of anchors on the lobe. Recessed proximal end screw Recapturable.	12–14Fr. Double curve (45°×45°) 	8 sizes (16–34 mm)	LZ: 11–31mm. Depth ≈ 12–15 mm.			Extensive evidence from large registries.	
LAmbre **(CE mark 2016)**	PET covered nilitol umbrella PET filled and covered nilitol disc. 8 anchors at outer side of umbrella. 8 “soft hooks” at tip of umbrella. Recapturable.	8–10Fr Double curve (45°×30°) 	11 umbrella sizes (16-36 mm): cover extends 4-6mm	Minimal LZ:14mm. Maximal ostium: 40mm	Umbrella: 4–6 mm larger than the LZ maximal diameter. Disc: 0–8 mm larger than LAA ostium.	Ostium: measured from the left circumflex artery to a point 1–2 cm within the left upper pulmonary vein ridge. LZ: measured 10-12 mm distal to the	Implantation in challenging LAA anatomies.	Limited evidence. Sealing depends mostly on disc.

			from umbrella. 6 special sizes: cover extends 12-16mm from umbrella.			LAA ostial plane, at an angle perpendicular to the neck axis.		
Ultraseal **(CE mark 2016)**	Nitinol frame lobe (bulb) with 12 stabilizing hooks. Polyvinyl alcohol foam and polyester fabric covered disc (sail). Multidirectional connecting joint Recapturable.	10–12Fr Single or double curve (45°×45°)	9 bulb sizes (16–32 mm)	LZ 12-26mm	Bulb at least 25%–33% longer than maximal LZ diameter.	LZ: measured 10–12 mm from the plane connecting the pulmonary vein ridge to the circumflex artery (i.e. LAA ostium).	Multidirectional articulating joint allows implant in complex LAA anatomies.	Limited evidence. Sealing depends solely on the disc.

Epicardial LAAO devices								
Lariat **(CE mark 2015, FDA 2006 for surgical use only).**	Endo-epicardial approach: magnetically assisted snare over balloon in LAA. EndoCATH occlusion balloon; FindrWIRZ magnet-tipped guidewires; epicardial snare with a pretied Teflon-coated suture.	13.5Fr epicardial sheath 8.5Fr transeptal	40 mm suture loop for snaring.	LAAs up to: 40 mm width, 20 mm height. 70 mm length. Lariat +: up to 45mm width	Not applicable.	Maximal body width.	Large anatomies (LAA diameter up to <40 mm, short neck). No foreign material in contact with blood. Potential electrical isolation of LAA.	Requires epicardial approach. Several anatomical exclusion criteria including superiorly oriented LAA with its apex behind the pulmonary trunk (preprocedural cardiac computed tomography mandatory).

CE: conformité européenne. FDA : US Food and Drug Administration. LAA: left atrial appendage. LZ: landing zone. PET: polyethylene terephthalate. ePTFE: extended polytetrafluoroethylene.