Esophagus Sandwiched Between the Descending Aorta and Left Atrium
— Pitfalls of Esophageal Cooling During Radiofrequency Hot Balloon Ablation —

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A 69-year-old man with a history of atrial fibrillation underwent pulmonary vein isolation using a radiofrequency (RF) hot balloon (SATAKE Hot Balloon, Toray Industries, Tokyo, Japan). The left superior pulmonary vein (LSPV) was occluded and energy application was initiated. Rapid temperature increase over the threshold of 39°C was observed shortly after, and a cooling solution (0°C) was injected into the esophageal lumen, 10 mL initially, subsequently a 5-mL bolus (Figure A). Despite the repeated cooling solution injection, the esophageal temperature just behind the balloon increased continuously to 43°C, and the energy delivery was terminated. Esophagography demonstrated an extrinsic compression of the esophagus behind the LSPV (Figure B) with stagnated contrast medium above the narrowed portion. Transverse imaging and reconstructed anatomy on computed tomography (CT) demonstrated the esophagus sandwiched between the left atrium and descending aorta (Figure C,D) and endoscopy confirmed an extrinsic esophagus compression (Figure E).

Esophageal narrowing limits effective cooling during RF hot balloon ablation. Pre-procedural CT may help to identify sandwiched esophagus between the descending aorta and left atrium, which may increase the risk of thermal injury.

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Figure. (A) Time course of the esophageal temperature during energy application and timing of injections of a cooling solution (black arrows; T1–5, esophageal temperature probes). (B) Esophagography after balloon deflation showing a beak-shaped compression of the esophagus (white arrow) behind the left superior pulmonary vein (LSPV). (C) Anterior-superior view of the reconstructed anatomy showing the esophagus crossing down over the descending aorta. (D) Endoscopy showing an extrinsic compression (white arrowheads) and narrowing of the esophagus. LA, left atrium; RHB, radiofrequency hot balloon.