A case of superior vena cava isolation with longitudinal linear ablation on both sides of the phrenic nerve

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Introduction: The most common source of atrial fibrillation (AF) except the pulmonary vein is the superior vena cava (SVC), and in that case, we isolate the SVC by ablation. However, phrenic nerve (PN) runs parallel in the vicinity of the SVC, and it is necessary to be careful about the complication of phrenic nerve palsy. When the SVC-right atrium (RA) conduction site is near the phrenic nerve, it is often difficult to isolating the SVC. This time, we succeeded in SVC isolation by a new method, so we introduce this method.

Methods: N/A

Result: A 64-years-old man, who had paroxysmal AF, underwent pulmonary vein isolation (PVI) with a hot balloon ablation. After PVI, the firing from the SVC induced AF. We did SVC isolation by radio frequency catheter ablation (RFCA). After the 1st session, he had AF recurrence and underwent the 2nd session. The four pulmonary veins were isolated. There was re-conduction between the SVC and the RA and the firing from the SVC caused AF. We performed re-SVC isolation by RFCA, but dormant conduction occurred many times just above the PN. We ablated near the PN with a low power (15 W) RFCA for avoiding PN injury, and finally succeeded in SVC isolation. However AF recurrence was documented after the 2nd session, we performed the 3rd session. In the activation map during sinus rhythm, the SVC and the RA conduction block were confirmed except just above the PN. We identified the position of PN by pacing, and tried SVC isolation by making longitudinal lines on both sides of the PN. With confirming compound motor action potentials and the PN capture, we performed longitudinal linear ablation on both sides of the PN for SVC isolation. The SVC was successfully isolated without PN injury. After the procedure, He had no AF recurrence.

Conclusion: In this case, it was difficult to isolate SVC because the re-conduction site between the SVC and the RA located just above the PN. Longitudinal linear ablation on both sides of PN may be a therapeutic option to isolate SVC avoiding PN injury.