**Raise Up Technique on the Creation of Left Atrial Roof Lesion with Cryoballoon for Atrial Fibrillation**

**Hirofumi Kujiraoka**  
Atsuhi Suzuki  
Naohiko Kawaguchi  
Kuniyoshi Sato  
Tasuku Murakami  
Mie Ochida  
Shingo Watanabe  
Shunji Yoshikawa  
Yasuhiro Yamamoto  
Michio Usui  
Yasuteru Yamauchi  
Teturo Sasano

**Introduction**: Recent study reported that the efficacy of left atrial roof block line (LA-RB) created by cryoballoon for persistent atrial fibrillation. On the other hand, there are difficulty to create LA-RB in some cases because of anatomical complexity to keep the balloon along the roof. When placing the cryoballoon in the superior left atrium (LA), the Achieve catheter is placed deeply in the right or left superior pulmonary vein (PV) as an ‘anchor’ to stabilize the cryoballoon, with the distal balloon freezing surface oriented towards the LA roof. However, if Achieve catheter can not be placed deeply in the upper PV, and if the Achieve catheter and the balloon are on the opposite side, Achieve catheter may come off and the balloon may bounce and be dislocated when trying to apply the balloon to the roof. This study aimed to clarify whether raising up technique could improve the success rate of LA-RB creation.

**Methods**: Consecutive 40 patients who underwent PVI and LA-RB creation by cryoballoon for AF were included. 20 of 40 patients had LA-RB creation with raise up technique (Raise-up group) and remaining 20 patients had LA-RB creation without raise up technique (Control group). Raise up technique is applied when it is difficult to apply the balloon to the roof before freezing. Raise up technique is as follows. If it is difficult to apply the balloon to LA roof before freezing, place the balloon below the targeted site, taking care not to be dislocated the anchor, and start freezing there. Raise up and press the balloon against the roof when the balloon temperature reaches -5 to -10 degrees Celsius and was fixed to a part of the left atrium. Then the balloon can be applied to the targeted site of the roof. Raising up the balloon before freezing may cause dislocation of the anchor and the balloon especially when the anchor and the balloon are on the opposite side. We compared the success rates of bidirectional LA-RB of the two groups.

**Result**: Bidirectional LA-RB creation was observed at 19 of 20 patients (95.0%) in raise up group and 14 of 20 patients (70.0%) in control group respectively. There was no difference between the two groups with respect to the number of times of freezing and the minimum temperature.

**Conclusion**: By performing raise up technique, We achieved high success rate of LA-RB creation of using cryoballoon without RF touch-up. LA-RB creation, also one of the mandatory process of left atrial
posterior wall isolation, is extremely important strategy for the patients of persistent AF. Though roof block creation by cryoballoon sometimes have difficulty to apply the balloon to the targeted site, raise up technique will be helpful to LA-RB creation.