**Clinical Significance of Atiral Subendocardial Smooth Muscle Layer and Cardiac Myofibroblasts in Human Atrial Tissue with Valvular Atrial Fibrillation**

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**Background:** The existence of myofibroblasts (MFB) and the role of sub-endocardial smooth muscle (SSM) layer of human atrial tissue has not yet been elucidated. We hypothesized that SSM layer and MFB play some roles in atrial structural remodeling and maintenance of atrial fibrillation (AF) in patients who underwent cardiac surgery. **Methods and Results:**

We analyzed immunohistochemical staining of atrial appendage (AA) tissues taken from 17 patients with AF and 15 patients remaining in sinus rhythm (SR) who underwent cardiac surgery. Results: 1. SSM layer of AA was significantly thicker in patients with AF (0.13±0.17mm vs. 0.02±0.04mm, p<0.0091) and higher relative NCX mRNA expression level (p<0.0247) than those SR patients. 2. The patients with SSM layer ≥14µm had larger LA size (63.11±11.46mm vs. 49.63±12.09mm, p<0.0006) and greater fibrotic area (p<0.0094) than those with <14µm. 3. MFBs were found in 7/17 patients with AF and 2/15 in SR group (18.35±37.65(n) vs. 2.29±6.50(n), p<0.0456) in SSM area and co-localized with PAS stain+ glycogen storage cells (95.5%). **Conclusion:** SSM layer of atrial appendage tissue is closely related with valvular AF, degrees of atrial remodeling and fibrosis in patients who underwent open heart surgery. We found MFB does exist in SSM layer of human atrial tissue co-localized with PAS+ cells. **Keywords:** atrial fibrillation, myofibroblast, subendocardial smooth muscle layer