Optical frequency-domain imaging and pulmonary angioscopy in chronic thromboembolic pulmonary hypertension

Hidetoshi Chibana, Nobuhiro Tahara, Naoki Itaya, Masahiro Sasaki, Motoki Sasaki, Takaharu Nakayoshi, Masanori Ohtsuka, Shiniro Yokoyama, Ken-ichiro Sasaki, Takafumi Ueno, and Yoshihiro Fukumoto*

Department of Internal Medicine, Division of Cardiovascular Medicine, Kurume University School of Medicine, 67 Asahi-Machi, Kurume, Kurume 830-0011, Japan

* Corresponding author. Tel: +81-942-31-7562, Fax: +81-942-33-6509, Email: yofukumoto-circ@umin.net

Unresolved thromboemboli in the pulmonary arteries (PAs) cause chronic thromboembolic pulmonary hypertension (CTEPH), which is usually diagnosed by mismatched perfusion defects on ventilation-perfusion lung scintigraphy and chronic thromboembolic signs on computed tomography (CT) scan and/or conventional pulmonary angiography. In our recent three cases of CTEPH (Case 1; a 75-year-old woman, mean PA pressure (PAP) 45 mmHg, PA wedge pressure (PAWP) 9 mmHg, Case 2; a 84-year-old woman, mean PAP 33 mmHg, PAWP 6 mmHg, Case 3; a 66-year-old woman, mean PAP 36 mmHg, PAWP 9 mmHg, evaluated by right heart catheterization), we were able to observe the unresolved PA thromboemboli, such as thrombus and mesh-like lesions (Panel, Supplementary material online, Video), in both optical frequency-domain imaging and pulmonary angioscopy. These techniques are useful especially to diagnose distal-type CTEPH or to detect thin chronic thrombus, which has some difficulties in CT scan and/or pulmonary angiography. Further, if 3D printed model of PA lesions by OFDI or angioscopy is developed in each patient in near future, it might be a great help for pulmonary endarterectomy or balloon pulmonary angioplasty.

Panel Optical frequency-domain imaging and pulmonary angioscopy showed thrombus (Panels A and B; Case 1) and mesh-like lesions (Panels C and D; Case 1, Panels E and F; Case 2, Panels G and H; Case 3) of the pulmonary arteries in patients with CTEPH.

Supplementary material is available at European Heart Journal online.