Response to balloon pulmonary angioplasty in treated versus untreated pulmonary arteries in CTEPH patients

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ABSTRACT

Balloon pulmonary angioplasty (BPA) is a treatment of obstructed pulmonary arteries (PAs), for patients with inoperable chronic thromboembolic pulmonary hypertension (CTEPH). Since the effect of BPA in untreated (i.e. unobstructed) PAs is unknown, we investigated the treatment response in treated and untreated PAs, by analyzing CT Pulmonary Angiography (CTPA).

We studied 22 consecutive CTEPH patients (20 female; age: 67±14), who underwent CTPA and right-heart catheterization (RHC), pre- and post-BPA. In consensus, three experts selected treated artery segments based on the BPA locations and approximately 5 untreated artery segments at a similar level. Post-BPA CTPA scans were registered to pre-BPA scans, and local intravascular density changes were measured. The median density change in treated (MDC_T) and untreated segments (MDC_U) was calculated, based on manual selections. The difference between MDC_U and MDC_T was tested by paired T-test. The difference in density changes (ΔMDC) between treated and untreated PAs was calculated (MDC_T-MDC_U). Changes in RHC parameters included systolic, diastolic and mean pulmonary artery pressure (ΔsPAP, ΔdPAP and ΔmPAP) and in pulmonary vascular resistance (ΔPVR). The relation between hemodynamic changes and ΔMDC was studied with Spearman's correlation.

MDC_T (51±85 HU) and MDC_U (-23±103 HU) were significantly different and in opposite direction (p=0.001). ΔMDC was significantly correlated with ΔdPAP (R=-0.55, p=0.008) and ΔPVR (R=-0.47, p=0.026), and marginally correlated with ΔmPAP (R=-0.4, p=0.068).

Perfusion in treated PAs increased, whereas perfusion in untreated PAs decreased. Not only improved

perfusion in treated arteries, but also normalization in untreated arteries may play a significant role in improving hemodynamics by BPA.

The normal vascular perfusion of healthy people is lack.

Approved by local ethics committee and written informed consent from patients.

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