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Editorial

Multimodality treatment for chronic thromboembolic pulmonary hypertension

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Chronic thromboembolic pulmonary hypertension (CTEPH) is a progressive disease with a poor prognosis if left untreated [1]. The gold-standard therapy is surgical pulmonary endarterectomy (PEA) [2–4]. Despite excellent long-term survival and maintenance of good functional status after PEA, Cannon et al. found a high incidence of persistent pulmonary hypertension after PEA surgery, indicating a worse prognosis in patients with a mean pulmonary artery pressure of more than 38 mm Hg and a pulmonary vascular resistance of more than 425 dyn $*$ s/cm^5 [5].

For technically inoperable patients with distal pulmonary vascular lesions PH targeted medical treatment has been developed and recommended by international guidelines [2,3]. In addition balloon pulmonary angioplasty (BPA) is an evolving interventional treatment option with increasing worldwide attention [6–8]. Currently, most published data are from single-center experiences, and early outcomes are promising. However, there are no controlled trials of BPA and long-term data are scarce; short-term hybrid concepts combining PEA and BPA in highly selected patients have been described but are limited to CTEPH centers with extensive experience in surgical and interventional treatments [9].

Present guidelines recommend consideration of BPA also for patients with residual or recurrent pulmonary hypertension after PEA [2,3] although data on the impact of BPA in this group of patients are very limited so far [10]. This highlights the relevance of the current study by Araszkiewicz et al. that presents 15 patients treated with BPA 28 (±25.8) months after PEA. The outcome of the interventional treatment appears promising, with an improvement in pulmonary hemodynamics and physical capacity. The results of this study are similar to the outcome data on BPA in inoperable CTEPH patients in other European centers [7,8]. The authors describe two severe periprocedural complications and one patient who died 2 months after the last intervention.

The results of the pre-BPA PEA procedures in this series are somewhat surprising: in 18% of all operated patients, there was no significant improvement in mean pulmonary artery pressure and cardiac output. Several reasons for these unsatisfactory results are discussed in the article. Secondary vasculopathy is a complication of CTEPH and may result in residual pulmonary hypertension after PEA, but may not be a target for interventional treatment. Therefore, incomplete clearing of pulmonary artery branches may be another explanation.

Residual or recurrent pulmonary hypertension after PEA is an important finding in the long-term course of CTEPH patients. Cannon et al. defined a level of pulmonary vascular resistance to help in assessing the prognosis of patients with residual or recurrent pulmonary hypertension after PEA [5]. These data demonstrate the need for an optimal therapeutic strategy even after successful PEA. Current guidelines recommend targeted medical treatment in CTEPH patients with residual or recurrent pulmonary hypertension after PEA [2,3]. From the surgical perspective, a reoperation for surgically amenable pulmonary arterial lesions should also be discussed. As shown in the present study, interventional treatment in combination with targeted medical treatment appears to be a promising therapeutic option in patients with residual or recurrent pulmonary hypertension after PEA, if target lesions for an intervention are identified by high-quality imaging and re-do surgery is not an option.

Despite all limitations of the study, especially the small number of patients and the short follow-up period, the data presented underline the importance of consequent long-term follow-up investigations and individualized multimodality concepts for CTEPH patients.

Conflict of interest

The author reports no relationships that could be construed as a conflict of interest.

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