Journal of Endocrine Disorders & Surgery

Extended Abstract

Preoperative balloon pulmonary angioplasty for chronic thromboembolic pulmonary hypertension led to successful anesthetic management for total hysterectomy under general anesthesia: a case report

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Abstract

Chronic thromboembolic pulmonary hypertension (CTEPH) is characterized by elevated pressure in pulmonary arteries. This study was performed to explore the critical miRNAs and genes affecting the pathogenesis of CTEPH. Methods: GSE56914 dataset (10 CTEPH whole blood samples and 10 control samples) was downloaded from the Gene Expression Omnibus database. Using limma package, the differentially expressed miRNAs (DE-miRNAs) were acquired. After miRNA-target pairs were obtained using miRWalk2.0 tool, a miRNA-target regulatory network was built by Cystoscope software. Using DAVID tool, significantly enriched pathways involving the target genes were identified. Moreover, the protein-protein interaction network and transcription factor-target regulatory network were built by the Cystoscope software. Additionally, quantitative real-time PCR (qRT-PCR) experiments and luciferase assay were conducted to validate miRNA/gene expression and miRNA-target regulatory relationship, respectively. Results: There were 25 DE-miRNAs (8 up-regulated and 17 down-regulated) between CTEPH and control groups. The target genes of has-let-7b-3p, has-miR-17-5p, has-miR-3202, has-miR-106b-5p, and has-miR-665 were enriched in multiple pathways such as "Insulin secretion". qRT-PCR analysis confirmed upregulation of hsa-miR-3202, hsa-miR-665, and matrix metalloproteinase 2 (MMP2) as well as downregulation of hsa-let-7b-3p, hsa-miR-17-5p, and hsa-miR-106b-5p. Luciferase assay indicated that MMP2 was negatively mediated by hsa-miR-106b-5p.

Conclusions: These miRNAs and genes were associated with the pathogenesis of CTEPH. Besides, hsa-miR-106b-5p was involved in the development of CTEPH via targeting MMP2. Chronic thromboembolic pulmonary hypertension (CTEPH) is a disease of obstructive pulmonary artery remodelling as a consequence of major vessel thromboembolism. Balloon pulmonary angioplasty (BPA) is an alternative treatment for patients with inoperable CTEPH. We report a case of CTEPH which improved following preoperative BPA intervention, allowing total hysterectomy to be performed.

Case presentation: A 48-year-old woman was transferred to our hospital to undergo total hysterectomy for endometrial cancer. She developed pulmonary embolism 7 months ago at another hospital, and a diagnosis of CTEPH was made based on multiple pulmonary emboli and pulmonary hypertension at our institute. Two BPA sessions for seven branches of the bilateral pulmonary arteries were conducted, resulting in a decrease of mean pulmonary artery pressure from 54 to 33 mmHg. Total hysterectomy was successfully performed under general anesthesia without any complications.

Conclusions: BPA could be effective for reducing PH in patients with CTEPH undergoing noncardiac surgery. Chronic thromboembolic pulmonary hypertension (CTEPH) is defined as the persistence of thrombi and vascular remodelling in pulmonary circulation after an embolic event associated with a mean pulmonary artery pressure (mPAP) of ≥ 25 mmHg. Pulmonary endarterectomy (PEA) is the only established treatment for advanced CTEPH. Recent reports have suggested that balloon pulmonary angioplasty (BPA) is an alternative therapy for inoperable patients with CTEPH. However, there are few reports on the effectiveness of preoperative BPA for CTEPH.

Case presentation: A 48-year-old woman (height 165 cm, weight 67 kg) had been hospitalized for schizophrenia in a psychiatric hospital. She had been prescribed sultopride hydrochloride, risperidone, and zotepine. Seven months prior to surgery, she was found to have developed dyspnea and palpitation on exertion, and lower leg edema. Computed tomography (CT) revealed thrombi in the main trunk of the left pulmonary artery as well as in the peripheries of the bilateral pulmonary arteries, confirming the diagnosis of pulmonary embolism. Transthoracic echocardiography showed a dilated right ventricle (RV) with moderate tricuspid valve regurgitation (TR) and an estimated mPAP of 43 mmHg, indicating PH. Anticoagulant therapy was started with apixaban.

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