Systemic-to-pulmonary venous collateral vessels after cavo-pulmonary connection

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Introduction:  
Venous collaterals connecting superior and inferior caval veins systems, as well as systemic to pulmonary venous collateral vessels (SPVCV) are commonly found in patients with partial or total cavo-pulmonary connection. SPVCV seem to be especially interesting from anatomical, physiological and therapeutic point of view. Their development is related to normally existing anastomoses of bronchial and mediastinal veins draining to the left atrium and pulmonary veins. The aim of the study was to describe anatomy and clinical importance of SPVCV in patients after cavo-pulmonary connection.

Methods:  
Cardiac catheterization results of 100 patients examined at our institution were reviewed. The group included 99 bi-directional Glenn patients and 1 patient after Kawashima procedure. Fontan procedure was completed in 12 of 99 Glenn patients. All existing examinations of patients were reviewed and the presence of SPVCV was assessed.

Results:  
In 17 of 100 patients SPVCV were visualized on angiography. SPVCV were found in 13 of 99 Glenn patients and in Kawashima patient. In one patient another SPVCV was discovered after interventional closure of previously existing collateral vein. Among Fontan patients, in 1 case the SPVCV existed after Glenn procedure and in 3 cases it appeared after Fontan circulation have been achieved. There were 19 supplying veins visualized. They originated from left brachiocephalic vein (12), azygos vein system (5), right superior phrenic vein (1) and right venous angle (1). Most of them (14) drained into a single vessel or chamber: to the left atrium (4), left superior pulmonary vein (4), right superior pulmonary vein (3), right inferior pulmonary vein (2), left inferior pulmonary vein (1). Five remaining veins emptied to both right pulmonary veins (2), both left pulmonary veins (1), left atrium and right inferior pulmonary vein (1). In most of cases they produced limited right-to-left shunt. Four patients were accepted for intervention, which was completed in 1 case.

Conclusions:  
SPVCV develop in almost one fifth of cavo-pulmonary anastomosis patients. They drain through bronchial and mediastinal veins to pulmonary veins and/or left atrium. Most of them are small vessels with limited clinical significance.