

BLOOD VESSELS AND LYMPHATICS IN CALCIFIC AORTIC STENOSIS – IN SUPPORT OF ITS INFLAMMATORY PATHOGENESIS

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Summary

In developed countries, calcific aortic stenosis (CAS) has become the most common acquired valvular disease. It is considered a form of atherosclerosis and, like the latter, of inflammatory origin. Majority of cases of CAS are classified etiologically as either senile (“degenerative”) – developing on previously normal aortic valve with three cusps, or based on congenitally malformed – bicuspid aortic valve. Twenty-eight cases of CAS (18 of the senile type, 7 of the bicuspid valve type, and 3 of indeterminate type) were examined by means of histology and immunohistochemistry (CD31 for blood vessels; D2-40 for lymphatics). In the calcified cusps, blood vessels were present in all 28 cases, and lymphatics in 14 of them. Vascularization was associated with lymphocytic infiltrates in 24 cases. There was no difference in the pattern between the two types of CAS. The origin of the cusp vessels is discussed. Our finding in the calcified cusps of both blood and lymphatic vessels together with lymphocytic infiltrates supports the inflammatory theory of the CAS pathogenesis.

Key words: calcific aortic stenosis – aortic valve – vascularisation – lymphatic vessels

Souhrn

Krevní a lymfatické cévy v kalcifikované aortální stenóze. Příspěvek k teorii o její zánětlivé patogenezi

V rozvinutých zemích je dnes kalcifikovaná aortální stenóza (KAS) nejčastější získanou chlopenní vadou. Je považována za formu aterosklerózy a, stejně jako tato, zánětlivého původu. Většina případů KAS je stařeckého (sklerotického, “degenerativního” typu), vznikající na normální tříčlupé chlopni, nebo vzniklá na podkladě vrozně malformované – dvojcípé aortální chlopně.

Vyšetřili jsme 28 případů resekovanych chlopní KAS (18 stařeckého typu, 7 dvojcípých chlopní a 3 neurčitelného typu) – makroskopicky, histologicky a imunohistochemicky (CD 31 na krevní cévy a D2-40 na lymfatika). V kalcifikovaných cípech byly prokázány krevní cévy ve všech 28 případech, lymfatika pak ve 14 z nich. Častost a charakter vaskularizace byly obdobné u obou typů KAS. Je diskutován původ těchto cév.

Nález přítomnosti krevních a lymfatických cév, spolu s přítomností lymfocytárních infiltrátů podporuje teorii zánětlivého původu KAS.

Klíčová slova: kalcifikovaná aortální stenóza – aortální chlopeň – vaskularizace – lymfatické cévy

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In developed countries, calcific aortic stenosis (CAS) has become the most common acquired valvular disease and reason for aortic valve replacement. The prevalence of the disease increases with age, reaching 2–4 % in adults over the age of 65 years (3).

Majority of cases of CAS are classified etiologically as either senile (“degenerative”) – of a previously normal aortic valve with three cusps, or based on congenitally malformed – bicuspid aortic valve (Fig. 1).

Calcific aortic disease is considered a form of atherosclerosis and, like the latter, of inflammatory origin (6). The aim of our work was to study patterns of blood vessels and lymphatics in CAS.

MATERIAL AND METHODS

From December 2008 to March 2009, twenty-eight consecutive calcified aortic valves operatively excised at the Department of Cardiosurgery for pure or predominant

nonrheumatic aortic stenosis were submitted for pathological examination.

After gross examination and description, at least one tissue sample was taken vertically from each valve cusp near its center. The formalin-fixed specimens were de-mineralised with the Sakura TDE solution in an automatic decalcifier, processed, embedded in paraffin wax, sectioned and stained with HE and elastica-Van Gieson stain. Immunohistochemistry was performed using antibodies (Dako Cytomation) to the CD31 (blood vessels), and the D2-40 (lymphatic vessels) antigen.

Table 1. Calcific aortic stenosis (n=28)

Type	n	M/F	Aver. age (yrs.)
Senile (3 cusps)	18	11/7	70.7
Bicuspid valve	7	6/1	57.0
Indeterminate	3	2/1	63.0
Total	28	19/9	66.5