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Variability of valve configuration in the lumen of the coronary sinus in the adult human hearts

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Described by many authors, valves refer to the coronary sinus. The best known among them are Thebesius and Vieussen valves. Information about valves in the lumen of the coronary sinus, though, is rarely found in anatomic literature. Frequency of occurrence of valves in the lumen of the coronary sinus and the degree of their formation was chartered in this paper. 150 adult human hearts of both sexes from 18 to 85 years of age were tested, fixed in a formalin/ethanol solution. Classical macroscopic anatomical methods were used. The valves in the sinus lumen were observed in 10% of the tested hearts, usually presented as incomplete single ones (7.3%).

key words: human heart, coronary sinus, valves in the coronary sinus

INTRODUCTION

The coronary sinus (*sinus coronarius*) is a structure that skims blood from the heart walls. Described by various authors, the valves refer to the coronary sinus. The best known are the Thebesius valve [4–7,9,10,12,13] — at the ostium of the coronary sinus to the right atrium and the Vieussen valve [3,8,10,12], at the ostium of the great cardiac vein to the sinus. Only few authors describe the valves in the sinus lumen [6,9]. It is thought that the presence of the valves can be one of the reasons for the difficulty in catherization of the coronary sinus. Bing et al. [1,2], followed by Hellerstein and Orbison [4] have already concidered catherization of the coronary sinus in human hearts as very difficult and unsuccessful in 25% of cases. According to Ratajczyk-Pakalska [10] the percentage is even higher, reaching 39%. Frequency of occurrence of the sinus lumen valves was tested and the degree of their formation chartered in this paper.

MATERIAL AND METHODS

150 adult human hearts of both sexes from 18 to 85 years of age, fixed in a formalin/ethanol solution, were tested. Macroscopic anatomical methods have excluded developmental anomalies and pathological changes in the hearts. The cutting was made along the coronary sinus. The walls of the sinus were opened, cleaned and the interior of the sinus scrutinized. Frequency of occurrence and morphology of the tested structures were chartered on the basis of photographs and outlines. Classical macroscopic anatomical methods were used.

RESULTS

Valves in the sinus lumen were observed in 10% of cases. In terms of their morphology two types of valves were distinguished:

— the first type: a complete single valve totally dividing the lumen of the coronary sinus (Fig. 1);

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— the second type: an incomplete valve which only partially divided the lumen of the sinus. Single (Fig. 2) and double (Fig. 3) valves, the leaflet ends of which none touched each other, were observed.

Frequency of occurrence and types of the valves in the lumen of the coronary sinus in the tested material are shown in Table 1. The valves belonging to the second type were in majority. The valves were usually revealed as incomplete single valves (7.3%), less frequently as incomplete double ones (1.3%).

Table 1. Frequency of occurrence and types of valves in the lumen of the coronary sinus in the tested material

Types of valves in the lumen of the coronary sinus	Frequency of occurrence (%)
Complete:	
— single	1.3
Incomplete:	
— single	7.3
— double	1.3

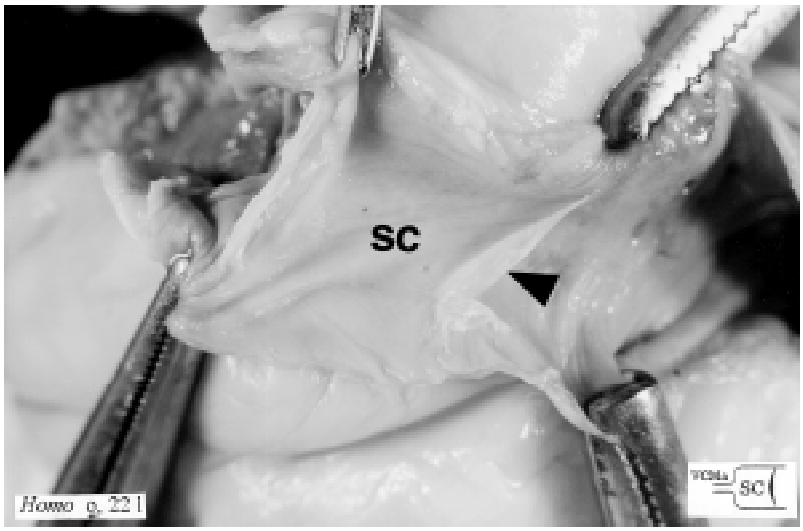

Figure 1. Complete valve in the lumen of the single coronary sinus SC — sinus coronarius.

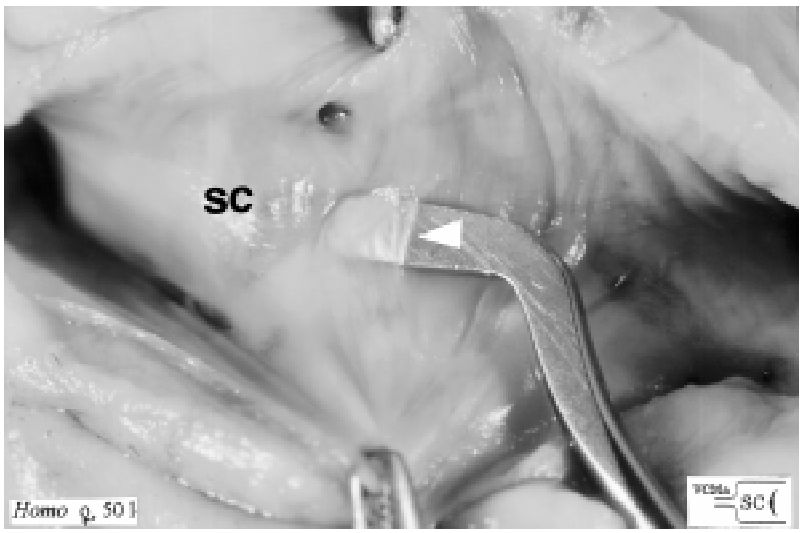

Figure 2. Incomplete valve in the lumen of the double coronary sinus.

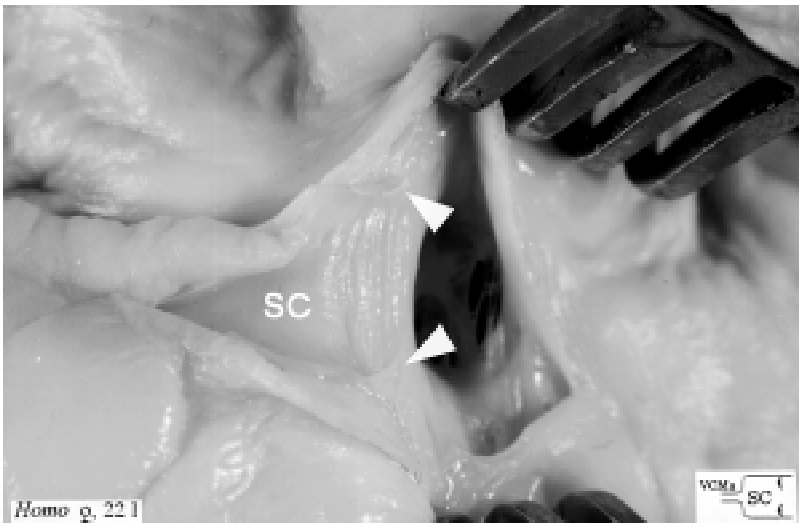

Figure 3. Incomplete valve in the lumen of the single coronary sinus.

DISCUSSION

There are only rudimentary references about valves in the lumen of the coronary sinus in anatomic literature. Rottenberg et al. [11] writes about intrasinusal valves only. Piffer et al. [9] distinguishes single and double valves in the wall of the vessel. Scientists use 143 human hearts of newborns, children, adolescents and adults, fixed in a formalin/ethanol solution. The researchers do not notice the permanent presence of the valves in the sinus lumen and do not provide any statistics, which makes a comparison to our results impossible. Koźluk et al. [6] notices the valves in the sinus lumen in 46% of cases. The scientists use 241 adult human hearts of both sexes from 20 to 60 years of age. Valves situated 3cm below the ostium of the coronary sinus to the right atrium were in majority. In the materials tested by us the valves were observed in 10% of cases only.

Our examination concludes that the presence of well-developed valves in the sinus lumen can cause a clinical problem, both in diagnosis and therapy of invasive cardiology owing to the difficulty in the catheterization of the coronary sinus.

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