

# Analysis of the course and the ostium of the oblique vein of the left atrium

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*Considering the origin of the coronary sinus and the oblique vein of the left atrium, both are remnants of the left horn of the embryonal venous sinus.*

*The studies were carried out on 100 human cadaver hearts. The causes of death were not cardiac reasons, no detectable changes in the coronary arteries. In the study, dissections and corrosion technique were used. Heart veins were filled by metacrylan through the coronary sinus. The beginning, the course, the tributaries and the ostium oblique vein of the left atrium to the coronary sinus were investigated.*

*The variability of the length and the venous tributaries and the ostium of the oblique vein of the left atrium were noticed. The variability of the venous tributaries (the dendritic, forked and simple types of the tributaries) was noticed. Four groups of ostium were observed. The ostium oblique vein of the left atrium was situated at the level of: the posterior vein of the left ventricle and also the great cardiac vein, the posterior vein of the left ventricle, the great cardiac vein and the independence ostium.*

**key words:** veins, heart, coronary sinus

## INTRODUCTION

The heart's veins show a great variety in regard to their length and course [2,6]. The changing character of the morphology of the coronary sinus and its tributaries is influenced to a high extent by the involution of the venous sinus. Knowing the proper layout and size of the coronary sinus and its tributaries is of basic importance in using anatomical data for clinical purposes [3,4,6]. The morphology of the oblique vein of the left atrium was subjected to a detailed analysis because of the common background of this vein and the coronary sinus. Both the oblique vein of the left atrium and the coronary sinus are remnants of the embryonal left corner of the venous sinus.

## MATERIAL AND METHODS

A hundred hearts were examined. The preparations were made from autopsy material taken from adult

corpuses, where no pathological changes in the heart or the blood vascular system had been found. The material was divided according to sex. 21 female and 79 male hearts were examined. The examinations used the methods of injection and corrosion. After a preliminary analysis of the venous system of the heart, the opening of the coronary sinus to the right atrium was found. The injection was made with the use of methacrylate resin. The applied technique made it possible to obtain preparations reflecting the natural size and spatial situation of the heart's venous vessels.

## RESULTS

The oblique vein of the left atrium running along the back surface of the left atrium would usually discharge into the coronary sinus at its left side. Such a course of the examined vein was observed in 97% of the examined cases.

In 3 out of 100 corrosion preparations (3%), it was not possible to get to the oblique vein of the left atrium with the help of corrosion.

The length of the oblique vein of the left atrium was measured on the corrosion preparations. The measurement was made from the ostium of the oblique vein of the left atrium to the sinus up to the strongest extension of the main trunk of the vessel in case of strong initial tributaries.

The oblique vein of the left atrium turned out to be changeable as far as its length was concerned. In most cases its diameter did not exceed 20 mm. The average value of the measurements was  $20 \pm 4.5$  mm. No differences in the vessel's length according to sex were stated.

The oblique vein of the left atrium revealed also a changing character referring to the course and initial tributaries. While analysing the vessel's course, three types of the examined vein were distinguished: dendritic, forked and simple type (Fig. 1).

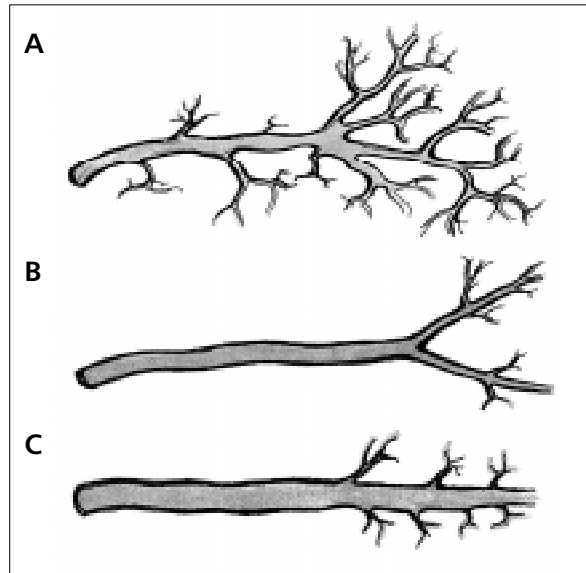
The dendritic type was characterised by the presence of numerous, minor initial tributaries, and then the vessel would go along a single trunk into the sinus. The length of the vessel's trunk was 0.5–1.8 mm.

The forked type was made by two bigger initial tributaries joining into a single vessel at a different distance from the sinus's ostium. The distance differed from 0.5 to 1.3 mm below the junction of the two main tributaries; there were no other side tributaries.

In the simple type there were no characteristic initial tributaries, and no side tributaries in the course of the vessel were observed.

The table presents the frequency of the particular types of the vessel in the group of 97 corrosion preparations in which it was possible to find the oblique vein of the left atrium (Table 1). The one occurring most often in the examined groups was the forked type, which was present in 48.5% of the cases. The simple type was stated in 34%, and the dendritic type in 17.5% of the examined preparations.

There were no grounds for stating any statistically significant differences in the frequency of the



**Figure 1.** The types of the examined vein: A) The dendritic type, B) The forked type, C) The simple type.

occurrence of the forked, dendritic or simple type dependent on the sex in the examined group.

The ostium of the oblique vein of the left atrium to the proximal part of the sinus was the subject of detailed analysis. A changing location of the examined opening in reference to the remaining tributaries of the sinus was observed. Four groups of ostia were distinguished. Group A included preparations in which the ostium of the oblique vein of the left atrium lies at the height of the posterior vein of the left ventricle and the great cardiac vein's opening (Fig. 2). Such cases were observed in 24% of the examined hearts.

Group B included the hearts in which the ostium of the oblique vein of the left atrium is situated at the level of the left ventricle's posterior vein. 11% of such cases were noted (Fig. 3).

Group C included preparations in which the ostium of the oblique vein of the left atrium lies at the same height as the opening of the great cardiac vein (Fig. 4). Such a picture of the opening of the examined vein was observed in 7% of the preparations. All remaining preparations were quali-

**Table 1.** A comparison of the frequency of the oblique vein course types in the left atrium in the examined material of 97 corrosion preparations

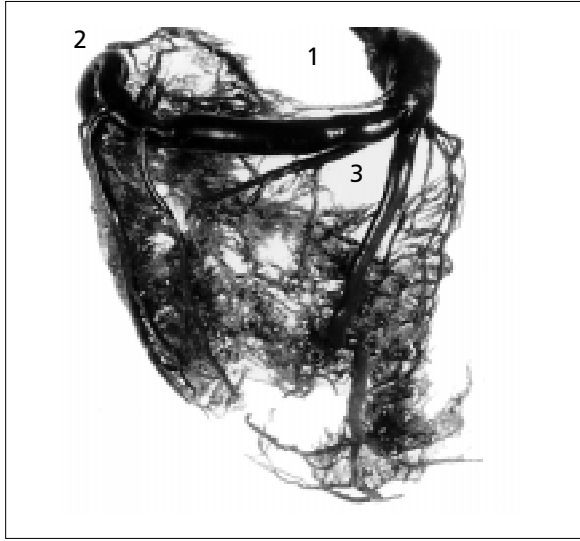
Sex			Forked Type		Dendritic type		Simple type		Notes on the statistical importance
	n	%	n	%	n	%	n	%	
Female	20	100	9	45	4	20	7	35	$\chi^2 = 0.016$  $p > 0.05$
Male	77	100	38	49	13	17	26	34	
Total	97	100	47	48.5	17	17.5	33	34	

fied as group D. The opening of the examined vein was situated here independently of other tributaries of the coronary sinus (Fig. 5). This group made up the remaining 58% of the studied cases.

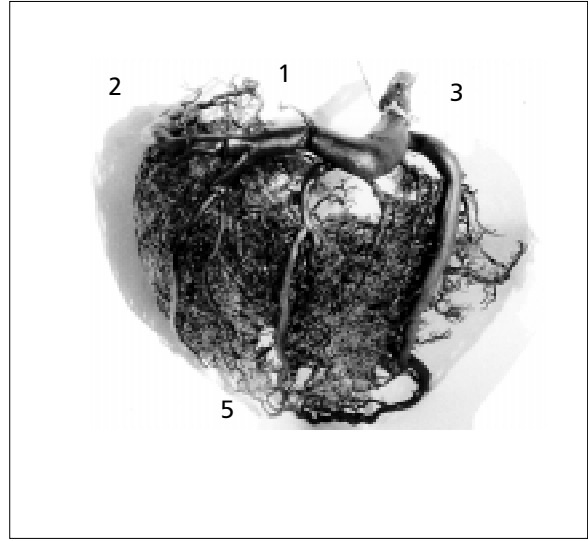
### DISCUSSION

The analysis of the course and the opening of the oblique vein of the left atrium are concerned with the

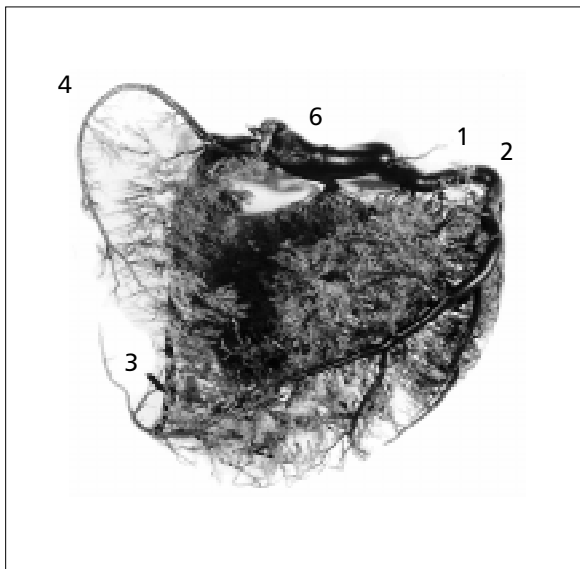
necessity of defining the layout of the coronary sinus. Since the coronary sinus is of importance in a number of diagnostic and treating procedures, effort was made to follow the morphology of the studied vein with the use of various research methods [1,3,5]. In our investigations we examined the morphology of the oblique vein of the left atrium. Average length of dish did not exceed 20 mm. One favoured 3 types of



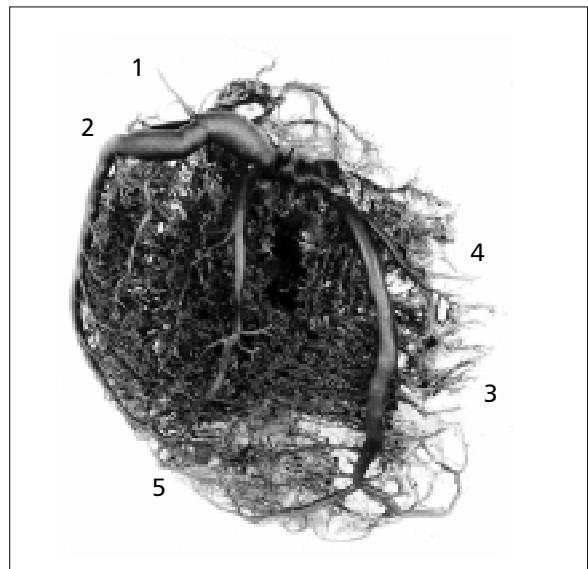
**Figure 2.** Group A. 1 — the oblique vein of the left atrium, 2 — the great cardiac vein, 3 — the posterior vein of the left ventricle.



**Figure 3.** Group B. 1 — the oblique vein of the left atrium, 2 — the great cardiac vein, 3 — the middle cardiac vein, 5 — the posterior vein of the left ventricle.



**Figure 4.** Group C. 1 — the oblique vein of the left atrium, 2 — the great cardiac vein, 3 — the middle cardiac vein, 4 — the small cardiac vein, 6 — coronary sinus.



**Figure 5.** Group D. 1 — the oblique vein of the left atrium, 2 — the great cardiac vein, 3 — the middle cardiac vein, 4 — the small cardiac vein, 5 — the posterior vein of the left ventricle.

course (forked, dendritic and simple), which can be helpful in diagnostic and therapeutic procedures.

Different types of the ostium of the oblique vein of the left atrium were defined in reference to the posterior vein of the left ventricle. The present study took into consideration the changing location of the opening of the examined vein in reference to other tributaries of the coronary sinus.

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