
Images in cardiovascular medicine

His bundle recording in congenital corrected transposition of the great arteries with mirror atrial arrangement (situs inversus) and mesocardia

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An 18-month-old infant with congenital corrected transposition of the great arteries, a large perimembranous ventricular septal defect, subpulmonary stenosis in situs inversus (mirror atrial arrangement) and mesocardia was referred for angiocardio-graphic and electrophysiological evaluation.

The left-sided morphological right atrium, receiving the left-sided caval veins, entered the left-sided morphological left ventricle that gave rise to the pulmonary artery.

The right-sided morphological left atrium, receiving the pulmonary veins, entered the right-sided morphological right ventricle that gave rise to the aorta.

The right-sided morphological right ventricle was located anterior to the left ventricle, and the right ventricular outflow tract was situated anterior to the inflow part. In the posteriorly located left-sided

morphological left ventricle the mitral valve was in a left superior and posterior position. The aorta arose to the right of the pulmonary artery. The ostium of the aorta was somewhat higher than that of the pulmonary trunk which was situated in a postero-medial position and in direct fibrous contact with the mitral ostium. The aortic arch was right-sided.

A 5F quadripolar catheter was placed in the left-sided right atrium, in a high postero-lateral position and another 5F quadripolar catheter was placed to record His bundle activity.

As expected, according to the gross misalignment between the interatrial septum and the inlet segment of the ventricular septum, it was not possible to record His bundle activity beneath the regular "posterior" atrioventricular node located at the apex of the triangle of Koch.

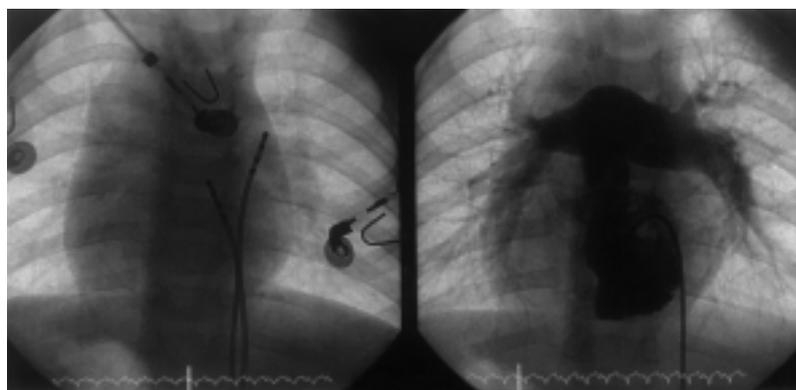


Figure 1. Antero-posterior view of the electrophysiological catheter recording of the high right atrial activity and His bundle electrogram compared with the antero-posterior angiographic view.

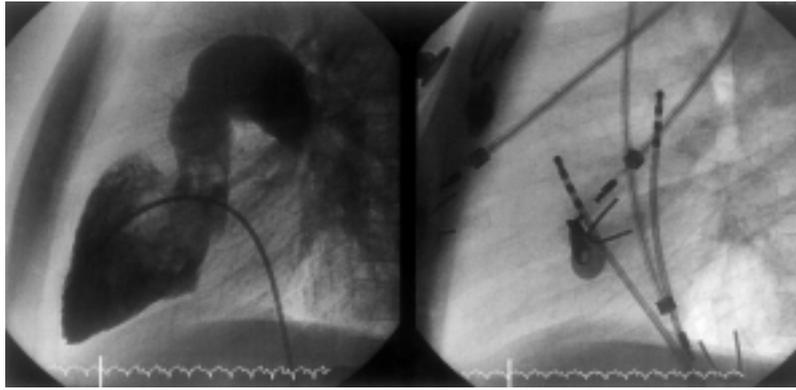


Figure 2. Left-lateral view of the electrophysiological catheter recording of the high right atrial activity and His bundle electrogram compared with the antero-posterior angiographic view.

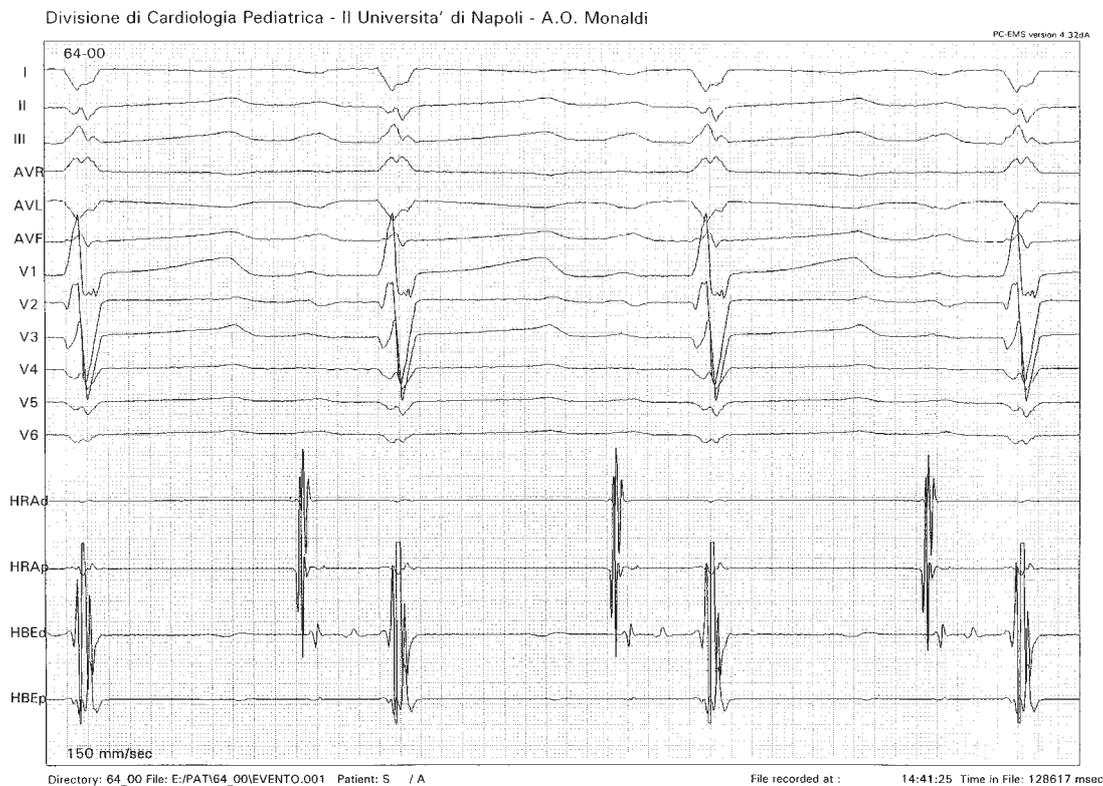


Figure 3. His bundle recording in the electrophysiological study. HBEd = distal His bundle electrogram; HBEP = proximal His bundle electrogram; HRAd = distal high right atrium; HRAp = proximal high right atrium.

Hence, His bundle deflection was recorded just beneath the pulmonary valve leaflets, at the anterior septal surface of the pulmonary outflow tract (Figs. 1-3). In this particular anatomical condition, the atrioventricular bundle originated from an additional “anterior” node located beneath the opening of the right atrial appendage within the base of the right atrial free wall, at the lateral margin of the area of pulmonary to mitral valve fibrous continuity. From this position,

the atrioventricular bundle of the “anterior” node normally runs superficially below the right anterior facing leaflet of the pulmonary valve and descends for some distance down the anterior septal surface of the pulmonary outflow tract, before giving rise to its branches.

The validation of the His deflection, recorded in this particular position, was obtained by means of pacing of both the atrium and His bundle.