

# Notions of irrigations of His bundle - 2015

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Irrigation of the His system is as follows: its trunk segment is irrigated by the first septal perforating branch of the anterior descending artery; its branching or perforating segment, or both of these, is irrigated by the perforating branches of the posterior descending artery, the 2<sup>nd</sup> septal perforating branch of the anterior descending artery, and Kugel's artery, which is a branch of the circumflex artery.

One proof of the participation of the irrigation of the first perforating branch is the frequent appearance of concomitant anterosuperior divisional left bundle-branch block, creating, therefore, a bifascicular block: right bundle-branch block + anterosuperior divisional left bundle-branch block as a consequence of the close proximity existing between the anterosuperior division and the branching portion of the right His' bundle.

The penetrating portion of the His' bundle extends from the inferior limit of the AV node to the origin of the first fibers that form the posteroinferior division of the left bundle-branch. Its length ranges from 50 to 100 mm and the designation "penetrating" is used because the right His' system, at that level, crosses the fibrous trigone. Histologic studies of the His' bundle show that its right half carries some fibers to the ipsilateral ventricle.

The branching portion of the His' bundle extends from the origin of the posteroinferior division of the left branch to the origin of the trunk of the right branch and the anterosuperior division of the left branch. It is closely related to the interventricular membranous septum and to the noncoronary and right coronary leaflets of the aortic valve. A lesion in this portion causes, almost invariably, complete right bundle-branch block and concomitant anterosuperior divisional left bundle-branch block, showing the close relation between both. The trunk, proximal, or membranous portion of the right bundle-branch is irrigated from 2 sources: one originating in the artery of the AV node of the right coronary artery( totally obstructed in the present case) and another in the first septal perforating branch of the anterior descending artery. Irrigation of the middle portion of the right bundle-branch is provided by the 3 following sources: the septal branches of the posterior descending artery, the 2<sup>nd</sup>septal perforating branch of the anterior descending artery, and

Kugel's artery, which is a branch of the circumflex artery. Consequently a Cx obstruction affect the His sistem

Finally, the middle and distal portions of the right bundle-branch are irrigated by the ramus limbi dextri, which is a branch of the 2<sup>nd</sup> septal perforating branch of the anterior descending artery.

The only regions of the right His' system exclusively irrigated by the first perforating branch of the anterior descending artery are the perforating and branching portions of the right His' bundle. This explains why complete right bundle-branch block is the most frequent dromotropic disorder after percutaneous septal ablation caused by absolute alcohol injection in the great first septal perforating branch. Recent studies performed in human hearts during autopsies with the injection of dyed gelatinous barium showed that the irrigation of the anterosuperior division depends, exclusively, on the first perforating branch only in 40% of cases. In 50% of cases, double irrigation is provided by the anterior descending artery and branches of the right coronary artery. In 10% of cases, the right coronary artery is the exclusive source. This explains why, only approximately half of the cases of alcohol injection in the first perforating branch develop complete right bundle-branch block associated with anterosuperior divisional left bundle-branch block.