

Author's Reply

Reply to: Ibn Sina and Galen Were Right: The Heart Exhibits Right to Left Communication Between the Fibers of the Muscular Part of the Interventricular Septum

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Author's Reply

The structural anatomy of the heart has been a subject of debate in anatomical history as early as the Hippocratic era (460–370 B.C.).^{1,2} In traditional medicine, the heart is considered as the source of the vital spirit which originates particularly from the left ventricle and distributes to the organs through arteries.³ In contemporary medicine, the heart is associated with the pumping action of blood aiding the distribution of oxygenated blood. The structure of the heart together with the mechanism of blood circulation has evolved through history from the era of Hippocrates to William Harvey.^{2,4} Aristotle (384–322 B.C.) described a three chambered heart.¹ The interpretation of Aristotle's three chambered heart is confusing; some regard it as the presence of two ventricles and a common atrium while some interpret it as the presence of three ventricles namely right, left and middle (medial).³ Galen (130–199 A.D.) performed vivisection and dissections on both live and dead animals respectively and observed small perforations within the interventricular septum of the heart acting as communicating channels between the right and left ventricles.⁵ The presence of communicating channels within the interventricular septum of the heart was further supported by Avicenna (980–1037 A.D.) in his treatise in the Canon of Medicine.⁶ Avicenna's treatises were greatly influenced by his predecessors and information about him carrying out vivisections and human cadaver dissection is contentious.⁷ Avicenna learned his anatomy through observations during surgery. Avicenna believed in the dogma of the three chambered heart and porous interventricular septum as laid down by his predecessors and regarded it as such,

“There are three ventricles within the heart, two ventricles which are relatively large and a middle one... The middle ventricle is the nutrient reservoir for the heart... this middle ventricle, in addition to being reservoir for the heart's food acts a channel between the

two other large ventricles... That canal which placed in the middle ventricle is wide open at the place the heart is wide and it is narrow and collapsed at the place the heart is long...”^{8,9}

The interpretation of the above statement can be twofold: firstly, the interventricular septum acts a reservoir of nutrition. According to Kankaanpää et al,¹⁰ the interventricular septum contains considerable amounts of fat which can be utilized in situations of high energy demands. Secondly, the interventricular septum houses the bundle of His – a bundle of specialized myocardial fibers constituting the impulse conduction system of the heart. The bundle is thick at the atrioventricular interface and thins out towards the apex of the heart as it distributes to both ventricles.³

Avicenna's views were later refuted by Ibn al-Nafis in the 13th century who established a clear explanation of the pulmonary circulation before William Harvey.¹¹ Despite these later advances, the existence of porous channels between the right and left ventricles have been confirmed in experimental studies in animals.¹² Hence, the observation of the interventricular channels is not surprising and the findings have reinvigorated Galen and Avicenna's anatomical concepts on the heart. Further investigations are required particularly on their role in health and disease.

Conflict of Interest Disclosures

The author has no conflicts of interest.

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