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The Anatomy of the Buffalo's Cardiac Veins

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Abstract: In this study, anatomical structure of buffalo heart coronary veins and derivities were studied. Twenty healthy buffalo hearts from slaughterhouses of Tabriz and another city around Tabriz. Buffalo hearts are used for studying architecture of coronary veins. Anatomical structure of buffalo cardiac veins (coronary veins) are detected by injection contrasts media such as barium sulpha and maglumin and injected by jellatin and latex for determination drivities branches. Obtained results of this study is showed that buffalo cardiac blood is dining into right atrium by two veins, great cardiac veins and middle cardiac veins. Great cardiac vein lie on left longitudinal groove. It was parallel to left longitudinal branch of left coronary artery. Great cardiac vein arises a circumfelex branch that is lie on coronary groove between left atrium and left ventricle. Great cardiac vein receives blood from left atrium and left ventricle and it drains into coronary sinus. Obtained results of oronary sinus biometery are showed that coronary sinus has about 4/5 cm long and 1/48 cm diameter. Middle cardiac vein go toward coronary sinus and drains into it. This vein and interventricular subsinousal artery together lie on right longitudinal groove. Also, a large vein is observed in buffalo heart. It is called ventricular margin vein.

Key words: Anatomy, buffalo, heart, ruminant, vein, blood, Iran

INTRODUCTION

The buffalo is special species in ruminant, which is Indian animals in Asia Anatomical structures and physiological properties of buffalo are not explained completely yet. Therefore, buffalo is an unknown animal. Different studies are performing on buffalo anatomical structures, physiological propertied and nutritional necessary in recent years by Asian researcher chiefly (Ayazi, 1991). The heart of buffalo is an organ that is not sufficient information about it in scientific references. In this research, the manner of drains of buffalo heart blood into right atrium is studied or in other hand, architecture of buffalo heart veins were studied in this research.

MATERIALS AND METHODS

Twenty healthy buffalo hearts were collected from slaughterhouses of Tabriz and another city around Tabriz. The heart immersed in heparin and normal sailing solution in slaughterhouse. This solution can be prevented from clots formation in the heart vessels. Then the heart veins injected by barium sulphat and maglumin and radiographed by Toshiba radiographic apparatus in Tabriz Emam hospital (Ahmed *et al*., 1978; Jain *et al*., 1997; Tourchian and Saeedi, 1994). Then the heart veins were injected by blue latex in coronary sinus and dissected for observation derivities of veins.

RESULTS AND DISCUSSION

This research results were appeared which buffalo heart have tree large veins. These veins were grate cardiac vein middle cardiac vein and ventricular margin vein. Grate cardiac vein in interventricular paraconal groove go toward base of heart as sub epicardial condition. This vein was accompanying by left circumflex coronary artery in coronary groove. Grate cardiac vein was received the blood of left aspect of the heart by many different cllateral branch. Two large collateral branches were very distinct, left proximal and left distal collateral branch. Dissecting studies appeared which grate cardiac vein before to reach

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to right atrium was distended. Terminal distension of grate cardiac vein was named coronary sinus. Grate cardiac vein was fused to right atrium in base of caudal vena cavae and caudal the place of fusion interatrial septum. Biometrical studies of coronary sinus was appeared which it had average length about 4.6 cm and average diameter about 1.84 cm. Observations of this study was showed which grate cardiac vein received many collateral branch in coronary groove before changing to coronary sinus. Two branch was grater than another branches. They were dorsal left ventricular branch and caudal margin vein. Dissection of buffalo heart after latex injection were showed which middle cardiac vein was in subsinousal interventricular groove. Radiographs of buffalo heart was appeared which two principal branches come from two side of base of the heart and fused in 1/3 distal interventricular subsinosal groove (Fig. 1 and 2). After this fusion middle cardiac vein was formed. This vein was entered into right atrium in close outlet of coronary sinus. A mucosal fold was observed in outlet of this vein. Also, radiographies was showed which middle cardiac vein received shuntig vein in entrance to right atrium (Fig. 3). Dissection study was appeared which shinting vein was right coronary groove. This vein receded 7-11 collateral vein and it was terminated in middle cardiac vein. Caudal margin vein was observed in all studied cases. Dissection results were appeared which this vein

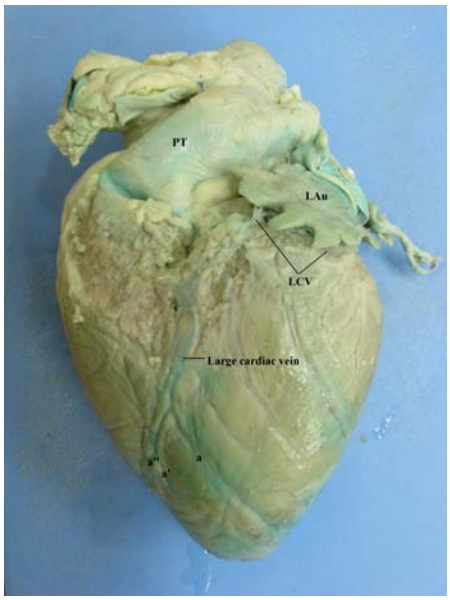

Fig. 1: Left surface of Auricular surface of the buffalo heart. LCV: Circumflex of Large Cardiac Vein, Pt: Pulmunary Trunk, Lau: Left auricle, a,a',a": Collateral branches (Photography by Karimi *et al*., 2008 in Faculty of Vet. Med. University of Tabriz)

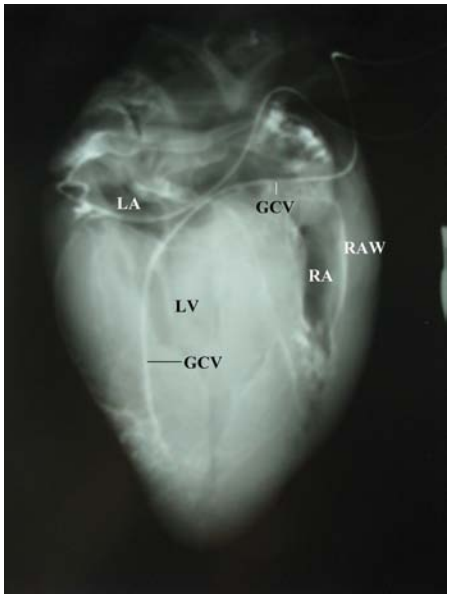

Fig. 2: Radiograph of buffalo heart in left side. GCV: Grate Cardiac Vein, LV: Left ventricle, La: Left atrium, Ra: Right atrium, RAW: Right Atrium Wall (Photography by Karimi *et al*., 2008 in Faculty of Vet. Med. University of Tabriz)

Fig. 3: Articular surface of buffalo heart after injection bloue latex. LCV (CB): Circumflex Branches of Large Cardiac Vein, RAt: Right Atriums, LV: Left Ventricle, RV: Right Ventricle, CS: Coronary Sinus, RV: Right Ventricle, a,a',a': Collateral branches (Photography by Karimi *et al*., 2008 in Faculty of Vet. Med. University of Tabriz)

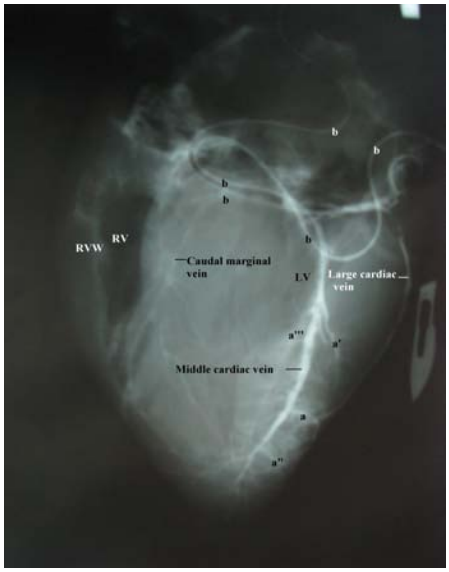

Fig. 4: Radiograph from articular surface of buffalo heart. RV: Right ventricle, RVW: Right Ventricle Wall, a,a',a''',a'''': Collateral branches, b: injection canula. (Photography by Karimi *et al*., 2008 in Faculty of Vet. Med. University of Tabriz)

accompanied similar artery in accessory groove in caudal border of left ventricle. It occupied 2/3 length of accessory groove and terminated into grate cardiac vein in close coronary sinus. Ventricular margin vein drained the parts of left ventricle that are near accessory groove (Fig. 4). Radiographs were appeared which there were 5-9 small veins. This small veins originate from left ventricle and drained into right atrium directly.

CONCLUSION

Generally, the cardiac veins are draining low oxygen heart blood (Warwick and Bannster, 1989). This research results were appeared which buffalo heart have tree principal vein, grate cardiac vein, middle cardiac vein and ventricular margin vein. Grate cardiac vein was formed from fusion many small vein. These small veins were collecting blood of left ventricle wall. Two collateral veins were grater than another. These were named proximal and distal collateral ventricular vein. Grate cardiac vein rued in left coronary groove and had a distension in terminal part. The terminal distension was named coronary sinus. Grate cardiac vein received many small veins in left coronary groove. Grate cardiac vein teminted in right atrium. Greate cardiac vein was reported similar to buffalo in another animals (Gloshal and Nanda, 1985; Nickel *et al*., 1986). Sisson and Grassman's and Nichele and Schummer were reported which great cardiac vein received ventricular margin vein in end par (Gloshal and Nanda, 1985; Nickel *et al*., 1986). Then reports are agreement with this study results. Middle cardiac vein was observed in interventricular subsinusal groove. This vein received two principles branches in 1/3 distal of interventricular subsinusal groove. Sissons and Grasmans and Nichels and Schumer and this research results was appeared which architecture of middle cardiac vein in buffalo was similar middle cardiac vein in horse (Gloshal and Nanda, 1985; Nickel *et al*., 1986). Caudal margin vein was observed in buffalo heart. It entred in accessory groove and terminated into grate cardiac vein. It was dined wall of the heart in near regions. Nickel *et al*. (1986) and Grassman reported this vein in heart of ruminant and it was not reported in heart of horse by any researcher (Gloshal and Nanda, 1985). Generally, venus architecture of the buffalo heart was like another ruminant heart.

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