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Research Article

Study of Pulmonary Ostia Variations

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Abstract: Pulmonary veins carry oxygenated blood from the lungs and drain into left atrium via pulmonary ostia. Though generally there are four pulmonary ostia, variations in number and drainage pattern are often noticed and this is valuable for various procedures involving them. The present study is done on 30 human hearts obtained from the dissection hall of Department of Anatomy, SIMS, Hyderabad. The drainage pattern of pulmonary veins draining into left atrium was studied carefully. Out of the 30 hearts, 10 hearts shows variation in pulmonary ostia. In 86.7% of hearts, right pulmonary veins drain the left atrium through 2 pulmonary ostia followed by 3 pulmonary ostia (6.7%) and 1 pulmonary ostia (6.6%). Also, in 90% of the hearts, left pulmonary veins drain the left atrium through 2 pulmonary ostia followed by 10% of the hearts in which left pulmonary veins drain through 1 pulmonary ostium.
Keywords: Heart, Left atrium, Pulmonary veins, Pulmonary ostia.

INTRODUCTION

Human heart consists of two atria and two ventricles. Oxygenated blood from the lungs is carried by four pulmonary veins (two from each lung) to left atrium via two pulmonary ostia (PO) on either side [1]. Variations in drainage pattern are often observed but have gained little attention. Though the knowledge of these variations is valuable for surgical procedure but literature regarding these is few [2].

So, the present study is done to find the variations in number of right and left pulmonary veins (PV) draining into left atrium.

Aim and Objective

To find the variations in drainage pattern of right and left pulmonary veins

MATERIALS AND METHODS

The present study is done in 30 hearts obtained from the formalin fixed cadavers in Department of Anatomy, SIMS, Hyderabad. The drainage pattern of right and left pulmonary veins was studied by giving midline incision along the posterior wall of left atrium.

RESULTS

In 10 out of 30 hearts, variation of pulmonary vein were observed either on the right side or left side of left atrium. None of the heart has variation in both right and left pulmonary veins.

The normal pattern of 2 pulmonary ostia (PO) was seen only in 86.7% and 90% of hearts on the right and left side respectively.

Table 1 depicts the comparison of drainage pattern of right pulmonary veins. The normal pattern of 2 pulmonary ostia (PO) was seen only in 86.7% of hearts. 6.7% of the hearts showed 3 pulmonary ostium while 6.6% of the hearts had 1 pulmonary ostia.

Table 2 shows the comparison of drainage pattern of left pulmonary veins. The normal pattern of 2 pulmonary ostia (PO) was seen only in 90% of hearts while 10% of the hearts drain the left atrium through 1 pulmonary ostium.

Table 1: Comparison of drainage pattern of right pulmonary veins

Number of ostia	Marom *et al.* [2] (%)	Shukla *et al.* [6] (%)	Present study (%)
2	71	86.2	86.7
3	27	10.3	6.7
1	2	3.4	6.6
5	1	-	-

Table 2: Comparison of drainage pattern of left pulmonary veins

Number of ostia	Marom *et al.* [2] (%)	Shukla *et al.* [6] (%)	Present study %
2	86	82.7	90
1	14	17.2	10

Fig. 1: Showing two right pulmonary veins and two left pulmonary veins

Fig. 2: Showing two right pulmonary ostia and two left pulmonary ostia

Fig. 3: Showing three left and one right pulmonary ostia

Fig. 4: Showing one Left Pulmonary Ostia

DISCUSSION

Variations in the pulmonary venous anatomy were rarely reported except for few cases [3-6].

These variations of pulmonary vein can be explained on the embryological basis. Initially, a single common pulmonary vein develops as on outgrowth of the dorsal atrial wall. Thereafter as the atrium expands the primordial pulmonary vein and its main branches gets gradually incorporated into the wall of left atrium resulting in the formation of four pulmonary veins [7]. Depending on the extent of incorporation of the branches, the number of PV opening into left atrium can vary [6].

In the present study the most common drainage pattern of 2 pulmonary veins each on right and left side was with 2 separate ostia, which coincides with the study of Marom *et al*. [2] and Shukla *et al*. [6]. The second common drainage pattern on the right side in present study was by 3 ostia (6.7%),which matches with the study of Marom *et al*. [2] and Shukla *et al*. [6]. Also, the second common drainage pattern on the left side in present study was by single ostium (10%) which coincides with the study of Marom *et al*. [2] and Shukla *et al*. [6].

CONCLUSION

Variations in the drainage pattern of pulmonary veins were observed in present study. Radiologists and Surgeons should be aware of the variations in the pulmonary venous anatomy to make surgical procedures like pulmonary catheterisation, etc more successful.

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