

2001 6

2001 6

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가

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	.....	1
I.	.....	3
II.	.....	6
1.	.....	6
2.	.....	6
가.	.....	6
.	.....	7
.	.....	7
.	.....	9
.	.....	9
.	.....	10
.	.....	10
.	.....	11
III.	.....	12
1.	.....	12
2.	.....	13
3.	.....	13
가.	.....	13

. . . . .	15
4. . . . .	15
가. . . . .	15
. . . . .	16
5. . . . .	17
6. . . . .	19
7. . . . .	22
IV. . . . .	24
V. . . . .	32
. . . . .	34
. . . . .	45

1.	.....	7
2.	.....	8
3.	.....	8
4.	.....	11
5.	.....	14
6.	.....	16
7.	.....	16
8.	.....	20
9.	.....	21
10.	.....	23

1.	.....	12
2.	.....	12
3.	.....	14
4.	.....	17
5.	.....	17
6.	, .....	18
7.		19
8.	.....	20
9.	.....	22
10.	, .....	23



243

77

가 350 g  
가

1. 가 115.5 mm 89.1 mm

2. 68.1 mm 41.6 mm,  
44.1 mm 48.5 mm

3. 5

가  
가

61.1% 가

3.2 , 1-2 mm 가 40.6%

7.8%

4. 3 , 1-2 가 94.3%

. 5 가 53.6% .  
 5. , , 가 40.0 mm, 13.7 mm,  
 24.1 mm , 22.0 mm, 11.6 mm, 25.7 mm .  
 6. 808.4 mm<sup>2</sup>, 206.7 m<sup>2</sup>  
 , 0.7 mm .  
 7. 15.7%, 21.4%  
 . 6.8 mm ,  
 20.6 . 가  
 , 가 가 27.9%  
 가 .  
 8. 21.8 mm, 18.7 mm,  
 47.5 , 가 .  
 . 가 가  
 , ,  
 가 ,  
 가 , 가  
 . , ,  
 가 .

---

: , , , , , , ,

I.

가 가  
가 . , 가  
가  
가 .  
Ho <sup>1</sup>  
3.0 cm, 가 4 cm,  
4,5 cm .

<sup>2</sup>,

<sup>3</sup>

15-20

.  
가

.

가

4.5  
.

23

6  
.

, , 7  
, ,  
5 .

500

,

가

.

,

.

가

가

8-10  
.

가

.

11

가

.

12-14  
.

가 .

가

15-20

.

가

가

18,20-22

.

,

,

가

가

.

## II.

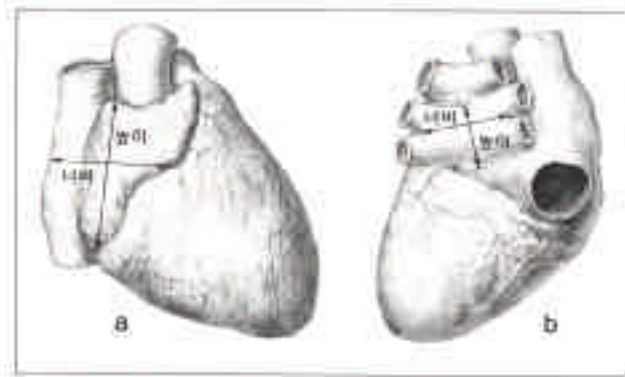
### 1.

						243
			77		6	
		.			56.2	
	44		20	83		51.9 ,
27		16	93		63.3	.
				가 350 g		
			가			

(Mitutoyo, Japan)

### 2.

가.



1. (a) (b)

•  
 (1)  
 가 (1a), 가

(2)  
 ,  
 ( 1b).

•  
 (1)  
 가 ( 2).  
 I 가

, II

가  
가

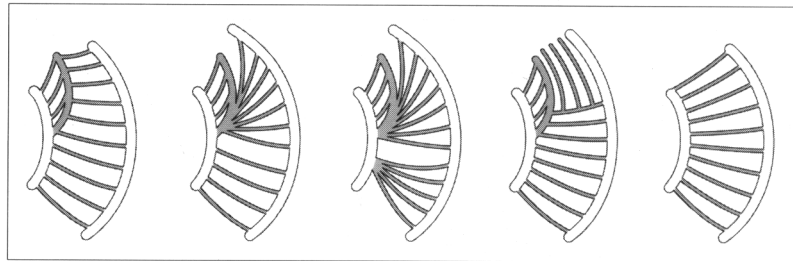
III

IV

가

가

V



2.



3.



(2)

가

.

.

( 3).

(Jena, German)

.

.

.

.

2 mm

가

5 mm

가

.

.

가

.

.

5 mm

.

.

가 가

가

I ,

II ,

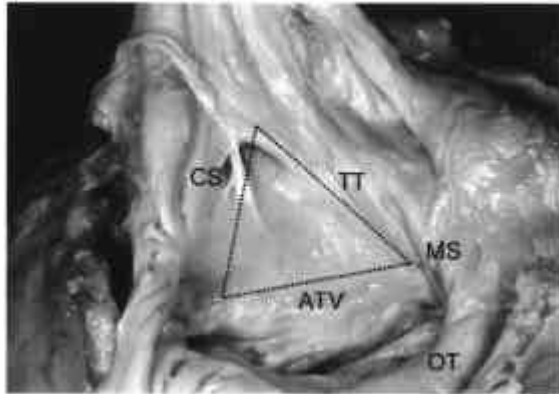
III ,

IV ,

V

(Todaro)

( 4).



4. . ATV: , CS:  
 , MS: , OT: , TT:

.

SPSS 9.0

student t-test

### III.

1.

1 . , , .

( 2).

1.

	±S.D.				±S.D.				±S.D.			
	115.6± 8.6	133.9	97.5		115.3± 7.6	127.0	95.8		115.5± 8.2	133.9	95.8	
	89.5± 8.6	113.2	72.9		88.5± 6.1	104.2	78.8		89.1± 7.7	113.2	72.9	
	284.7± 47.0	350.0	180.0		283.1± 46.1	350.0	180.0		284.1± 46.4	350.0	180.0	

: : mm; : g

S.D.

2.

	LH	BH	WH	HRA	BRA	HLA	BLA
LH							
BH	.377*						
WH	.632*	.443*					
HRA	.426	.213	.277				
BRA	.234	.255	.163	.414*			
HLA	.233	.320*	.246	.293	.519*		
BLA	.191	.380*	.107	.253	.468*	.488*	

\* p<0.01

LH, ; BH, ; WH, ; HRA, ;  
 BRA, ; HLA, ; BLA,

2.

68.9 mm, 41.6 mm .  
44.1 mm 48.5 mm .  
3 .

( 2).

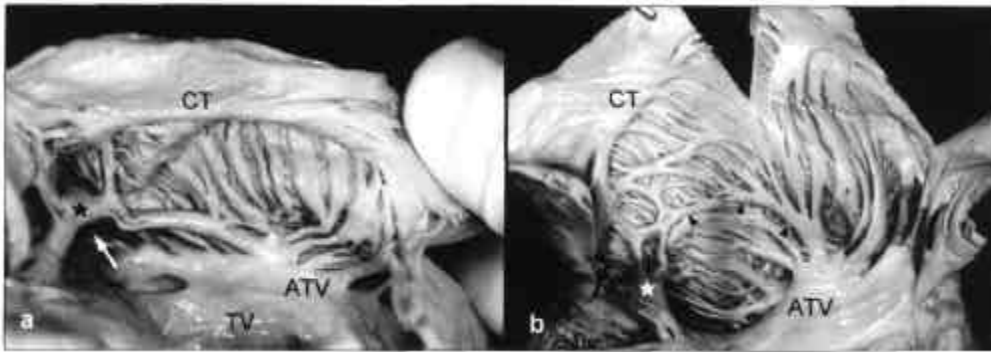
가 ( 2).

3.

가.

가 ( 5)  
가  
72  
, I 26.4%, II 61.1%, III 2.8%, IV 5.6%,  
V 4.2% .

가 .



5.

. a I, b II. ATV: , CT: ,  
 TV: , 가 .  
 가  
 가 .

3.

	±S.D.	±S.D.	±S.D.
	70.4 ± 8.5 87.7 54.6	66.6 ± 8.9 85.8 42.9	68.9 ± 8.8 87.7 42.9
	42.7 ± 8.0 59.9 22.0	39.8 ± 5.4 52.7 29.1	41.6 ± 7.2 59.9 22.0
	44.6 ± 6.8 59.3 28.9	43.2 ± 6.5 61.3 32.0	44.1 ± 6.7 61.3 28.9
	49.0 ± 6.1 64.5 35.6	47.7 ± 5.0 58.0 39.2	48.5 ± 5.7 64.5 35.6

: mm

S.D.

( 3)

3.2

7.8%

11

1 mm 가 9.9%, 1-2 mm 40.6%, 2-3 mm 가 31.7%, 3-4 mm 가 13.4% . 4 mm 4.4%가 .

2.2 mm .

4.

가.

53.5%,

40.9%

5.6% ( 6).

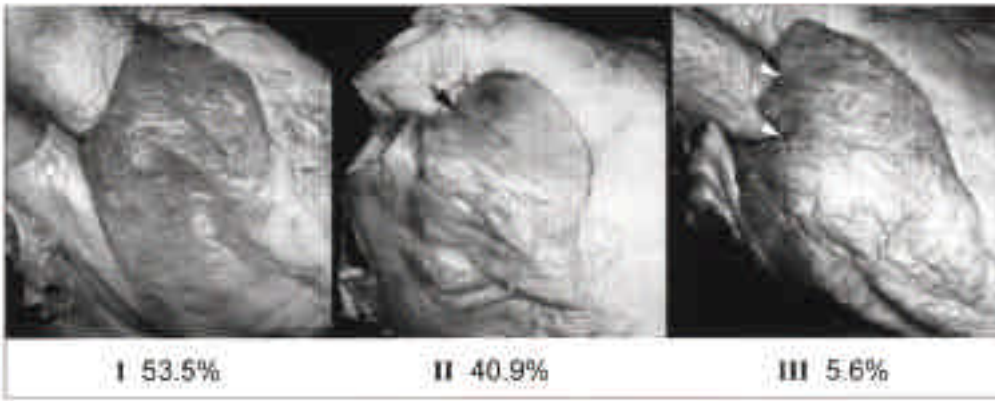
가 52.9%

37.1% ( 7).

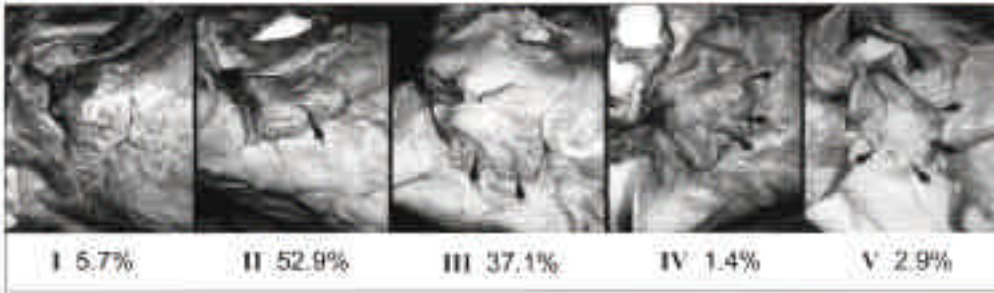
가 5.7%

(1.4%) .

가 .



6. (71 ). 가 .



7. (70 ). 가 .

4 .

( 5).

( 5).



4.

	40.9 ± 8.3	38.5 ± 8.3	40.0 ± 8.3
	13.8 ± 3.5	13.5 ± 3.8	13.7 ± 3.6
	25.2 ± 5.5	22.3 ± 7.1	24.1 ± 6.3
	22.5 ± 4.6	21.2 ± 4.6	22.0 ± 4.6
	11.5 ± 3.4	11.9 ± 3.1	11.6 ± 3.3
	25.2 ± 5.1	26.5 ± 4.7	25.7 ± 5.0

± (mm)

5.

	Age	LDRA	SDRA	DRA	LDLA	SDLA	DLA
Age							
LDRA	-.160						
SDRA	-.180	.478*					
DRA	-.313*	.611*	.558*				
LDLA	.034	.281*	.131	.148			
SDLA	.233	-.203	-.029	.049	.269		
DLA	.051	.177	.201	.197	.171	.248	

\* p<0.01

DLA, ; DRA, ; LDLA, ;

LDRA, ; SDLA, ; SDRA,

5.

가 ( 7).

6.

(mm <sup>2</sup> )	808.4±196.9(60)	468.2- 1,230.3(60)	821.9±192.2(38)	785.3±207.2(22)
(mm <sup>2</sup> )	206.7±117.1(59)	67.5- 674.5(59)	192.3±106.7(38)	233.0±132.7(21)
FO/AS(%)	26.5±19.7(59)		24.0±17.4(38)	31.0±23.0(21)
(mm)	17.7±5.6(67)	9.6±35.7(67)	18.0±5.1(43)	17.1±6.4(24)
(mm)	11.2±3.9(67)	3.9- 22.6(67)	11.4±3.5(43)	10.9±6.4(24)
(mm)	0.7±0.2(67)	0.0- 1.2	0.7±0.2(43)	0.6±0.3(24)
±				
( )	:	; AS:	; FO:	

7.

	HRA	BRA	HLA	BLA	LDFO	SDFO	TFO
HRA							
BRA	.414*						
HLA	.293	.519*					
BLA	.253	.468*	.488*				
LDFO	.313*	.297	.525*	.188			
SDFO	.104	.311	.441*	.141	.768*		
TFO	-.068	-.128	-.244	-.097	-.251	-.403*	

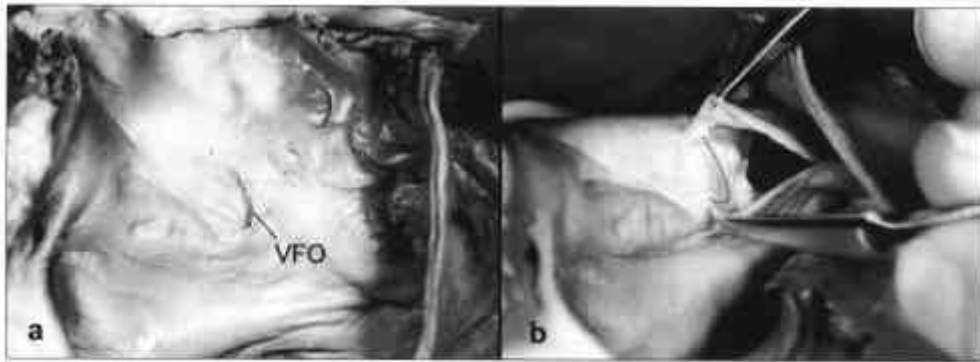
\* p<0.01

HRA, ; BRA, ; HLA, ; BLA,  
; LDFO, ; SDFO, ; TFO,

6.

70 15.7% 가 350 g 173  
21.4% , 243 19.8% ( 8).

( 8).



8. a. , b.

. VFO:

8.

			(%)
Parsons	Keith(1897) <sup>53</sup>	399	26
Fawcett	Blachford(1900) <sup>54</sup>	306	31.7
Scammon	Norris(1918) <sup>55</sup>	1,809	29
Patten(1931) <sup>56</sup>		4,083	24.6
Seib(1934) <sup>57</sup>		500	17
Wright	(1948) <sup>58</sup>	492	22.9
Sweeney	Rosenquist(1979) <sup>49</sup>	64	31
Hagen	(1984) <sup>59</sup>	965	27.3
	(2001)	70	15.7
		173	21.4
		243	19.8

3.0 mm      12.7 mm  
 6.8 mm      4.8 mm,  
 2.7 mm  
 20.6 °

9 .  
 ,  
 .

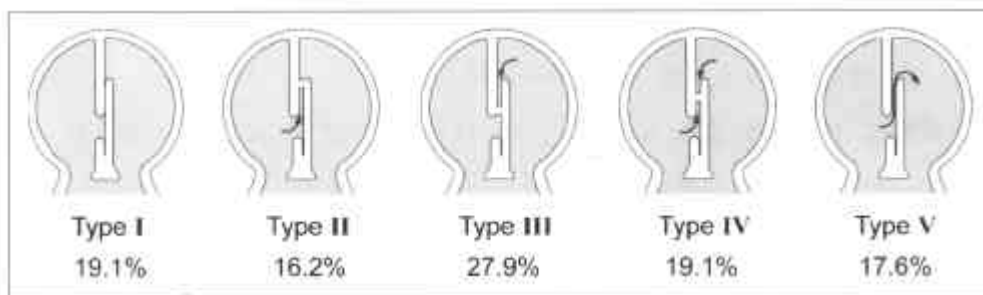
가

가

가

가      . III      27.9%      가

16- 19%      (      9).



9 .

(68 ) .

9.

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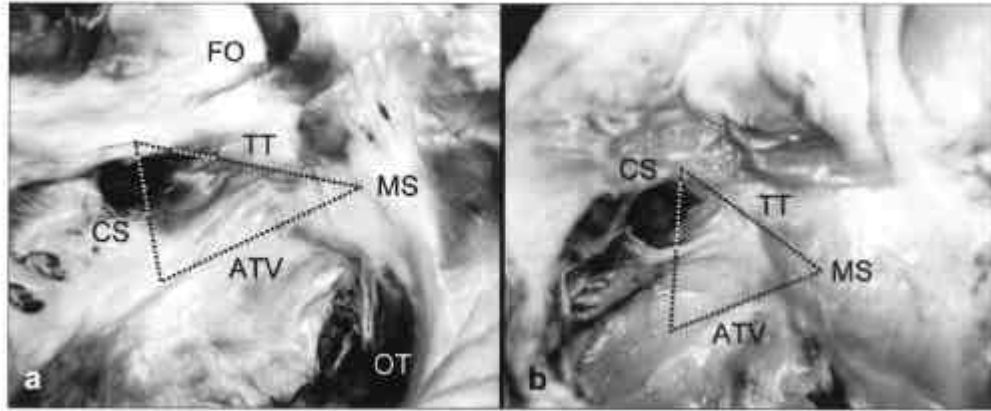
	12.5 ± 5.5(39)	3.4 - 26.5
	4.1 ± 3.1(36)	0.8 - 13.8
	3.7 ± 2.3(25)	1.1 - 10.9
	8.0 ± 2.5(48)	3.2 - 14.4
	2.8 ± 2.3(47)	0.1 - 10.6
	4.1 ± 3.6(34)	0.0 - 13.4

---

( ) : ± (mm)  
( ) :

7.

( ), ( ), ( )  
10  
가 10.  
가  
( 10).  
( 10).



10. . a. , b. .  
 ATV: , CS: , FO: ; MS:  
 , OT: , TT:

10. ,

(mm)	$21.8 \pm 4.6(65)$	7.7 - 32.6
(mm)	$23.0 \pm 3.8(65)$	16.3 - 31.0
(mm)	$18.7 \pm 3.7(65)$	12.0 - 25.4
( ° )	$47.5 \pm 9.0(64)$	30.0 - 75.0
(mm)	$2.9 \pm 2.6(58)$	0.0 - 16.2
(mm)	$9.6 \pm 2.8(58)$	4.8 - 15.0
(mm)	$9.6 \pm 3.1(64)$	3.8 - 18.6
(mm)	$9.6 \pm 3.1(64)$	2.8 - 19.0

: ±  
 ( ) :

IV.

23  
 250-330 g 24-30  
 24-29  
 24-28  
 265-316 g 가 29  
 28,29 가 가  
 29 가 28 1994-1998 가  
 31  
 12 cm, 가 8-9 cm ,  
 300 g, 250 g .  
 11.5 cm, 8.9 cm  
 ,  
 284 g 가  
 가 350 g  
 350 g  
 가 가  
 가  
 26 가 가 4.0 cm,  
 가 4.5 cm .



가

가

가 5.2 cm,

5.7 cm

<sup>7</sup>

가

3.96 cm

가<sup>32</sup>

(atrial fibrillation)

<sup>33</sup>,

<sup>34</sup>

가

가

1.5

가

<sup>35</sup>

, 1920 Papez<sup>2</sup>

<sup>3</sup>

<sup>3</sup>

가

가

가

가

<sup>36</sup>

<sup>37</sup> 90%

3.2

2.2 mm

가

1 mm

가 <sup>5</sup>

1 mm

9.9%

<sup>5</sup> 3.0%

3 mm가

17.8 %

가

<sup>38,39</sup>

가 가

가

<sup>5-7,32,40</sup>

가

가

가

가

가 .<sup>6</sup>

40 mm,

14 mm

<sup>6</sup> 20 mm

가

가

2.4 cm

<sup>6</sup>

1.2

cm

가

가

가

가

가

5.6%

가

가

가

가

<sup>6</sup>

<sup>41</sup>

가

, ,

,

가 <sup>42</sup> . 42,43

<sup>32,44,45</sup> .

220

<sup>37</sup> 500

<sup>5</sup> .

22.0 mm, 11.6 mm, 25.7 mm

<sup>5,37</sup> .

가

53.6 %

37.1 % . 5.7 %

<sup>5</sup> 가 .

가

<sup>46</sup>

47,48

<sup>9,19,49</sup> .

49

. 9 .  
10 .  
50 , 51 , 52  
가 .  
가 .  
가 .  
가 .  
15-32%  
( 8).<sup>49,53-59</sup> 21.4% . 15.7%  
가 가  
가  
가  
가  
가  
가 .

<sup>21</sup>, <sup>60</sup>, 61.62  
 20 가 .  
 20  
 가 .  
 8 mm 33 mm, 12 mm 25 mm,  
 30° 75° 가  
 가 .  
 63.64  
 65  
 가 가  
 가 가 <sup>66</sup>

.  
가

.

V.

243

77

1. 가 115.5 mm 89.1 mm .
2. 68.1 mm 41.6 mm, 44.1 mm 48.5 mm .
3. 5 , 가 가
4. 61.1% 가 . 3.2 , 1-2 mm 가 40.6% . 7.8% .
5. 3 , 1-2 가 94.3% . 5 가 53.6% .
6. , , 가 40.0 mm, 13.7 mm, 24.1 mm , 22.0 mm, 11.6 mm, 25.7 mm .
7. 808.4 mm<sup>2</sup>, 206.7 m<sup>2</sup> , 0.7 mm .
8. 15.7%, 21.4% . 6.8 mm , 20.6 . 가 , 가 가 27.9%



가 .

9. 21.8 mm, 18.7 mm,

47.5 , 가 .

, , ,

가 .

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## **Abstract**

### **Morphology and Morphometry on the Atria of the Heart in Koreans**

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The morphology of the atrium was not interesting subject to study until diagnostic evaluations for the thrombi in auricles and surgical operations on atria were being taken these days. With observation on the atria of hearts from Korean adults, the object of this study was to collect useful information for clinicians and to compare them with those of Caucasians. The size of atria and variations of intraatrial structures of 77 adult hearts which were ascertained as normal from total 243 collections were evaluated. A heart was defined as normal when a cardiac pathologist confirmed as normal range for the ventricular thickness and valve structures and weighed below 350 g. Results are as follow :

1. The length and width of the heart were 115.5 mm and 89.1 mm on

average, respectively. The heart weight was 284.7 g in men and 283.1 g in women.

2. Right atrium was 68.1 mm high and 41.6 mm wide and left was 44.1 mm high and 48.5 mm wide on average.

3. Morphologic features of pectinate muscle of right atria were classified into 5 types. The most was a type of which muscular bundles from upper crista terminalis converge to the entrance or lateral wall of auricle and bundles from lower crista terminalis runs straight onto lateral wall. This type was 61.1%.

4. In left auricle, the average number of muscular bundles separated from walls was 3.2, and 40.6% of them had diameters between 1 and 2 mm. There was no separated bundles in 7.8% of left auricles.

5. Right auricles had maximum 3 lobes and 94.3% of them had 1 or 2 lobes. Left auricles had maximum 5 lobes and 53.6% of them had 2 lobes.

6. The average long and short lengths and depth of the right auricle were 40.0 mm, 13.7 mm, 24.1 mm respectively and for the left auricle, they were 22.0 mm, 11.6 mm, 25.7 mm.

7. The average areas of atrial septum and fossa ovalis were 808.4 mm<sup>2</sup> and 206.7 mm<sup>2</sup>. A fossa ovalis was 0.7 mm thick on average.

8. A foramen ovale appeared in 15.7% of normal hearts and 21.4% of large hearts over 350 g. Each foramen was 6.8 mm long and at an angle of 20.6 degrees against the axis formed by two venae cavae. The morphologic types of valves of foramina ovalea were grouped into five. The type of foramen in which a probe was able to be inserted only

from left atrium was 27.9%.

9. Two sides of Koch's triangle were 21.8 and 18.7 mm long and the vertex made an angle of 47.5 degrees on average. They were highly variable from person to person.

With the results above, we could find out the dimensions and morphological variations of cardiac atria of Korean adults. Some of these findings were compared to those of Caucasians. They will be helpful information for atrial operation, ultrasound diagnosis, and catheterization.

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Key words : atrium, auricle, pectinate muscle, foramen ovale, interatrial septum, Koch's triangle, measurement