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Frequency of the Median Artery of the Forearm in Adult Pakistani Cadavers

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SUMMARY

Frequency of the presence of median artery of the forearm was studied in 180 upper limbs of both sides (94 right and 86 left) of both sexes (70 males and 10 female) in adult Pakistani cadavers. Differences in frequencies were tested statistically by X^2 test. The frequency of median artery was 28.8% in Pakistani, higher than those of Black South Africans (27.1%) and White South Africans (27.4%). It was significantly higher than reported by previous workers (4.4% to 8.3%).

Significant difference in its occurrence between sexes and between right and left limbs was observed. These findings compare well with previous studies where no such difference was noted. The frequency of presence of median artery per individual in Pakistanis was almost similar to those of South Africans.

INTRODUCTIONS

Internal as well as external anatomy varies in different human populations[1] and a quantitative survey is very important to highlight the anatomical variations. The median artery provides the main blood supply to the hand in the embryo. Embryologically the upper limb is initially supplied by the primary axis artery from which the median artery arises accompanying median nerve into the hand and ends up as superficial capillary plexus. The radial artery arises by a more proximal origin from axis artery, crosses the median nerve and supplies biceps brachii muscle. Later on it froms a new origin near the site of origin of ulnar artery, whereas proximal connection mostly disappears. As the ulnar artery reaches the hand to establish its connection with superficial palmer, arch, the median artery looses its connection. The median artery accompanies and supplies the median nerve, reaches the palm where it joins superficial palmer arch or ends as 2-3 palmer digital arteries[2].

The median artery dwindles away after the origin of ulnar and radial arteries to become a small vessel accompanying the median nerve, the arteria comitans nervi median[3]. Median artery has been reported to occur in adults with frequencies ranging from 4.4% to 8.3% in various samples[4,5,6]. Presence of median artery was observed in Black South African cadavers recently. Its incidence was proved to be much higher (27.1%) than previously reported. No significant difference was found in its occurrence between sexes nor between right and left limbs[7]. Its frequency in South Africans of European extraction was found to be 27.4%[8]. The discrepancies in the frequency of presence of median artery may be due to regional variations or by the occurrence of a secular trend in the development of vasculature. This study was designed to observe the frequency of median artery of the forearm in a sample of adult Pakistani cadavers.

PATIENTS AND METHODS

About 180 undamaged upper limbs of both sides (94 right and 86 left) of both sexes (170 males and 10 female) from freshly embalmed, adult, unclaimed cadavers were selected for this study. They were dissected to see the origin, course and relations of median artery in the Department of Anatomy, King Edward Medical College, Lahore, Pakistan during 1990-1994. The dissection was

extended from the distal upper arm to the fingers to observe the entire course and relations of median artery. The criteria for the presence of median artery was, (i) when it supplies the structures in the hand other than median nerve and its branches (ii) a minimum diameter more than 1 mm at the narrowest point of embalmed artery anywhere between its origin and proximal border of flexor retinaculum (iii) when its diameter is more than 2 mm at its origin. Differences in frequencies of the median artery were tested statistically by means of X^2 test with a conventional probability level of 0.05.

RESULTS

The frequency of the presence of the median artery in 180 upper limbs dissected was 28.8%. There was a significant difference in the frequency of the artery between male and female forearms (Table 1). Frequency in males was three times more than female.

Table 1: Frequency of median artery of the forearm by sex and by antimere.

	Sex				Antimere			
Frequency	Male		Female		Right		Left	
	No.	%	No.	%	No.	%	No.	%
Artery present	47	34.3	5	11.6	28	29.8	22	25.6
Artery absent	90	65.7	38	88.4	66	70.2	64	74.4
Total	137	100	43	100	94	100	86	100

Among 94 right forearms, 28 (29.8%) possessed a median artery whereas among 86 left forearms, 22 (25.6%) possessed the artery. The difference in antimeres was not significant (Table 1). In the 72 cadavers in which both forearms of the same individuals were dissected, median artery was found more often bilaterally (Table 2). These findings appeared to be statistically significant with sign test.

Median artery was found present bilaterally in 21 cases (29.2%) and unilaterally in 6 cases (65.5%). This gives a frequency of 37.5% per individual (Table 2).

Table 2: Frequency of median artery of the forearm in individuals with both forearms dissected.

	Number	Percent
Median artery present		
Unilaterally	6	8.3
Bilaterally	21	29.2
Median artery absent		
Bilaterally	45	65.5
Total	**72**	**100**

DISCUSSION

The frequency of the median artery of the forearm in Pakistanis is slightly higher than South Africans. Taking into account the statistical errors, the lower boundary of the 95% confidence limits being 22.3% and the upper 33.5% which is higher than reported by previous workers[5,6,7].

According to the present study, significant sexual dimorphism was observed in two sexes ($P<0.01$) (Tables 1, 3) in the presence of median artery. Significant difference ($P<0.01$) (Table 2) was noticed in unilateral and bilateral presence of the artery in the individuals with both forearms dissected, whereas the difference in the frequency of presence of the artery on right and left sides was observed to be insignificant ($P>0.05$).

The frequency of presence of the artery in Black South Africans (27.1%) and White South Africans (27.4%) was insignificant when compared with Pakistanis (28.8%). Frequency of the presence of the artery in individuals with both forearms dissected in Black South Africans (32.3%) and White South Africans (37.5%) was also insignificant ($P>0.8$) when compared with Pakistanis (37.5%).

Significant sexual difference ($P<0.01$) in both sexes was noticed between White South Africans and Pakistanis whereas it was highly significant ($P>0.9$). in Black South Africans vs Pakistanis (Table 3). When frequency of the presence of artery is compared on the bases of antimere between Black South Africans vs Pakistanis and White South Africans vs Pakistani, the difference between right and left sides was found to be insignificant ($P>0.3$

and P>0.5) respectively (Table 3).

Table 3: Comparison of frequency of the median artery of the forearm by sex and by antimere in different populations.

Frequency	Sex				Side			
	Male		Female		Right		Left	
	No.	%	No.	%	No.	%	No.	%
Black South Africans Henneberg & George (1992)								
Artery present	23	30.3	3	15	11	22.4	15	31.9
Artery absent	53	69.7	17	85.0	38	77.6	32	68.1
White South Africans Henneberg & George (1992)								
Artery present	9	27.3	8	27.6	8	26.7	9	28.1
Artery absent	24	72.7	21	72.4	22	73.3	23	71.9
Pakistani Present study (1994)								
Artery present	47	34.3	5	11.6	28	29.8	22	25.6
Artery absent	90	65.7	38	88.4	66	70.2	61	74.4

The frequency of presence of median artery per individual in Pakistanis was almost similar to those of other two populations. It proves that the median artery cannot be considered as a relatively rare variant and there are various common modes of the arterial supply to the hand. Similar instance has been observed in lateral internal thoracic artery with a frequency of 27.7%[9]. Validity of descriptions of normal anatomy becomes questionable in the presence of such high frequency of additional arteries. So the frequencies substantial enough must be taken into consideration while planning surgical procedures.

The important factors affecting the high frequency of median artery like exacting techniques, regional phenomenon and secular trends as mentioned by previous workers may not be accepted in the light of observations made in the present study, whereas simple alteration of early intrauterine development and secular trends could result in the retention of sizable median artery until adulthood and various anomalous patterns.

Table 4: Comparison of the frequency of median artery in the individuals of different populations with both forearms dissected.

Population	Number	Percent
Black South Africans		
Median artery present		
Unilaterally	2	5.9
Bilaterally	9	26.5
Median artery absent		
Bilaterally	23	67.6
Total	**34**	**100.00**
White South Africans		
Median artery present		
Unilaterally		19.2
Bilaterally		23.1
Median artery absent		
Bilaterally		57.7
Total	**26**	**100.00**
Pakistanis		
Median artery present		
Unilaterally	6	8.3
Bilaterally	21	29.2
Median artery absent		
Bilaterally	15	65.5
Total	**45**	**100.00**

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