

FORMATION AND BRANCHING PATTERN OF CORDS OF BRACHIAL PLEXUS- A CADAVERIC STUDY IN NORTH INDIAN POPULATION

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ABSTRACT

BACKGROUND: The anatomical variations in the different parts of brachial plexus in human have been described by many authors. These variations have clinical significance for the surgeons, radiologists and the anatomists. A lot of work has been done on the morphology of branching pattern of the different cords of brachial plexus but almost all the workers are silent about their morphometry. That's why this study is planned on morphology & morphometry of branching pattern of different cords of brachial plexus.

MATERIAL AND METHODS: The present study was conducted on 60 upper limbs belonging to 30 cadavers (Male:Female = 28:02), (Right:Left = 30:30) obtained from Department of Anatomy, Govt. Medical College, Amritsar. These were dissected to expose the different components of brachial plexus.

OBSERVATIONS: Out of 60 limbs, the lateral and the medial cords were formed in the usual way in 56 limbs, while the posterior cord was normal in 57 limbs. The average lengths of lateral, medial & posterior cords were 3.37 cm, 4.05 cm & 1.95 cm respectively. The branches of lateral cord depicted more variations in the form of origin as compared with those of medial & posterior cords. The distance of different branches of all the cords from the point of origin to parent cord varied between the two sides of same cadaver as well as on the same side of different cadavers.

DISCUSSION & CONCLUSION: The present study on the adult human cadavers is an essential prerequisite for the initial built up of the data base at the grass root level. The anatomy has always provided a bedrock for the sound surgical endeavors. It definitely has an upper edge to widely and indiscriminately used radiological and sophisticated CT and MRI observations which carry a margin of error inherent to any diagnostic procedure because no doubt the machines are a good bet but the eyes see the best.

KEYWORDS: Brachial plexus; Lateral cord; Medial cord; Posterior cord.

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BACKGROUND

Brachial plexus is a network of nerves supplying the upper limb with the root value C5-T1. These roots join with each other to form three trunks viz; the upper, middle and lower by union of C5, C6; continuation of C7 and union of the C8 and T1 respectively. The three trunks bifurcate into anterior and posterior divisions. The anterior divisions of upper and the middle trunks

unite to form the lateral cord, that of the lower trunk continues as the medial cord and the posterior divisions of all the three trunks unite to form the posterior cord. These cords give rise to different nerves for the upper limb. The lateral cord gives lateral pectoral nerve, lateral root of the median nerve and the musculocutaneous nerve, the medial cord gives medial pectoral nerve, medial cutaneous nerve of the arm,

medial cutaneous nerve of the fore arm, ulnar nerve and medial root of the median nerve. The posterior cord gives Upper subscapular, lower subscapular, thoracodorsal, axillary & radial nerves [1-8].

Anatomical variations in different parts of human brachial plexus may be attributed to unusual formation during the development of trunks, divisions, or cords [9] and usually occur at the junction or separation of the individual parts [10, 11]. The clinical implications of these variations lie in the anaesthetic blocks & surgical approaches to the region and the interpretation of a nervous compression having unexplained clinical symptoms like sensory loss, pain, wakefulness and paresis etc [12, 13].

A knowledge of anatomy & variational patterns of brachial plexus is extremely important not only to distinguish between the lesions, involving its roots, trunks, divisions or cords [14] but also for a proper treatment of these [15], not only for a surgeon, but also to the radiologists and anaesthesiologists, neurosurgeons, neurologists, vascular surgeons and orthopaedic surgeons [16, 17].

Different types of variational patterns of brachial plexus have been reported earlier, some of which are:

- a. A prefixed or postfixed brachial plexus [7].
- b. Formation of four/ two or one trunk instead of the usual three [18-22].
- c. Absence of posterior cord [23].
- d. Communication between musculocutaneous & median nerve [24, 25].

A lot of work has been done on the morphology of branching pattern of the different cords of brachial plexus but almost all the workers are silent about their morphometry i.e., what are the lengths of different cords & at what distance from their origin do these give different branches. This gave us an impetus to undertake this study on morphology & morphometry of branching pattern of different cords of brachial plexus.

MATERIALS AND METHODS

The material for the present study comprised of 60 upper limbs belonging to 30 adult human cadavers of known sex [Male:Female :: 28:02]

obtained from the Department of Anatomy, Govt. Medical College, Amritsar. These were serialized from 1-30 with suffix 'M' for male or 'F' for female and 'R' for right or 'L' for left side

The brachial plexus was dissected and exposed according to the methods described by Romanes [26] in Cunningham's Manual of Practical Anatomy. All its roots, trunks, divisions, cords and branches were cleaned and the pattern of the formation and branching was seen. Out of all these, formation & branching pattern of different cords are being reported here.

The length of lateral cord was measured from the point of union of anterior divisions of upper & middle trunks upto its terminal bifurcation into musculocutaneous nerve & lateral root of median nerve; the medial cord was measured from point of bifurcation of lower trunk into anterior & posterior divisions upto bifurcation of medial cord into ulnar nerve & medial root of median nerve; the posterior cord was measured from point of union of posterior divisions of upper or lower trunk (whichever is distal) with posterior division of middle trunk upto terminal bifurcation of posterior cord into axillary & radial nerves. The distances of different branches of different cords were measured from the point of formation of the parent cord upto distal point of origin of that branch. The distal point was taken because it is an acute angle from the parent cord & thus well marked as compared to proximal point of origin which is obtuse & so less well marked.

For measuring the lengths of different parts of brachial plexus, a thread was kept along the length of that part and was marked with Indian ink at designated points. The thread thus marked was lifted off the dissection area, and spread along a graduated metric scale to measure the length. All the measurements were taken in cms.

OBSERVATIONS

A. Formation - Out of 60 limbs, the lateral and the medial cords were formed in the usual way in 56 limbs, while the posterior cord was normal in 57 limbs. The variant cords were observed in the limb no. 8FR, 8FL, 14ML & 16FL.

In limb no. 8FR, the middle trunk, instead of being a direct continuation of C7 root was formed by union of C6 & C7 roots and was giving

2 anterior & 1 posterior divisions. The lateral cord was formed by the union of the anterior divisions of the upper trunk (formed by C4 & C5) with the upper anterior division of the middle trunk (formed by C6 & C7) while the medial cord resulted by union of lower anterior division of the middle trunk (C6 & C7) and the anterior division of the lower trunk (formed by C8 & T1). So medial cord was having fibres from C6,7 as well (coming via lower anterior division of the middle trunk) in addition to usual C8, T1 (Fig.1). The posterior cord in this limb was normal.

In limb nos. 8FL, 14ML & 16FL, the plexus was postfixed as well as four trunked. For further details of these, the readers are advised to consult Chaudhary et al [18].

B. Length of cords - Table 1 depicts the mean value & range of the lengths of different cords on the two sides as observed in the present study-

Table No.1: Showing Lengths of different cords of Brachial plexus.

S.No.	Cord	Length of the cords (cm)					
		Right (30)		Left (27)*		Total (57)	
		Range	Average	Range	Average	Range	Average
1	Lateral	0.9-6.2	3.35	1.1-8.7	3.4	0.9-8.7	3.37
2	Medial	1.6-7.6	3.9	1.6-6.1	4.2	1.6-7.6	4.05
3	Posterior	0.7-3.9	1.85	0.8-3.9	2.05	0.7-3.9	1.95

* In the other three limbs of left side (limb no. 8FL, 14 ML & 16 FL) there were four trunks so not included here.

C. Branching pattern of cords- The different patterns of branching of various cords as observed in present study are discussed & compared with the earlier studies vide serial no. C, D & E in 'Discussion' below.

DISCUSSION

A. Formation- According to the standard text books of Anatomy [1-8], the anterior divisions of upper and the middle trunks unite to form the lateral cord, that of the lower trunk continues as the medial cord and the posterior divisions of all the three trunks unite to form the posterior cord. Out of the 60 brachial plexuses of the present study, the lateral and the medial cords were formed in the standard way in 56 limbs (93.3%) while the posterior cord was formed normally in 57 limbs (95%). Earlier Kerr [27], in a study of 175 three trunk brachial plexuses had encountered normal pattern of lateral cord form-

ation in 143 (81.71%), medial cord formation in 166 (94.85%) and posterior cord formation in 122 (69.71%) dissections.

In one limb (1.7%) (limb no. 8FR) of the present study, the lateral cord was formed by the union of the anterior division of the upper trunk (formed by C4 & C5) with the upper anterior division of the middle trunk (formed by C6 & C7) while the medial cord resulted by union of lower anterior division of the middle trunk (C6 & C7) and the anterior division of the lower trunk (formed by C8 & T1). Earlier Kerr [27] in 4 limbs out of a total of 175 brachial plexuses encountered the middle trunk (C7) dividing into three divisions viz. two anterior and one posterior. Out of these the upper anterior joined the anterior division of the upper trunk to form the lateral cord and the lower anterior joined with the anterior division of the lower trunk to form the medial cord, a finding apparently similar to our limb no. 8FR but with the difference that in his cases, the middle trunk was a continuation of the C7 while in our case it was formed by the union of the C6 and C7. Further more, in our case since the middle trunk (C6,7) was contributing to both the lateral and the medial cords, it could be possible that the fibres from both C6 and C7 would have gone to both lateral and the medial cords. While their contribution to the lateral cord is normal, the C6,7 fibres going to the medial cord is a variant and may be clinically important in cases of the Klumpke's paralysis.

B. Length of the cords: The lengths of the various cords varied from one another when compared in the same plexus; on the two sides when compared in the same cadaver and in the different cadavers. The range and average lengths of the different cords as observed in the present study is given in the Table no.1.

It is seen that on both the sides the mean length of medial cord is maximum. It is because the medial cord is simply a continuation of anterior division of lower trunk so measured from point of bifurcation of lower trunk & thus includes the length of anterior division of lower trunk as well. On the other hand length of lateral cord is measured from point of union of anterior divisions of upper & middle trunks. So lengths of anterior divisions are not included. The length of posterior cord is minimum because it is

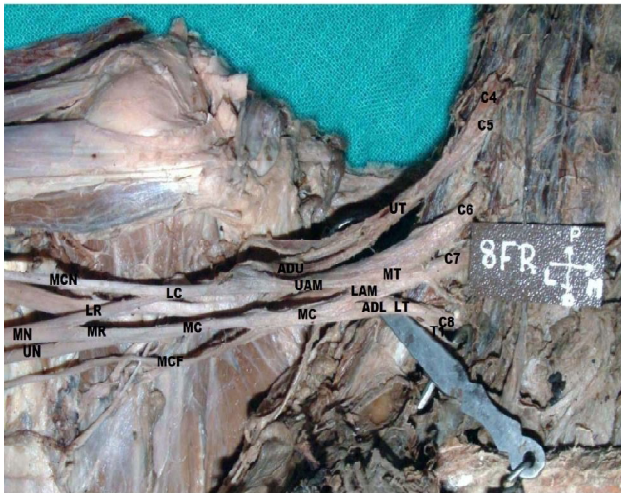


Fig.1:

* Upper trunk (UT) formed by C4,5; Middle trunk (MT) by C6,7 & Lower trunk (LT) by C8,T1.
 * Lateral cord (LC) formed by the union of anterior division of upper trunk (ADU) & upper anterior division of middle trunk (UAM).
 * Medial cord (MC) formed by the union of lower anterior division of middle trunk (LAM) & anterior division of lower trunk (ADL).
 * MCN- musculocutaneous nerve; LR- lateral root of median nerve; MR- medial root of median nerve; MN- median nerve; UN- ulnar nerve; MCF- medial Cutaneous nerve of forearm.

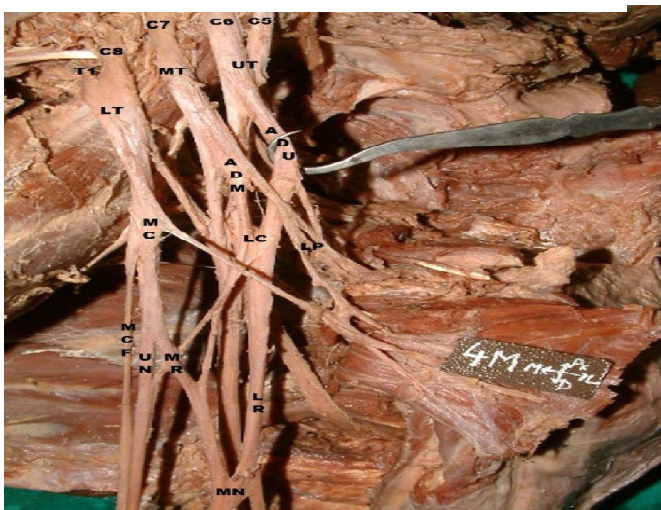


Fig. 2:

* Upper trunk (UT) formed by C5,6; Middle trunk (MT) by C7 & Lower trunk (LT) by C8,T1.
 * Lateral cord (LC) formed by the union of anterior division of upper trunk (ADU) & anterior division of middle trunk (ADM), continuing as lateral root of median nerve (LR) [absence of musculocutaneous nerve]
 * Medial cord (MC)- continuation of anterior division of lower trunk (ADL).
 * Lateral pectoral nerve (LP) arising from anterior divisions of upper trunk (ADU) & middle trunk (ADM).
 * MR- medial root of median nerve; MN- median nerve; UN- ulnar nerve; MCF- medial Cutaneous nerve of forearm.

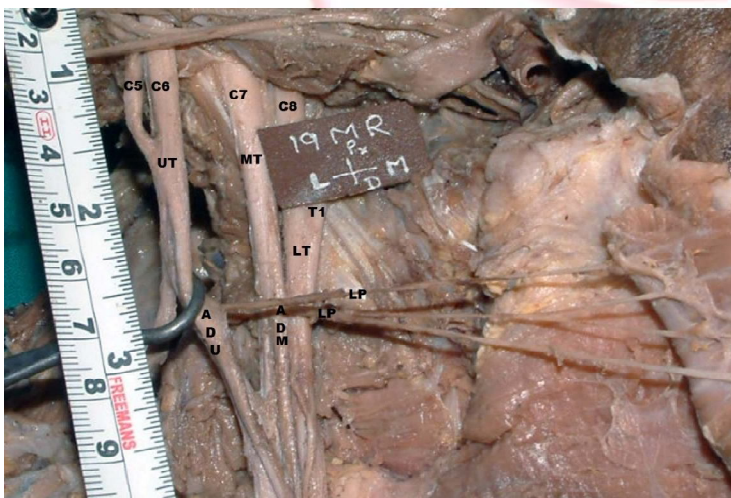


Fig. 3: * Upper trunk (UT) formed by C5,6; Middle trunk (MT) by C7 & Lower trunk (LT) by C8,T1.

* Lateral pectoral nerve (LP) arising from anterior divisions of upper trunk (ADU) & middle trunk (ADM).

measured from point of fusion of posterior divisions of upper/ lower trunk (which ever is distal) with that of middle trunk, so it is smallest. This could not be compared with the previous studies as none could be traced in the accessible literature showing the lengths of the cords.

C. Branches of the lateral cord - Usually the lateral cord is said to give off 3 branches viz; lateral pectoral nerve, lateral root of the median

nerve and the musculocutaneous nerve [1-8]. This pattern was found in only 44 (73.3%) limbs of the present study. In the remaining 16 (26.66%) limbs, the variations in the one form or the other were encountered (vide infra).

(a) Lateral pectoral nerve (C5, 6, 7)

Lateral pectoral nerve is normally a branch of the lateral cord, its variable origin was encountered in 12 (20%) limbs of the present

study, the commonest variant being a separate origin from the anterior division of both the upper and the middle trunk in 8 [13.3% (R:L :: 5:3)] limbs followed by origin from the anterior division of the upper trunk and from the middle trunk only in 2 [(3.3% R:L :: 1:1)] limbs each. All these variant limbs belong to the male cadavers. Does it mean that the variant origin of the lateral pectoral nerve is not seen in the females? Considering the small number of the female limbs (only 4) in the present study, it can't be emphasized but a need for a study based upon a large number of female limbs is stressed. It is said to be the first branch of the lateral cord [1-8], but it was found so in only 48 (80%) limbs of

Morphologically, it depicted following variants:

1. Absence of musculocutaneous nerve- It was absent in 6 (10%) limbs; the muscles usually supplied by this being supplied by median nerve in two limbs & by lateral cord (Coracobrachialis) and Median Nerve (Biceps & Brachialis) in the other 4 limbs.
2. Communication between the musculocutaneous and the median nerve was encountered in the 6 (10%) limbs. It was in the upper third of the upper arm, proximal to the entrance of the musculocutaneous nerve into the coracobrachialis muscle.

Table No.2: Comparison of different origins of Lateral Pectoral nerve with earlier studies

Source of lateral pectoral nerve	Author	Incidence [no. (%)]					Average distance from the formation of parent trunk (cm)
		Sexwise		Total	Sidewise		
		Male	Female		Right	Left	
Lateral cord	Kerr [27]	N.R.	N.R.	17/166 (10.2)	N.R.	N.R.	N.R.
	Fazan et al [28]	N.R.	N.R.	27/54 (50)	N.R.	N.R.	N.R.
	P. study	46	2	48 (80)	25	23	0.62
A.D. of U.T.	Kerr [27]	N.R.	N.R.	12/166 (7.2)	N.R.	N.R.	N.R.
	Fazan et al [28]	19 (45)	05 (42)	24 (44)	09 (30.00)	15 (55)	N.R.
	P. study	02 (3.5)	00 (00)	02 (3.3)	01 (3.33)	01 (3.33)	1.75
A.D. of M.T.	Kerr [27]	N.R.	N.R.	06/166 (3.6)	N.R.	N.R.	N.R.
	Fazan et al [28]	02 (4.8)	01 (8.3)	03 (5.5)	03 (10.00)	00 (00)	N.R.
	P. study	02 (3.5)	00 (00)	02 (3.3)	01 (3.33)	01 (3.33)	1.05
A.D. of U.T&M.T.	Kerr [27]	N.R.	N.R.	73/166 (43.9)	N.R.	N.R.	N.R.
	Fazan et al [28]	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.
	P. study	08 (14.2)	00 (00)	08 (13.30)	03 (10)	05 (16.6)	2.0 & 1.1 resp.

A.D.- Anterior Division N.R.- not reported

the present study. In these, it was arising at a mean distance of 0.7 cm (range 0.1-1.8cm) from the point of formation of lateral cord on right side & at a mean distance of 0.55 cm (range 0.1-1.7cm) on left side. Out of the remaining 12, in 8 (13.33%), it originated by two roots, one either from anterior divisions of the upper and the middle trunks (Fig. 2 & Fig. 3); and in 2 limbs (3.33%) each, from the anterior divisions of upper and the middle trunk only. A vis to vis comparison with the earlier studies is shown in Table no. 2.

(b) Musculocutaneous nerve (C5, 6, 7)

It was one of the terminal branches of lateral cord.

3. A complete fusion of the musculocutaneous nerve and the median nerve after normal formation of the former was seen in 4 (6.66%) limbs. Out of these 4 limbs; in one limb, coracobrachialis; in two limbs, coracobrachialis and biceps & in one limb all three muscles of the anterior compartment were supplied by musculocutaneous nerve before its fusion with the median nerve. For further details, readers are requested to refer to the article by Chaudhary et al [29].

(c) Lateral root of the median nerve

Like musculocutaneous nerve, this is one of the terminal branches of the lateral cord which joins

with the medial root of the median nerve (branch of the medial cord) to form the median nerve [2-8]. We encountered this pattern in 54 (90%) limbs including three limbs (limb no. 1MR, 7ML and 21ML) in which it was very slender with the majority fibres of the lateral cord going via musculocutaneous nerve to join the median nerve in the arm. In the other 6 (10.00%) limbs, the lateral cord continued as the lateral root of the median nerve with the musculocutaneous nerve being absent (discussed above).

Communicating branch from the lateral root of the median nerve to the ulnar nerve

In one limb (limb no. 1 MR), some fibres of the lateral root of the median nerve joined the ulnar nerve, as was observed by Fazan et al [28] in 30% of their dissections. It was Martin [30] who first described a communication from the median nerve to the ulnar nerve and later Gruber [31] reported the similar communications. So Sonek et al [32] called these as Martin Gruber communication. Limb no. 1 MR of the present study showed the almost similar communication with a difference that instead of the median nerve, it was from its lateral root to the ulnar nerve.

In the other limb (limb no. 4 ML), some fibres of the lateral root of the median nerve (or the lateral cord, because, due to the absence of the musculocutaneous nerve in this limb, lateral cord continued as the lateral root of the median nerve. (discussed vide supra)) were separating at a distance of 1.0 cm from its formation and bifurcating to join the ulnar nerve and the medial root of the median nerve. For further details, readers are requested to refer to the article by Chaudhary et al [33]

(d) Any other branch

(i) Nerve to the coracobrachialis: The nerve to the coracobrachialis was seen only in those limbs in the present study where the musculocutaneous nerve was absent (4MR, 4ML, 11ML, 13MR).

In these limbs coracobrachialis muscle was innervated by a branch from the lateral cord. Kerr [27] in his dissection of 175 limbs, encountered the nerve to coracobrachialis in 109 limbs out of which in 35 (32.11%) limbs, it originated from the lateral cord; the musculocutaneous nerve

being the source in the rest of the 74 (67.88%) limbs.

(ii) Communicating branch from the lateral cord to medial root of the median nerve- It was seen in 3 limbs (i.e. limb no. 29MR, 29ML) arising at an average distance of 2.23 cms. (range 1.0 - 4.2 cms.) from the formation of the lateral cord and joining medial root of the median nerve at an average distance of 2.7 cms. (range 0.8- 5.6 cms.) from latter's formation. Average length of the communicating ramus was 4.3 cms.

The distances of different branches of lateral cord from point of formation of the lateral cord
The distances of the various branches of the lateral cord from the point of its formation varied from one another when compared in the same plexus; on the two sides when compared in the same cadaver and in the different cadavers. The range and average distances of the different branches of the lateral cord in the present study is given in the table no. 3

Table No. 3: Showing distances of different branches of the Lateral cord from origin of Parent cord.

S.No.	Branches of lateral Cord	Distances of the branches in cms.								
		Right			Left			Total		
		Limbs studied	Range	Average distance	Limbs studied	Range	Average distance	Limbs studied	Range	Average distance
1	Lat. pectoral	25	0.1-1.8	0.7	23	0.1-1.7	0.55	48	0.1-1.8	0.62
2	Musculocutaneous	27	0.9-6.8	3.1	27	1.1-7.6	3.04	54	0.9-7.6	3.07
3	Lat. root of median nerve	27	0.9-6.8	3.1	27	1.1-7.6	3.04	60	0.9-8.7	3.07
4	Nerve to coracobrachialis	2	1.3-2.8	2.05	2	2.5-2.7	2.6	4	1.3-2.8	2.32

*In the remaining limbs abnormal origin of branches was there as discussed earlier in the relevant sections. However, these could not be compared with the previous studies as none could be traced in the accessible literature showing the lengths of branches of the lateral cord.

D. Branches of the medial cord

The medial cord usually gives off medial pectoral nerve, medial cutaneous nerve of the arm, medial cutaneous nerve of the fore arm and terminally bifurcates into the ulnar nerve and medial root of the median nerve [1-8]. This pattern was encountered in 58 (96.66%) limbs of the present study. Out of the remaining 2 (03.44%) brachial plexuses (which were 4 trunked brachial plexuses), in one limb (limb no. 14ML) upper anterior divisions of the IIIrd and the IVth

trunks joined to form the medial root of the median nerve while their lower anterior divisions joined to form the ulnar nerve; medial pectoral nerve & medial cutaneous nerve of the arm took origin from the IIIrd trunk and the medial cutaneous nerve of the forearm from the IVth trunk. In the other limb (limb no. 16FL) medial cutaneous nerve of the fore arm came from the anterior division of the IVth trunk. For further details, refer to earlier article by authors [18]. Earlier Fazan et al [28] had also encountered medial cutaneous nerve of the arm & forearm coming as the branches of the lower trunk but in the three trunked brachial plexus.

The percentage incidence of the normal origin of the different branches of the medial cord in the present study is compared with that of Kerr [27] in the Table no.4

Table No. 4: Showing percentage of normal origin of the branches of the medial cord.

S. No.	Branches of the medial cord	Author	Limbs studied	Normal Origin [n(%)]
1	Medial pectoral	Kerr [27]	151	105 (69.53)
		Present study	60	59 (98.33)
2	Med. Cut. N. of Fore arm	Kerr [27]	174	143 (82.18)
		Present study	60	58 (96.66)
3	Med Cut. N. of Arm	Kerr [27]	137	92 (67.15)
		Present study	60	59 (98.33)
4	Ulnar nerve	Kerr [27]	175	170 (97.14)
		Present study	60	59 (98.33)
5	Medial root of Median Nerve	Kerr [27]	175	170(97.14)
		Present study	60	59 (98.33)

From the table no. 4, it is clear that all the branches of the medial cord showed one or the other variation in their origin (all variants being in the four trunked brachial plexuses) as given below;

(a) Medial pectoral nerve: The sole limb (limb no. 14 ML) showing the abnormal origin of the medial pectoral nerve had it from the IIIrd trunk (root value- C8)

(b) Medial cutaneous nerve of the forearm: Out of the 2 limbs having the abnormal origin of the Medial cutaneous nerve of the forearm, in one limb (limb no. 14ML) it came as a branch of the IVth trunk (root value- T1, T2). While in the other limb (limb no. 16FL), it originated from the anterior division of the IVth trunk (root value- T1, T2).

(c) Medial cutaneous nerve of the arm: The sole limb (limb no. 14ML) showing the abnormal ori-

gin of the medial cutaneous nerve of the arm, had it from the IIIrd trunk . (root value- C8)

(d) Ulnar nerve: The abnormal origin of the ulnar nerve was seen only in one limb (limb no. 14ML). Here it was formed by the union of the lower anterior divisions of the IIIrd and IVth trunks (root value- C8 and T1, T2 respectively).

(e) Medial root of the median nerve: Along with the abnormal origin of the ulnar nerve and the medial cutaneous nerve of the arm et forearm, the limb no. 14 ML also showed the abnormal origin of the medial root of the median nerve by the union of the upper anterior divisions of the IIIrd and the IVth trunks (root value- C8 and T1, T2 respectively).

From the above variations in the origin of the branches of the medial cord in the four trunked brachial plexuses, we can conclude that when the IIIrd and the IVth trunks (root value C8 and T1 & T2 respectively) fail to join to form the lower trunk, they give branches of the medial cord. However a detail study is needed to explore it further.

The above stated variations in the branching of the medial cord in the 4 trunked brachial plexuses could not be compared with the previous studies as no data is available in the accessible literature till date.

The distances of different branches of medial cord from point of formation of the medial cord
 The distances of the various branches of the medial cord varied from one another when compared in the same plexus; on the two sides. It is evident from the table no. 5 that medial cord gave off medial pectoral nerve at an average distance of 1.46 cms. (Rt.- 1.51 cms.; Lt.- 1.42cms.) from the point of its formation, medial cutaneous nerve of the arm at an average distance of 1.95 cms. (Rt. – 1.90 cms; Lt – 2.0 cms.) and medial cutaneous nerve of the forearm at an average distance of 2.32 cms. (Rt. – 2.30 cms; Lt – 2.34cms.) from point of its formation. Then it bifurcated terminally into ulnar nerve and the medial root of the median nerve at an average distance of 4.05 cms. (Rt. - 3.90 cms.; Lt – 4.20 cms.) from the point of its formation.

This could not be compared with the previous

studies as no earlier study on this subject could be traced in the accessible literature.

and indiscriminately used radiological and sophisticated CT and MRI observations which carry

Table No. 5: Showing distances of different branches of the medial cord from the origin of parent cord.

S.No.	Branch of the medial cord	Distances of the branches in cms.								
		Right			Left			Total		
		Limbs studied	Range	Average distance	Limbs studied	Range	Average distance	Limbs studied	Range	Average distance
1	Medial pectoral nerve	30	0.3-4.8	1.51	29**	0.4-3.7	1.42	59**	0.3-4.8	1.46
2	Med. Cut. N. of Arm	30	0.6-5.6	1.9	29**	0.2-4.6	2	59**	0.2-5.6	1.95
3	Med. Cut. N. of Forearm	30	0.7-5.9	2.3	28**	0.6-4.9	2.34	58**	0.6-5.9	2.32
4	Ulnar nerve	30	1.6-7.6	3.9	29**	1.6-6.1	4.2	59**	1.6-7.6	4.05
5	Medial root of median nerve	30	1.6-7.6	3.9	29**	1.6-6.1	4.2	59**	1.6-7.6	4.05

* In the limb no. 16 FL, the medial cutaneous nerve of the forearm originated from the anterior division of the IVth trunk.

** In the limb no. 14 ML, no medial cord was formed; so these nerves had abnormal origin and hence not included here

E. Branches of the Posterior Cord

The upper subscapular, lower subscapular, thoracodorsal, axillary & radial nerves usually arise from posterior cord of brachial plexus. This normal branching pattern of the posterior cord was encountered in 52 (86.67%) limbs, the remaining 8 (13.33%) being variants, in one form or the other.

The Upper subscapular nerve, Thoracodorsal nerve and Axillary nerve were seen arising normally in 91.66%, 96.66% and 98.33% limbs respectively; the posterior division of the upper trunk being the parent of variants of all these. Lower subscapular nerve had a normal origin in 96.66% with the axillary nerve being parent in its variants; while the Radial nerve had a normal origin in all of the limbs. Almost all the branches of posterior cord emanated distally on left side as compared to right side. For details readers are referred to the previous article by the authors [34].

CONCLUSION

Eventually it is concluded that the present study on the adult human cadavers is an essential prerequisite for the initial built up of the data base at the grass root level. The findings were akin to the results of the previous works but with some variations. The anatomy has always provided a bedrock for the sound surgical endeavors. It definitely has an upper edge to widely

a margin of error inherent to any diagnostic procedure because no doubt the machines are a good bet but the eyes see the best. Nevertheless in the present times, a combined anatomical, radiological and MRI approach is the need of the hour. This combined effort should prove a torchbearer in the preoperative planning and the final execution of the surgeries done in the axillary region.

Conflicts of Interests: None

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