Descending and Recurrent Branches of Medial Cutaneous Nerve of Forearm

Variations in the pattern of formation and distribution of the brachial plexus are common findings, and of particular interest are the cutaneous nerves of the forearm de facto their implications in anaesthesia and brachial plexus block.[1-4] Kasai and Yamamoto[5] indicated inconsistencies in the distribution of the medial cutaneous nerve of the fore arm and Horiguchi [6,7] reported recurrent branches of the lateral cutaneous nerve of the forearm that hitherto was not mentioned in textbook of human anatomy.

In this study, recurrent and descending branches were identified in the medial cutaneous nerve of the forearm during dissection and these were examined following an intensive dissection of four cadavers. Eighty two cadavers comprising of 68 males and 14 female were inspected during the course of student gross anatomy dissection in the Department of Human Anatomy, Ahmadu Bello University, Zaria between 1991 and 1999. Following the confirmation of these branches and the observed cases and patterns recorded, four cadavers (2 males and 2 females) were randomly chosen and intensive dissection of the nerves performed on the limbs of either side. [8,9]

Following thorough dissection, two unusual branches were observed: one, a descending branch given off just outside the axilla innervated the skin covering the biceps brachii muscle while anterior and posterior branches were distributed to the skin of the corresponding surfaces of the medial aspect of the fore arm; two, a recurrent branch from the anterior branch of the medial cutaneous nerve of the fore arm replaced descending branch and innervated the skin covering the biceps brachii muscle. On each side, 68 males and 14 females arm were inspected. Descending branches were seen in 26 (38%) males and 6(43%) females; and recurrent branch in 20(29%) males and 4(28%) females on the right aside, while descending branches were seen in 24(35%) males and 5(36%) females and recurrent branches appeared in 22(32%) males and 5 (36%) females on the left side. There were 5(7%) and 2(3%) respective cases of bilateral descending and recurrent branches (Table 1).

The medial cutaneous nerve of fore arm is commonly described outside the axilla as ending in anterior and posterior branches supplying their respective surfaces of the ulna sides of the fore arm.[10] The descending and recurrent branches had probably not been recognized perhaps due to oversight or neglect as their location is widely seen as supplied by twigs from medial cutaneous nerve of arm. A times, careful study usually reveal more details of a structure.[11] This finding attest to the work of Kasai and Yamamoto[5] who alerted a confusion in the dermatome of the medial cutaneous nerve of fore arm; we observed here that in the arms where these branches were absent, twigs from the medial cutaneous nerve of arm compensated for their area of supply, a notable point in local anaesthesia. In 1981, Horiguchi detected 58(93%) recurrent branches out of 62 lateral

cutaneous nerve of fore arm of Japanese cadavers. He reported similar findings in the arms of both sides. This work reports 50 (73%) descending and 42(61%) recurrent branches out of 136 male arms and 11(77%) descending and 9(63%) recurrent branches in 28 female arms.

Table 1: Descending and Recurrent Branches of Medial Cutaneous Nerve of Fore Arm

		Right Arm				Left Arm			
		Male		Female		Male		Female	
		(N=68)		(N=14)		(N=68)		(N=14)	
		No	%	No	%	No	%	No	%
Unilateral:	Descending branch	26	38	6	42	24	35	5	36
	Recurrent branch	20	29	4	28	22	32	5	36
Bilateral:	Descending branch	5	8	-	-	5	8	-	-
	Recurrent branch	2	4	-	-	2	4	-	-
Total		53	79	10	72	53	79	10	72

Statistical analysis using χ^2 at $P<0.05$ is non-significant

An intriguing observation however, was that both branches were not simultaneously present in an arm, that is, either one is present in the observed cases. Hence, the alternating occurrence of the branches could possibly be developmental in origin[12-14], in which the descending branches sprouted from the corresponding side of the medial cutaneous nerve of the forearm, and their subsequent regression cranially at the point of origin.

Statistical analysis of the results showed that neither was there any prevalence of occurrence on either side of the two patterns nor sex discriminations in the cases noted, though the female samples were relatively few; this investigation is progressive with more samples of males

and females, however, this report becomes noteworthy and pertinent for reference purpose in anaesthesia and human anatomy.

References

1. Adebisi SS, Ekanem PE, Asala SA. "Anatomical Studies of variations in the patterns of formation and distributions of the brachial plexus." Presented at the VIth International Congress of the Anatomical Society of West Africa, Obafemi Awolowo University, Ile-Ife, August 5 -11, 1991.
2. Olson IA .The origin of lateral cutaneous nerve of fore arm and its implication for modified brachial plexus block. J Anat 1969; 105: 381 - 382.
3. Bosom worth PP, Egbert LD, Hamelberg W. Block of the brachial plexus at the axilla: its value and complications. Ann Surg 1961; 54: 911 – 914.
4. De Jong RH. Modified axillary block with block of terminal musculocutaneous nerve. Anesthesiology 1965; 26: 515 – 618.
5. Kasai T, Yamamoto M. The medial cutaneous nerve and the intercostobrachial nerves. Acta Anat Nipp 1966; 41: 29 - 42
6. Horiguchi M. The cutaneous branch of some human suprascapular nerves. J Anat 1980; 130: 191 – 195.
7. Horiguchi M. The recurrent branch of the lateral cutaneous nerves of the forearm. J Anat 1981; 132(2): 243 – 247.
8. Romanes GJ. Cunningham's manual of practical anatomy. Oxford University Press, Oxford, 1981, pp 38.
9. McMinn RMH, Hutchings RT, Pegington J, Abrahams PH. A colour atlas of human anatomy, Wolfe, Holland, 1995, pp 126.
10. Lockhart RD, Hamilton GF, Fyfe FW. Anatomy of the human body, Faber and Faber, London, 1974, pp 289.
11. Asala SA, Bower AJ. Vagal innervation of the gastric wall: an autoradiographic study. J Anat 1984; 138: 589
12. Pongrac JL, Rylett RJ. Differential effect of nerve growth factor on expression of choline acetyl transferase and sodium coupled choline transport in basal fore brain cholinergic neurons in culture. J Neurochem 1996; 66: 804 – 810.
13. Mayes LC. Developing brain and in utero cocaine exposure: effect on neuronal ontogeny. Dev Psychopathol 1999; 11: 685 – 714.
14. Hirai K, Yoshiok H, Kihara M, Hasegawa K., Sawada T, Fushik, S. Effects of ethanol on neuronal migration and neuronal cell adhesion molecules in the embryonic rat cerebral cortex: a tissue culture study. Dev Brain Res 1999; 118: 205 – 210.

S.S. Adebisi, S.A. Asala and S.P. Singh

Department of Human Anatomy, Ahmadu Bello University, Zaria, Nigeria. E-mail: sambisi@abu.edu.ng