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The Accessory Root of the Medial Fascicle of the Brachial Plexus in Man

Dodatkowy korzeń pęczka przyśrodkowego splotu ramiennego u człowieka

The continuation of the anterior division of the inferior trunk usually forms the medial fascicle. Sometimes the accessory root (2, 3, 10), derived from the middle trunk, takes part in its formation. Studies devoted to this root's internal structure have not been published yet, therefore I decided to work on some of its features.

The study was performed on 264 medial fascicles obtained bilaterally from the cadavers of sixty one males and seventy one females who died between the first day and eighty seventh year of life. The methods used to visualize different structures of brachial plexus, to obtain and fix the sections, to stain the slides and to determine thickness of the examined parts of peripheral nervous system, number of fascicles, and the index of their cross-section area were described in the previous papers (9, 10).

RESULTS

The medial fascicle was present in all the cases and it made continuation of the anterior division of the inferior trunk in 93.9% of cases. In 6.1% it was formed by the fusion of the anterior division of the inferior trunk and the accessory root, which has arisen from the anterior division of the middle trunk and derived from C₇ fibres. The accessory root occurred in nine males (bilaterally in two persons, on the right side in four persons, and on the left side in three persons) and in four females (bilaterally in one person, and on the left side in three persons).

The results of investigations of some features of the internal structure of both roots of the medial fascicle, namely of the one constantly occurring, which formed continuation of the anterior division of the inferior trunk, and of the accessory root arisen from the anterior division of the middle trunk are presented in Table 1.

Table 1. Some features of the internal structure of the roots of the medial fascicle

Case no.	Age (year)	Sex	Side	Thickness of (in sq mm)		No. of fascicles		csa (in sq mm)		IAF	
				ar	ad	ar	ad	ar	ad	ar	ad
1	0.25	♂	L	0.285	6.327	2	17	0.185	3.780	64.9	59.7
2	1.30	♂	R	0.237	4.768	1	15	0.148	2.318	62.4	46.2
3	8	♂	R	1.968	9.529	1	13	1.450	5.022	73.7	52.7
4	19	♀	L	0.718	11.991	1	15	0.563	7.077	78.4	59.0
5	23	♂	L	2.016	10.216	1	9	1.300	7.345	64.5	71.9
6	25	♀	R	2.099	12.993	2	35	1.312	7.221	62.5	55.6
7	41	♀	L	2.068	12.523	3	32	1.551	6.866	75.0	54.8
8	45	♂	R	4.023	14.274	1	25	0.540	7.844	75.2	55.0
9	51	♂	L	4.753	16.080	2	14	2.712	10.724	67.4	66.7
10	52	♂	R	0.586	15.378	1	15	3.919	10.670	82.5	69.4
11	59	♂	R	1.967	9.298	1	19	0.486	4.428	82.9	47.6
12	71	♂	L	1.828	17.283	3	24	1.269	7.541	64.5	43.6
13	86	♀	L	4.861	21.875	4	28	1.088	8.641	59.5	39.5
			L	0.617	18.132	7	30	2.662	9.263	54.8	51.1
			L	2.851	15.895	1	30	0.486	6.625	78.8	41.7
			L		21.126	3	27	1.672	8.067	58.6	38.2

Explanation: R — right side, L — left side, ♂ — males, ♀ — females, ar — accessory radix of the medial fascicle, ad — anterior division of the inferior trunk, IAF — index of the area of fascicles, csa — size of cross-section area of fascicles.

Accessory root thickness ranged from 0.237 to 4.861 sq mm, and its fascicles cross-section area from 0.148 to 3.919 sq mm. In the constantly occurring root the corresponding values were 3.2—25.8 times bigger as regards thickness, and 2.7—20.4 times bigger as regards fascicles cross-section area. Fascicles number in the accessory root ranged from 1 to 7 and was 4.3—30.0 times smaller than in the constantly occurring root. Single fascicle thickness in the accessory root ranged from 0.046 to 3.919 sq mm and in the constantly occurring root from 0.001 to 5.347 sq mm. According to cross-section area values, the very thin fascicles (up to 0.100 sq mm), thin fascicles (0.101—0.300 sq mm), medium thick fascicles (0.301—0.500 sq mm), thick fascicles (0.501—1 sq mm) and very thick fascicles (more than 1 sq mm) were distinguished. They occurred in medial fascicle's roots with different frequency. The very thin fascicles formed 17.6% of the accessory and 31.9% of the constantly occurring root, the thin fascicles 20.6 and 32.5%, the medium thick fascicles 20.6 and 17.2%, the thick fascicles 17.6 and 12.9% and the very thick fascicles 23.6 and 5.5% respectively. The value of the index of cross-section area of the accessory root fascicles ranged from 54.8 to 82.9 and it was greater than in the constantly occurring root in 93.7% and smaller in 6.25% of cases.

DISCUSSION

The accessory root of the medial fascicle is observed relatively rarely and is derived usually from the middle trunk (2, 3) of the brachial plexus. In this study it was present in 6.1% of cases, more often in males than in females and more often on the left than on the right side of the body. It was always derived from the anterior part of medial trunk and it contained fibres from C₇.

The internal structure of the accessory root, like of other parts of the peripheral nervous system (1, 4—10), is characterized by great individual variability and asymmetry. Both roots of medial fascicle differ in thickness, fascicles number, fascicles cross-section area, and value of the index of their cross-section area. Thickness of the accessory root was 7 times smaller than of the constantly occurring root, cross-section area 5.3 times and fascicles number 10.2 times respectively. Great differences occurred in different thickness fascicles participation in forming both roots of the medial fascicle. In the accessory root thick and very thick fascicles were observed more often than in the constantly occurring root, and thin and very thin fascicles far rarely. The index of fascicles cross-section area had usually higher values in the accessory root, which reflected its smaller contents of connective tissue.

Scarce material made the analysis of sex, age, and body sides differences of the medial fascicle accessory root internal structure impossible.

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STRESZCZENIE

W tworzeniu pęczka przyśrodkowego, stanowiącego zazwyczaj przedłużenie przedniej części pnia dolnego, brał udział w 6,1% przypadków dodatkowy korzeń, który wywodził się z przedniej części pnia środkowego. W porównaniu z korzeniem stale występującym był on przeciętnie 7 razy cieńszy, miał 5,3 razy mniejszą powierzchnię poprzecznego przekroju pęczków i 10,2 razy mniejszą liczbę pęczków, natomiast jego wskaźnik powierzchni pęczków w większości przypadków osiągał wyższe wartości. W dodatkowym korzeniu obserwowano częściej niż w korzeniu stale występującym pęczki grube i bardzo grube, a rzadziej pęczki bardzo cienkie i cienkie.