

신경근육재활 및 전기진단

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Anatomical course and branching patterns of common peroneal nerve around knee

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OBJECTIVES

Common peroneal nerve which is the smaller branch of the sciatic nerve travels along the medial side of the biceps femoris tendon and fibular head around the popliteal fossa. It gives off several banches in the popliteal fossa and then divides into terminal branches of superficial peroneal and deep peroneal nerves around fibular neck. The purpose of this study is to demonstrate the branching patterns of its cutaneous nerves including lateral sural cutaneous nerve and lateral cutaneous nerve of the calf, quantitative data of branches of the common peroneal nerve, and relative relationship between common peroneal nerve and fibular head.

SUBJECTS AND METHODS

Twenty-one lower legs from 12 fresh cadavers were dissected. We performed dissection from mid-thigh to ankle. We measured the distance from the tip of fibular head to the branching point of branches of common peroneal nerve including lateral sural cutaneous nerve, lateral cutaneous nerve of the calf, superficial peroneal nerve and deep peroneal nerve, and their thicknesses by a vernier caliper. Relative relationship between fibular head and common peroneal nerve at the mid-fibular head level was measured.

RESULTS

The median distance between fibular head and branching point of common peroneal nerve and lateral sural cutaneous nerve and lateral cutaneous nerve of the calf was 47.2mm (range: 11.0 ~ 85.0mm) and 20.6mm (range: -22.0 ~ 59.2mm) proximal to the fibular head, respectively. The median angle between common peroneal nerve and line parallel to tibial nerve at 5cm above the fibular head was 13.1 (range: 8.0 ~ 20.5mm). The median distance between the tip of fibular head and branching point of deep peroneal nerve and superficial peroneal nerve was 29.8mm distal to the fibular head. At the mid-fibular head level, common peroneal nerve ran across the fibular head in 16 cases and run posterior to the fibular head in 5 cases (Table 1). The median distance between common peroneal nerve and the anterior margin of mid-fibular head and the thickness of the mid-fibular head were 20.4mm (range: 14.9 ~ 24.5mm) and 24.0mm (range: 19.0 ~ 27.9mm), respectively. The branching patterns of lateral sural cutaneous nerve

demonstrated that type arising from lateral sural cutaneous nerve were most common (type 3, 10 cases) followed by type arising from medial margin of common peroneal nerve (type 2, 6 cases) and type from the lateral margin of common peroneal nerve (type 1, 3 cases) (Table 2).

Conclusion

There were various branching patterns of cutaneous nerves of common peroneal nerves around the popliteal fossa, especially lateral cutaneous nerve of the calf, which would be related with mononeuropathy of lateral cutaneous nerve of the calf although it is rare. Anatomical correlation (across type) between fibular head and common peroneal nerve at the mid-fibular head level could be related with development of common peroneal neuropathy because of stretching or compression on the fibular head.

Table 1. Anatomical Parameter of Common Peroneal Nerve Course at the Mid-fibular Head

	Cross type (16 legs)			Posterior type (5 legs)		
	MAX	MIN	Median	MAX	MIN	Median
CPN_Mid FH anterior margin (mm)	24.5	14.9	20.4	27.9	19.0	23.6

Cross: CPN run across the fibular head, Post: CPN run posterior to the fibular head

Abbreviation: CPN_Mid FH anterior margin, distance between middle fibular head (anterior margin) and common peroneal nerve

Table 2. Branching Patterns of Lateral Cutaneous Nerve of the Calf (LCNC)

Type 1	The LCNC arising from lateral margin of common peroneal nerve	3 cases
Type 2	The LCNC arising from medial margin of common peroneal nerve	6 cases
Type 3	The LCNC arising from lateral sural cutaneous nerve	10 cases
Type 4	Two LCNC arising from common peroneal nerve and lateral sural cutaneous nerve, respectively	1 case

Table 3. Anatomical parameter of common peroneal nerve thickness at multiple sites

	A. Cross (16 legs)			B. Post (5 legs)		
	MAX	MIN	Median	MAX	MIN	Median
CPN thickness_mid BFS (mm)	14.0	6.2	9.5	12.0	4.6	9.1
CPN thickness_PF (mm)	14.2	6.0	9.5	12.0	8.8	10.2
CPN thickness_FH+7cm (mm)	9.0	3.0	5.3	7.6	4.0	5.2
CPN thickness_FH+5cm (mm)	10.4	2.8	5.2	7.9	4.8	6.4
CPN thickness_FH+2cm (mm)	6.4	4.3	5.4	6.5	3.0	5.0
CPN thickness_FH (mm)	7.8	4.2	6.1	10.2	3.8	6.6
CPN thickness_mid FH (mm)	8.0	5.0	6.6	9.8	4.8	7.2
CPN thickness_FN (mm)	10.0	6.8	8.7	11.2	5.8	8.6

Cross: CPN run across the fibular head, Post: CPN run posterior to the fibular head

Abbreviation: CPN thickness_mid BFS, common peroneal nerve thickness at the mid biceps femoris short head muscle; PF, popliteal fossa (upper margin); FH+7cm, 7cm proximal to the fibular head; FN, fibular neck

Table 4. Classification of variations of lateral cutaneous nerve of the calf (LCN)

Type 1	The LCN arises from lateral margin of common peroneal nerve	3 cases
Type 2	The LCN arises from medial margin of common peroneal nerve	5 cases
Type 3	The LCN arises from sural nerve	5 cases
Type 4	The complex of LCN and sural nerve arise from common peroneal nerve and divided	2 cases
Type 5	The LCN arises from common peroneal nerve and branch off lateral sural cutaneous nerve	2 cases
Type 6	The LCN and sural nerves arise from common peroneal nerve, simultaneously	1 case
Type 7	Two LCN arises from common peroneal nerve and sural nerve	1 case