

신경근육재활 및 전기진단

발표일시 및 장소 : 10 월 18 일(금) 15:35-15:45 Room C(5F)

OP3-2-9

Sonographic evaluation of optimal needle insertion site of biceps femoris short head

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Purpose

To assess the optimal needle placement site for the electromyographic examination of the biceps femoris short head muscle through sonographic evaluation

Participants

Thirty-six lower limbs of 18 voluntary healthy people

Methods

The study was designed as a prospective cross-sectional study. The distance was measured using ultrasonography from medial and lateral margin of BFL tendon to CPN (M_BFLT_CPN, L_BFLT_CPN distance), and hazard window from medial and lateral margin of BFL tendon to CPN (M_CPN_angle1&2, L_CPN_angle1&2) at 5cm proximal to the tip of fibular head (P1), 7cm proximal (about 4 finger breadths) to the tip of fibular head (P2).

Results

Median results of medial BFL tendon margin to CPN distances (M_BFLT_CPN) were 7.33mm (2.10mm – 16.18mm) at P1, 11.58mm (7.16mm - 22.39mm) at P2 level. Median results of lateral BFL tendon margin to CPN distances (L_BFLT_CPN) were 19.97mm (11.96mm – 26.22mm) at P1, 22.05mm (14.31mm – 29.81mm) at P2 level. Median results of angle between medial BFL tendon margin to CPN borders were 23.53° to 52.28° at P1 level, and 18.18° to 35.06° at P2 level. Median results of angle between lateral BFL tendon margin to CPN borders were 75.12° to 83.00° at P1 level, and 37.24° to 74.60° at P2 level. The CPN courses in proximity to the medial margin of the BFL tendon and locates nearly direct below the BFL tendon.

Conclusions

A medial approach of the needle electrode for electromyographic examination of the biceps femoris short head would have a high risk of injury to the CPN. Considering the anatomical positioning between CPN and biceps femoris short head muscle, the lateral approach is strongly recommended for electromyographic examination of this muscle.

Table 1. Measurement results of parameters at P1, P2 level			
Parameter	P1	P2	P-value
BFLT_1 (mm)	1.70	1.44	0.00*
BFLT_2 (mm)	14.32	14.35	0.52
BFS_1 (mm)	7.34	10.78	0.00*
BFS_2 (mm)	32.78	37.29	0.00*
M_BFS_S (mm)	3.35	3.56	0.00*
M_BFS_D (mm)	9.53	14.01	0.00*
M_BFS thickness (mm)	6.29	11.16	0.00*
M_BFS_HL (mm)	5.41	8.32	0.00*
M_BFLT_CPN (mm)	7.33	11.58	0.00*
L_BFS_S (mm)	5.85	6.89	0.00*
L_BFS_D (mm)	12.85	17.19	0.00*
L_BFS thickness (mm)	6.92	9.32	0.00*
L_BFS_HL (mm)	9.77	11.93	0.01*
L_BFLT_CPN (mm)	19.97	22.05	0.00*
M_CPN_angle1 (degree)	23.53	18.18	0.03*
M_CPN_angle2 (degree)	52.28	35.06	0.00*
L_CPN_angle1 (degree)	75.12	67.24	0.00*
L_CPN_angle2 (degree)	83.00	74.60	0.00*

BFLT_1: BFL tendon short distance, BFLT_2: BFL tendon long distance, BFS_2: BFS tendon long distance, BFS_1: BFS muscle short distance, BFS_2: BFS muscle long distance, M_BFS_S: direct distance of skin to BFL tendon medial border, M_BFS_D: direct distance of skin to BFS muscle deepest margin at medial border of BFL tendon point, M_BFS thickness: M_BFS_D-M_BFS_S, M_BFS_HL: direct distance of M_BFS_D line to medial border of BFS muscle, L_BFS_S: direct distance of skin to BFL tendon lateral border, L_BFS_D: direct distance of skin to BFS muscle deepest margin at lateral border of BFL tendon point, L_BFS thickness: L_BFS_D-L_BFS_S, L_BFS_HL: direct distance of L_BFS_D line to lateral border of BFS muscle, * P-value < 0.05; Wilcoxon signed-rank test compared between P1 and P2

Table 2. Median results of parameters at P1, P2 level with medial and lateral sides			
Parameter	Lateral side	Medial side	P-value
P1 level			
BFS_S (mm)	5.85	3.35	0.00*
BFS_D (mm)	12.85	9.53	0.00*
BFS thickness (mm)	6.92	6.29	0.13
BFS_HD (mm)	9.77	5.41	0.00*
BFLT_CPN (mm)	19.97	7.33	0.00*
CPN_angle1 (degree)	75.12	23.53	0.00*
CPN_angle2 (degree)	83.00	52.28	0.00*
P2 level			
BFS_S (mm)	6.89	3.56	0.00*
BFS_D (mm)	17.19	14.01	0.00*
BFS thickness (mm)	9.32	11.16	0.14
BFS_HD (mm)	11.9	8.32	0.00*
BFLT_CPN (mm)	22.05	11.58	0.00*
CPN_angle1 (degree)	67.24	18.18	0.00*
CPN_angle2 (degree)	74.60	35.06	0.00*

BFS_S: direct distance of skin to each BFL tendon border, BFS_D: direct distance of skin to BFS muscle deepest margin at each border of BFL tendon point, BFS thickness: BFS_D – BFS_S, BFS_HL: direct distance of BFS_D line to each border of BFS muscle, BFLT_CPN: each BFL tendon margin to CPN distance, CPN_angle1: angle of medial border of CPN between each BFL tendon margin, CPN_angle2: angle of lateral border of CPN between each BFL tendon margin, *P-value < 0.05; Wilcoxon signed-rank test compared between lateral and medial

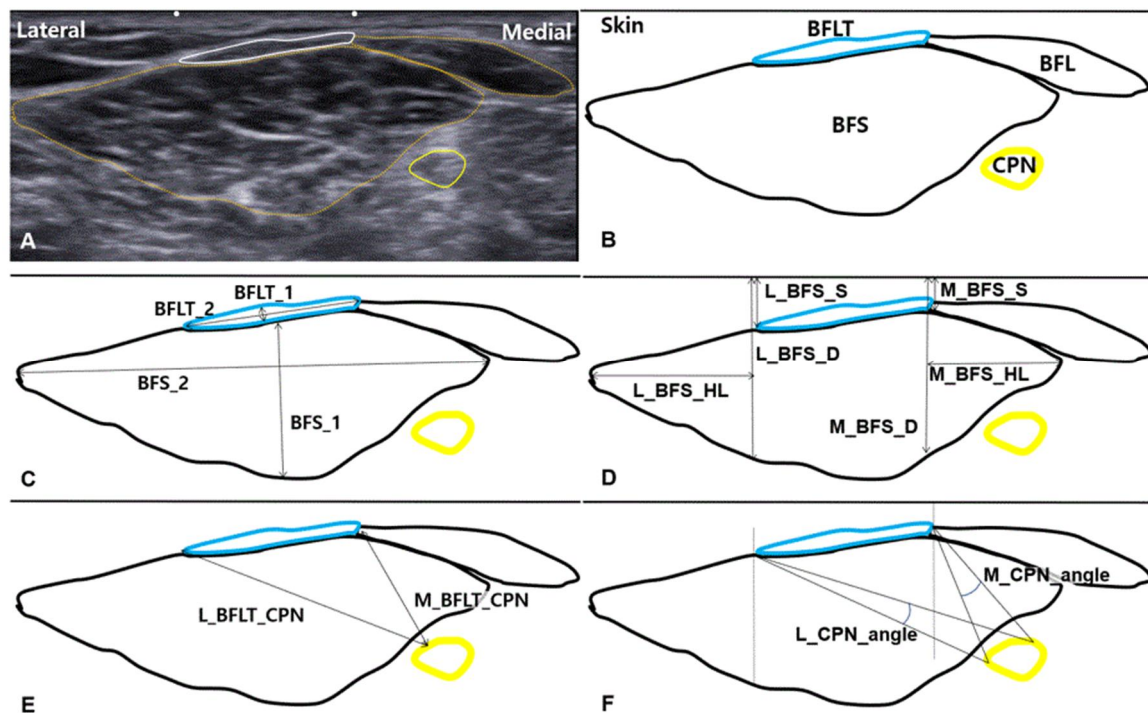


Figure 1. Ultrasonographic image and measurement parameters at P1 level