



RELATIONSHIP BETWEEN CHANGES IN MOVEMENT PATTERNS AND THE VASCULAR TERRITORY OF ISCHEMIC STROKE IN PATIENTS IN THE EARLY RECOVERY PERIOD

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Motor function impairments have the greatest impact on independence in daily life and the working capacity of patients after a stroke [1]. To identify the structure of motor impairments in paresis and, accordingly, to enable precise, targeted selection of rehabilitation methods after stroke, objective diagnostics of the quantitative and qualitative characteristics of the altered movement pattern are necessary [2]. As walking is the primary locomotor act in humans, gait patterns are specifically analyzed in the diagnosis of motor disorders. Aim of this study was the analyses of spatiotemporal and kinematic parameters of the movement pattern during the early recovery period of ischemic stroke (IS) with lesion localization in the middle cerebral artery (MCA) territory and the verte-brobasilar system (VBS) [3, 4]. A total of 30 patients were examined (17 women, 13 men; mean age 60.6 ± 6.45 years) at 4–6 weeks post-IS. Fifteen patients had ischemic lesions in the MCA, and fifteen in the VBS. The total score on the FIM scale was $118 \pm 5.2 / 121.8 \pm 4.5$, on the Modified Ashworth Scale — $0.5 \pm 0.6 / 0.3 \pm 0.7$, proximal leg paresis — $4 \pm 0.4 / 4.3 \pm 0.5$ points, distal leg paresis — $3.9 \pm 0.4 / 4.1 \pm 1.0$ points, respectively. Spatiotemporal (gait cycle, stance phase, swing phase, step length, speed, step width, and step frequency) and kinematic (pelvic motion in three planes during walking) parameters of the movement pattern were

studied in a 3D video analysis laboratory equipped with the high-resolution SMART-DX Motion Analysis System, Serial SDX-0313-0071 (Italy), for analyzing all types of movement according to the international Davis protocol. In patients with mild paresis after IS, the structure of the gait cycle (percentage distribution of stance and swing phases) was preserved, but the spatiotemporal and kinematic movement parameters deviated from normal in both groups. Patients with ischemic lesions in the MCA were characterized by excessive pelvic elevation in the frontal plane on the paretic side, with insufficient pelvic drop on the healthy side during walking. In patients with IS in the VBS, the leading feature was a pathological forward shift of the pelvis in the sagittal plane during gait. No differences between the groups were found in the changes of spatiotemporal parameters. Importantly, in cases of mild paresis, alterations in the movement pattern developed on the healthy side simultaneously with those on the paretic side from the first month after stroke onset. In conclusion., patients with IS in the MCA and VBS territories with mild paresis and absence of spasticity are similar in their alterations of spatiotemporal gait parameters but show statistically significant differences in the kinematic characteristics of pelvic motion during walking. The findings highlight the importance of differentiating rehabilitation strategies based on whether the stroke is localized in the MCA or VBS.

Keywords: ischemic stroke, gait analysis, spatiotemporal parameters, pelvic kinematics, early rehabilitation.