We aimed to evaluate the thicknesses of the retinal nerve fiber layer (RNFL) in patients with cerebral infarction (CI) by using optical coherence tomography. This cross-sectional study evaluated 45 patients with CI (patient group) and 45 healthy subjects (control group). All subjects underwent a complete ophthalmic examination including optical coherence tomography. The average, temporal, nasal, inferior, and superior quadrant RNFL thicknesses and in each of 12 sectors around the optic nerve head were obtained. The side with the infarction was compared to the contralateral side among the patients with cerebral infarction, and their measurements were also compared to those of the control group. Patients who had CI only in the middle cerebral artery (MCA) and posterior cerebral artery (PCA) were included in this study. Correlations between the RNFL thicknesses and infarction features were also evaluated. The mean age of the patients was 61.6 ± 12.4 years, and the mean age of the controls was 59.6 ± 11.8 years (p = 0.65). Of the 45 patients with cerebral infarction, 35 (77.7 %) had infarction in the MCA territory, 10 (22.2 %) had infarction in the PCA territory and the mean duration of the disease was 20.2 ± 29.1 months. The average, superior, inferior, and nasal RNFL thicknesses were significantly thinner in both eyes of the patients with CI than in the eyes of the control group (p < 0.05). The average and inferior RNFL thicknesses were significantly more affected in the ipsilateral eyes than in the contralateral eyes (p < 0.031 and p < 0.006, respectively). The amount of reduction in the RNFL thicknesses was not correlated with the infarction features. Significant thinning of the RNFL in patients with CI may result from transneuronal retrograde degeneration. Optical coherence tomography may provide useful information to confirm the process of trans-synaptic retrograde degeneration.