The Weight and Linear Dimensions of the Human Cerebellum

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MATERIALS AND METHODS

Studies were performed on the corpses of 80 women and 140 men aged 20–90 years, from the Ryazan’ Regional Forensic Medical Bureau.

The following brain measurements were made: 1) longitudinal, from the middle of the glabella to the most posterior point of the outer surface of the occipital bone; 2) transverse, between the two outermost points on the squamous parts of the right and left temporal bones. These measurements were used to calculate the skull index and to classify skulls into the following types, as defined by Martin et al.: dolichocephalic (skull index 70.0–74.9), mesocephalic (75.0–79.9), brachycephalic (80.0–84.9), hyperbrachycephalic (85.0–89.9), and ultrabrachycephalic (90.0 and greater) [3]. The linear dimensions of the cerebellum were measured: 1) transversely, between the outermost points of the superior semilunar lobes of the cerebellum; 2) longitudinally, from the hindmost point of the inferior semilunar lobes to the foremost part of the quadrate lobes of the left and right cerebellar hemispheres; 3) vertically, from the extreme of the amygdala to the opposite points of the quadrate lobes of the left and right cerebellar hemispheres.

Cerebellar sizes were studied in preparations including the brainstem and cerebellum. After measurements, brainstems were removed and the weight of the cerebellum was measured. Preparations were studied on the day of removal from bodies. Available histories were recorded, along with the cause of death and age.

The length index was measured as the ratio of the longitudinal cerebellar dimension to the length of the head and the width index was measured as the ratio of the transverse dimension of the cerebellum to the width of the head. Data were analyzed statistically using standard computer programs.

RESULTS

Studies of cerebellar weight were of interest in relation to the extreme values – the minimum and maximum. Data from measurements of cerebellar size in males aged 20–60...
years were combined into a single group (excluding the effects of age-related influences after age 60 years) and were assessed in relation to craniometric measures. Cerebellar weight changed with skull size, as shown by the statistically significant differences between cerebellar weight in the extreme groups (dolichocephalic and ultrabrachycephalic) (Table 1). Analysis of age-related changes in cerebellar weight in males in relation to craniometric measures identified a significant \( p < 0.05 \) decrease in weight in brachycephalics from age 60 years and in mesocephalics from age 70 years (Table 2).

Mean cerebellar weights differed between males and females aged 20–60 years, with a value of 134.7 ± 1.2 g in females (see Table 1). Thus, cerebellar weight depended on gender, age, and skull size.

The linear dimensions of the cerebellum were also assessed in relation to craniometric measures and age. Changes in the transverse size of the cerebellum coincided with changes in cerebellar weight at different skull sizes, i.e., transverse size increased with increases in skull width (see Table 1). The transverse dimension of the cerebellum in women aged 20–60 years, like weight, was less than in males.

Studies of the longitudinal dimension of the cerebellar hemispheres yielded no statistically significant differences in groups with different skull sizes (see Table 1). The longi-