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Age and Gender differences in Cerebellar and Posterior Cranial Fossa Volumes and Correlation with Cerebellar Atrophy in Sudanese Population, CT Study – 2021-2022

Saeed Ahmad Saeed Mohammed

MBBS, M.Sc. National University – Sudan

Background: Cerebellar atrophy has been associated with aging process and dementia and also used as a reference to several cortical diseases. This research aimed to measure the cerebellar and posterior fossa volumes, and to estimate the cerebellar atrophy of the Sudanese population across gender and age groups.

Methods: 78 cases (45 male, 33 female) were subdivided according to age into four groups: young (20 –35 years); early middle age (36 - 50 years); late middle age (51 – 65 years); elderly (66 – 89 years). CT scans were manually delineated in CT scan device of healthy individuals in transverse and sagittal sections, and cerebellar and posterior cranial fossa volumes were calculated using ABC/2 formula. Then, cerebellar reduction percentage calculated by reverse percentage formula.

Results: Males had relatively larger cerebellar volume than females ($p = 0.028$), which was only significant in the elderly age group ($p = 0.03$); they also showed insignificant larger posterior cranial fossa volume ($p = 0.089$). Males had insignificant lower cerebellar reduction percentage (CVRP) than females ($p = 0.090$). Age was found to be negatively correlated to cerebellar volume only in males ($r = -0.319$; $p = 0.033$), and positively correlated to cerebellar reduction percentage in both genders, males ($r = 0.592$; $p = 0.000$) and females ($r = 0.677$; $p = 0.000$). After age grouping only the latter two age groups showed significant positive correlation ($r = 0.55$; $p = 0.013$); ($r = 0.434$; $p = 0.03$), respectively. There was significant decline in CVRP between the elderly age group when compared with the young and early middle age groups ($p= 0.000$).

Conclusion: Both cerebellar and posterior cranial fossa volumes showed an increase from young to early middle age groups after which the volumes progressively declined afterwards, with males having larger cerebellar volumes and lower reduction percentage than females. Unlike cerebellar volume, the reduction percentage was positively correlated with age in both genders, suggesting the importance of using it rather than the cerebellar volume alone in estimating cerebellar atrophy in randomized analysis that is independent on gender, and the use of the two latter age groups (51-89 years) for cerebellar atrophy clinically related researches

Biography

Dr. Saeed Ahmad Saeed Mohammed (known also as Saeed A. S. Mohammed) was born in Jeddah, Saudi Arabia on 03/09/1995, is a Sudanese male who studied Medicine (MBBS) in National University – Sudan (2013-2018), and then studied M.Sc. Human Clinical Anatomy in National University – Sudan (2019-2021), Dr. Saeed has deep interest in Anatomy and Neurosurgery and submitted this paper as part of the fulfillment of his master degree

sas.chahoo@yahoo.com