الاية

بسم الله الرحمن الرحيم

قال تعالى: *(إِنَّ السَّمْعَ وَالْبَصَرَ وَالْفُؤَادَ كُلُّ أُولَـٰئِكَ كَانَ عَنْهُ مَسْئُولاً)*

صدق الله العظيم

(سورة الاسراء الآية 36)

Dedication

To my parents and the belovedfamily

My husband

My children

My teachers

And friends

For giving me never-ending gifts of encouragement, love and patience

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List of Abbreviations

CH	Cochlea height
CW	Cochlea width
WCN	Width of the bony canal for cochlear nerve
CNCW	Cochlear nerve canal width
BTW	Basal turn width
CN	Cochlear nerve
TCW	Transverse cranium width
CT	Computed Tomography
HRCT	High Resolution Computed Tomography
MPR	Multiplanner Reformation
EMI L	England Medical Imaging Laboratories
SNHL	Sensoral hearing loss
ANOVA	An analysis of variances
MRI	Magnetic Resonance Imaging
WHO	World Health Organization
3D	Three dimensional
Sd	Standard deviation
mA	Milli Ampere
mm	Milli meter
CDs	Compact disk
SPSS	Statistical package of social sciences

Abstract

The study was carried out to establish normal Sudanese cochlear measurements using High ResolutionComputerized Tomography.

The study was done in Alamal DiagnosticCenter, Military Hospital, Royal Care Hospital and Royal Scan Diagnostic Departments, during the period from 2011 up to 2014

A total of 460 Cochlear images were obtained from the scans ofthe normal hearing group comprised 200 subjects (137 Males and 63 Females), aged 1- 84 years. A control group (n = 30) comprised adult with congenitalhearing loss(12 Males and 18 Females),theirages were in arrange between 10- 30 years.

Using high resolution computed tomography volumetric acquisition was obtained of brain scan with slice thickness of 0.5 mm and a reconstruction increment of 0.5 mm, 0.85 pitch, FOV of 70mm. The reconstruction slice was 2 mm. A reference plane was determined parallel to the lateral semicircular canal containing the cochlear modiolus, and the canal for the cochlear nerve, the oval window along with the footplate, and the posterior semicircular canal. Reference slice was computed for each patient and all the measurements were performed exclusively on this plane.

cochlea width, height, cochlea nerve canal width and cochlear nerve CT number, basal turn width, transverse cranial dimension, were all been evaluated. The study showed that for the normal subjects, Themean of the left and right cochlear width measured5.56±0.58 mm, 5.61±0.40 mm, height were 3.56±0.36 mm, 3.54±0.36 mm, the basal turn width 1.87±0.19 mm, 1.88 ±0.18 mm, cochlea nerve canal width were 2.02±1.23, 1.93±0.20, cochlea nerve CT number were 279.41±159.02, 306.84±336.9Hounsfieldrespectively

as well as the transverse cranialdimensions mean were also been evaluated as 123mm

The measurement forthe of hearing loss patients group showed that themean of the left and right cochlear width were 5.34±0.30mm, 5.38±0.46mm and theheight were 3.53±0.25mm, 3.49±0.28mm, the basalturn width were found to be 1.76±0.13mm, 1.79±0.13mm, cochlea nerve canal width were1.75±0.18mm, 1.73±0.18mm, and cochlea nerve signal intensity (CT number) were 232.84±316.82, 196.58±230.05Hounsfield respectively.

New equations were established to characterize the cochlea for Sudanese subjects whose ages were known.

The study revealed no significant differences were noted in both sides' measurements and between genders, while the age wasfound to have an impact on the transverse cranial dimension, right Cochlea nerve canal width and rightcochlea nerve CT number significantly at $p< 0.05$.

When comparing normal hearing subjects with the Hearing loss group,The study showed a significant difference in cochlea's measurementit was smaller in deafness subjectsat $p< 0.05$.

The study concluded that the Cochlea nerve canalwidth and CT number can be predicted for the Sudanese subjects whose ages were known andhigh resolutions computed tomography of temporal bone imaging is the modality of choice in the investigation of cochlear normal anatomy, guided the clinician's management of the hearing loss conditions if abnormalities are acknowledged.

ملخصالدراسة

هدفت الدراسة لتحديد القياساتالطبيعيةللقوقعة السمعية لدي السودانين باستخداماالاشعةالمقطعيةالمحوسبةعاليةالدقة.

وقدأجريتالدراسةفيمركزالاملالتشخيصي،المستشفيالعسكرييامدرمانومستشفرويالكيرومر كزرويالالتشخيصيوذلكفيالفترةمنعام 2011 حتىعام 2014.

تمتالدراسةعلىمجموعه 460 منصورالقوقعةمنمسحالراسوالعظمالصدغي . وتألفتمجموعة الاولي من طبيعي السمع من 200 شخصا (137 ذكورو 63 إناث) ،الذينتتراوحأعمارهمبين 1- 84 عاما .

مجموعةالضبطوالمقارنةمنفاقديالسمعكونتمن 30منالراشدين(18 ذكورو 12 منالاناث) الذينتتراوحأعمارهمبين 10- 30 عاما. تمقياس اتساعالقوقعة،الارتفاع،اتساعالقاعدةالاساسيةللقوقعه،اتساع قناةالعصبالسمعيومقياسعرضالجمجمة،ومديكثافةالنسيجللعصبالسمعيللعينةمن طبيعي السمعيسارويمينأ قد كانت قياساتها كالاتي 5.56 ± 0.58 ملم، 5.61 ± 0.40ملم،الارتفاع 3.56 ± 0.36ملم، 3.54 ± 0.36ملم،اتساع القاعدةالاساسية 1.87 ± 0.19ملم، 1.88 ± 0.18ملم،اتساعقناةالقوقعةالعصبية 2.02 ± 1.23 ملم ، 1.93 ± 0.20 ملم،متوسطكثافةنسيجالعصبالسمعي 279.41 ± 159.02 ، 306.84 ± 336.9 هاونسفيلدعلىالتوالي،كما تم قياس اتساعالجمجمة وقد كان متوسط القيم 123 ملم.

تمتالقياساتلمجموعةالضبطمنالصموقدأظهرتأنمتوسطاليسارواليمينلاتساعالقوقعة 0.46± ± 0.58 ملم، 5.34 ± 0.30ملموارتفاعها 3.49 ± 0.36ملم ، 3.53 ± 0.25 ملم ،اتساعالقاعدةالاساسية للقوقعة 1.76 ± 0.13 ملم

ملم ، 1.79 ± 0.13ملمواتساعقناةالعصبالقوقعي±1.73 0.18 1.75 ± 0.18ملم،متوسطكثافةنسيجالعصبالسمعي196.58 ± 230.05،232.84 ± 316.82هاونسفيلدعلىالتوالي و متوسط اتساع الجمجمة 123 ملم

تم من خلال الدراسه وضع معادلات تمكن من التنبؤ بقياسات القوقعة السمعية الطبيعية للسودانينمتي ما كانتمعروفةاعمارهم

وقدتوصلتالدراسةلعدموجودفروقكبيرةفيكلاالجانبينوالجنسين،فيحينتماثباتأنالعمريكونلهتأثير رعلىاتساع قناةالعصبالقوقعي الايمنومتوسطكثافةالعصبالقوقعيالايمنبشكلكبيرفيمدياحتمالية> 0.05 .

عندمقارنةقياساتالقوقعةلذويالسمعالطبيعيوفاقديالسمعوجدنافرقاكبيرافيجميعالقياساتاذهيأصغر لدي الصم في مدي احتمالية> 0.05.

خلصتالدراسةإلىأنهيمكن التنبؤ بقياسات القوقعة الطبيعية للسودانين المعروفاعمارهمو الي ان التصويربالاشعةالمقطعيةعاليةالدقةفيتصويرالعظمالصدغيهوالطريقةالافضلفي تحديد التشريحالطبيعي للقوقعة،لاسترشادالجهةالتشخيصيةلتحديداسبابفقدانالسمعالولادي.

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