



TYMPANOMETRIC EVALUATION IN CEREBRAL PALSY PATIENTS IN BENIN CITY NIGERIA

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ABSTRACT



TITRE: ÉVALUATION TYMPANOMÉTRIQUE CHEZ LES MALADES DE PARALYSIE CÉRÉBRALE À BENIN CITY, AU NIGÉRIA.

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ABSTRACT CON'D



- **DONNÉES DE BASE**
- La paralysie cérébrale est une condition neurologique statique qui vient d'une blessure du cerveau qui s'est produite avant que le développement cérébral n'ait été achevé¹. C'est l'invalidité d'enfance le plus commun qui touche à 2,5 à 10,3 enfants sur 1000 naissances viables au Nigéria. ¹²³⁴⁵ Ils sont plus vulnérables à la surdité ^{23,24}. La surdité peut être due à la pathologie de l'oreille moyenne qui est évitable et corrigible, justifiant ainsi cette étude.



ABSTRACT CONT'D



- **OBJECTIFS**

- Déterminer le modèle de la pathologie de l'oreille moyenne et la gravité du Dysfonctionnement de la Trompe d'Eustache (DTE) chez les enfants atteints de Paralyse Cérébrale à UBTH, au Nigéria.

- **MÉTHODOLOGIE**

Une étude descriptive prospective menée pendant quatorze mois (mai 2014 à juin 2015). La technique d'échantillonnage de population totale a été employée. La taille d'échantillon a déterminé l'usage de la formule de Cochran. 112 sujets ont participé, chaque oreille, comme une entité à part entière. Un examen de l'ouïe a été fait au préalable pour 60 sujets à Project Charilove. On a administré des questionnaires structurés qui servaient à interviewer. L'otoscopie et la Tympanométrie ont été faites. Les données ont été analysées en utilisant un train de mesures statistiques destinées à la Solution Scientifique de la version 16. Des procédures pareilles ont été faites pour 112 sujets contrôlés, comprenant des enfants à Russell International Group of Schools, Ugbowo, Benin City, (Complexe Scolaire International, Russell).



ABSTRACT CONT'D

- **RÉSULTATS**

Les Médais d'Otite avec écoulement ont prédominé dans 154 (68,8 %) oreilles contrôlées, comparées à 25,9%. DTE, 129 (57,6%) principalement la trace du Type C1. La conformité réduite de l'oreille moyenne remarquée dans 22 (9,9%) oreilles. (Statistiquement significatif, PL 0,001).

- **CONCLUSION**

La pathologie de l'oreille moyenne est prédominante chez les malades de paralysie cérébrale. Le dysfonctionnement de la trompe d'Eustache a été principalement la trace du Type C1.

- **MOTS CLÉS**

- La Pathologie de l'oreille moyenne, la Paralysie cérébrale, la Tympanométrie.



INTRODUCTION



- ❖ Cerebral palsy : Static neurologic condition, from brain injury, before cerebral development is complete
- ❖ Brain damage in children with cerebral palsy; dependent; at risk of middle ear pathologies due to poor personal hygiene (more vulnerable to hearing problems)
- ❖ **Justification** : Middle ear pathologies; preventable and correctable



AIM AND OBJECTIVE



- ❖ The pattern of middle ear pathology
- ❖ The severity of Eustachian Tube Dysfunction



METHOD

- Prospective Descriptive study carried out for fourteen months from May 2014 to June 2015.





METHOD



- Clearance from Ethics & Research Committee U.B.T.H / Approval / permission / written informed Consent
- Pretest (60 subjects at Project Chari-love)
- Parents and caregivers were educated on the aim and objective of the study and possible intervention
- Total population sampling technique (Study group)
- Stratified sampling technique {Control group}



METHOD



- Sample Size Determination: $n = Z^2 pq/d^2$
(Cochran's formula), Attrition : 10%
- 112 subjects participated, representing 224 ears.
- Each ear regarded as a separate entity
- Structured interviewer administered Questionnaire was completed
- Otoscopy; Disinfection of speculum, wax and foreign body removal



METHOD



- Tympanometry was done (Welch-Allyn, version 4, 2008, Probe Tone frequency, 226HZ , Sound Pressure level, 85dB with Pressure range, +200 to –400 daPa)
- (Modified Jerger)
- Type A (and subtypes As, Ad) - Middle ear pressure
+ 200 to – 99mm of Water.
- Type B - Flat traces without a well defined compliance.
- Type C1- Middle ear pressure – 100 to –199mm of Water
- Type C2- Middle ear pressure – 200 to – 400mm of Water



METHOD



- Types C1 and C2 : negative middle ear pressure
(Eustachian tube dysfunction; middle ear effusion)
- Type B : Middle ear effusion
- **Type B, C1 and C2** : Indicators of Otitis Media with Effusion.
- Each probe thoroughly disinfected prior to re-use.
- Each Tympanogram analyzed
- Patients that had middle ear pathology; referred to E N T Department, UBTH {further evaluation and management}



METHOD



- Similar procedures, carried out on 112 control subjects (Russell International Group of Schools), matched 1:1 for age and gender.
- Data analyzed using Statistical Package for Scientific Solution version 16.
- Results presented in tables
- P value < 0.05 considered statistically significant.



RESULTS



TABLE 1: SOCIO-DEMOGRAPHICS



Age (years)	Case N (%)	Control N(%)	Total N (%)
1–5	37 (33.0)	48 (42.9)	85 (37.9)
6 – 10	25 (22.3)	23 (20.5)	48 (21.4)
11 – 15	33 (29.5)	34 (30.4)	67 (29.9)
16 – 18	17 (15.2)	7 (6.2)	24 (10.7)
Total	112 (100.0)	112 (100.0)	224 (100)

mean age = 9.69 ± 6.53 years



TABLE 2: Tympanometric findings



Variable	Cases N=224(%)	Control N=224(%)	Total N (%)
A	48 (21.4)	134 (59.8)	182 (40.6)
As	22 (9.8)	32 (14.3)	54 (12.1)
B	25 (11.2)	26 (11.6)	51(11.4)
C1	106 (47.3)	27 (12.1)	133 (29.7)
C2	23 (10.3)	5 (2.2)	28 (6.2)
Total	224(100.0)	224(100.0)	448(100.0)

P < 0.001



Table 3: Prevalence / Pattern of Middle Ear Pathology()



Variable	Case N=224(%)	Control N=224(%)	Total N=448(%)
As, B, C1, C2	176 (78.6)	90 (40.2)	266 (59.4)
OME*	154 (68.8)	58(25.9)	212 (47.3)
ETD*	129 (57.6)	32(14.3)	161(35.9)
Reduced middle ear compliance	22 (9.8)	32(14.3)	54(12.1)

Multiple interpretation*
P < 0.001.

Type B, C1 and C2 are indicators of OME.
C1 and C2 are indicators of ETD



Discussion

- Normal middle ear function: 48 (21.4%) ears of cases
134 (59.8%) ears of control
18(60%) {El-Behairy et al 2010}
.....(sample size 112; 30)

- Abnormal middle ear function: 176 (78.6%) ears of the cases
90 (40.2%) ears controls.

(statistically significant as $p < 0.001$).

52%..... El-Behairy et al

(Diagnostic criteria)

20.9%..... Ijaduola et al



Discussion

➤ Prevalence of middle ear pathology:

176 (78.6%) ears of the cases

90 (40.2%) ears controls

Otitis Media with Effusion, 154 (68.8%) ears cases,

58 (25.9%) ears control

6.7% {El-behairy et al 2010}.....(Diagnostic criteria)

15.9% {Okolugbo et al 2009}

1.2% type B, 6.8% type C {Ogisi}

18.7% and 18.2% {Ijaduola and Nwawolo}

respectively.

64.0%, developed countries. (environmental factors)



Discussion cont'd

- **Pattern** {in this study}
- Otitis Media with Effusion predominated
154 (68.8%) ears of the cases
58 (25.9%) ears of the control

Contrasted {El-behairy et al 2010}

{Amusa et al 2007} CSOM

commonest

- **(Recurrent upper respiratory tract infection)**



Discussion cont'd



- Eustachian tube dysfunction , 2nd common,
129 (57.6%) ears of the cases
32 (14.3%) ears of the control

33.33% {El-behairy 2010}

5.8% {Mwaniki Kiama 2009}

- Type C1, (-100 to -199 mmH₂O) predominated
106 (47.3%) ears of cases,
27 (12.1%) ears of the control

C2, 5%, C1, 4%; {Okolugbo et al 2009}

...sample size 112 ; 270



Conclusion



- Middle ear pathology is predominant in cerebral palsy patients {78.6% }.
- Otitis Media with Effusion is the commonest {68.8% }.
- Type C1 tympanogram predominated {47.3% }.



Recommendations

- Otorhinolaryngologists should be involved in the management of cerebral palsy patients to improve their quality of life



References



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THANKS FOR LISTENING





Appendix



- **QUESTIONNAIRE ON ASSESSMENT OF THE MIDDLE EAR FUNCTION OF CHILDREN WITH CEREBRAL PALSY IN UNIVERSITY OF BENIN TEACHING HOSPITAL**
- **A) Socio-Demographic data of Parents/ Guardian**
- Your Age in years as at last Birth day: -----
- Sex: Male { } Female { }
- Ethnic Group: Hausa { }; Ibo { }; Yoruba { }; Benin { }; Etsako { }; Esan { }; Others (specify): -----
- Occupation:
- Religion: Christianity { }, Islam { }, Traditional { }, None { }, Others (specify): ---
- Highest Educational Attainment: Primary { }; Secondary { }; Tertiary { }, None { }



Questionnaire cont'd



- Marital Status: Married { }; Single { }; Divorced { };
Widow/Widower { }; Separated { }
- Relationship to patient: Father{ }; Mother { }; Foster { }; Guardian
{ }; Others { }(specify)
- Family structure : Monogamous{ } Polygamous{ } Separated { }
- Family size: Less than 4{ } More than 4 { }
- Type of residence : Shared apartment { } Flat/self-contained { }



Questionnaire cont'd



- **B) Socio-Demographic data of patient**
-
- Age in years as at last Birth day: -----
- Sex: Male { } Female { }
- Ethnic Group: Hausa { }; Ibo { }; Yoruba{ }; Benin{ };Etsako { }; Esan { };
- Others (specify) -----

-
- Religion: Christianity { }, Islam { }, Traditional { }, None { }, Others: (specify)

- Highest Educational Attainment: Primary { }; Secondary { }; Tertiary { },
None { }
- Degree of Disability: can walk { } Can't walk { } Walk with restrictions { }
Assistive walking { }



Questionnaire cont'd



- **C) Questions on Possible pattern of any middle ear pathology present in the patient with Cerebral Palsy**
- 46) Any ear pain : Yes{ }No { }
- 47) Any fever in the presence of any ear problem: Yes { }No { }
- 48) Any history of frequent tugging of the ears: Yes { } No { }
- 49) Any feeling of water in the ears: Yes { } No { }
- 50) Does the patient scream on touching the ears Yes{ } No { }
- 51) How does the patient respond to calls: poorly{ } fair { } very well { }
- 52) Is the patient always poking hands inside the ears: Yes { }No { }
- 53) Does the child communicate with others: Yes { } No { }
- 54) Is there any visible matter inside the ears: Yes { } No { }



Questionnaire cont'd



- 55) Anything (pus, water, blood) coming out from the ears: Yes { }
No { }...specify....
- 56) Any swelling at the back of the ears: Yes { } No { }
- 57) Any pus coming out from the back of the ears: Yes { } No { }
- 58) Any convulsion following any ear problem: Yes { } No { }
- 59) Does the patient complain of Headaches in the presence of any ear problem: Yes { } No { }
- 60) Any history of neck pain or stiffness following any ear condition: Yes { } No { }



Questionnaire cont'd



- **D) Questions on possible Eustachian Tube pathology in the patient with Cerebral Palsy**
- 61) Any tickling of the ears: Yes { } No { }
- 62) Any popping of the ears or at the back of the nose: Yes { }
No { }
- 63) Any noise in the ears: Yes { } No { }
- 64) Upon yawning or chewing, any feeling of discomfort at the back of the nose: Yes { } No { }

Ethical clearance form



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PROTOCOL NUMBER: ADM/E 22/A/VOL. VII/913

PROJECT TITLE: "AN ASSESSMENT OF MIDDLE FUNCTION AMONG CHILDREN WITH CEREBRAL PALSY IN UNIVERSITY OF BENIN TEACHING HOSPITAL, EDO STATE."
EAR

PRINCIPAL INVESTIGATOR(S): DR. IMMACULATA OGECHI AKPALABA

DEPARTMENT/INSTITUTION: DEPARTMENT OF OTORHINOLARYNGOLOGY, UNIVERSITY OF BENIN TEACHING HOSPITAL, BENIN CITY, NIGERIA.

DATE CONSIDERED MAY 6th, 2013

DECISION OF THE COMMITTEE: APPROVED

REMARK:

CHAIRMAN: PROF. M.N. OKOBIA

SIGNATURE & DATE.....

[Signature] 6/5/2013

SUPERVISORS: MR. VITALIS EZEUKO, DR. IGHALO EDWIN EBHO-ORIAZE

DECLARATION BY INVESTIGATOR(S)

PROTOCOL NUMBER (please quote in all enquiries)

To be completed in four and three copies returned to the secretary, Ethics and Research committee, Clinical services and Training Division. University of Benin Teaching Hospital Benin City.

I/We fully understand the conditions under which I am/we are authorized to conduct the above mentioned research and I/We undertake to resubmit the protocol to the Ethics and Research Committee.

Signature.....

Date..... 10/05/13

[Signature]
10/5/13



CERTIFICATE OF CONSENT



I have read the above information. I had the opportunity to ask questions about it and they have been answered to my satisfaction.

(A) I consent voluntarily to take part as a Participant in this Study

(B) I do not consent to participate in this Study.

Name of Participant :.....

Signature of Participant:.....

Date:.....

Witness:

Address of Witness:.....

Researcher's signature and date:.....



WELCH-ALLYN TYMPANOMETER

