Frequency of Speech and Language Disorders in Patients with Microtia

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Abstract

The use of language is a social act used to understand and transmit meaning. There are certain pathologies that disrupt this function, such as microtia. This pathology has been associated with hearing loss in 90%. The prevalence of language disorders reported by the American Academy of Pediatrics is 3%. In Mexico, the Instituto Nacional de Estadística y Geografía reported a 9% prevalence of language disorders.

Methdos: This is a descriptive study of patients that have been diagnosed with microtia at "Dr. Manuel Gea González" General Hospital in Mexico City, Mexico.

Results: A total of 125 patients, 40% are female and 60% are male, 16.8% with bilateral microtia and 83.2% are one sided, 61.5% are right auricular deformities and 38.5% are left. A mean age of 11.9 years. We found as a non syndromic deformity in 47.2%, and associated to other diseases in 52.8%. The audiologic deficit average is 72.6 dBHL. 67.2% did not have any type of speech or language disorder, 16.8% have a phonetic problem and 16% have a phonologic problem.

Conclusions: The frequency of speech disorders in our active population is 32.8% (16.8 phonetic and 16% phonologic). The hearing threshold is 72.6 dB.

Keywords: microtia, ear, ear deformities, speech disorders, language disorders.

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1 Introduction

1.1 Definition

The use of language is a social act intended to develop, understand, and convey meaning. There are diseases that break this function. One of them is microtia, an auricular congenital malformation that affects 1 in 5,600- 8,000 live births. (1,2)

It is unilateral in up to 85-90% and more common in the right side with 5: 3: 1 ratio (right, left, and right bilateral). It is more common in men than in women with 2:1 ratio and is more prevalent in African Americans and Caucasians. It can be associated with multiple craniofacial syndromes such as Treacher Collins Franceschetti, Walter Warburg, hemifacial microsomia, Goldenhar, Townes Brocks, VACTERL, Schinzel phoomelia, Pallister-Hall, Braquiooculofacial, coxoauricular, Diamond-Blackfan Meler-Golin, Johnson, and Kippel-Feil among many others. (3)

Although it can occur with changes in the middle ear and/or ear canal, there´s no relationship between the severity of the external malformation with the function of the middle ear. It has been associated with diminished conductive hearing in up to 90% and diminished sensory hearing in 15%. (3)

1.2 Embryology

Microtia is an alteration during embryo growth due to a supression in growth of the auricular monticules. The anatomy is similar to that of 6 week embryo.

The formation of the outer and middle ear comes from the first branchial arch (mandibular) and the second branchial arch (hyoid). The ear begins to develop from the 5th week on the first branchial cleft located between the two arches, which will become the ear canal. The first arch also contributes to the formation of the tragus and the root of the helix. The rest of the ear is formed by the second arch. The middle ear bones are formed from these two arches along with the mastoid air cells and the Eustachian tube. The rest of the middle ear is formed from the first pharyngeal pouch. The tympanic membrane is formed of the first cleft.

In the beginning, the ear has a ventromedial position, which becomes more dorsolateral on the face´s medial third. The processeses of the jaw, grow and move outward and upward.

By understanding the normal embryology of this area, one can understand that an alteration in development can lead to the formation of rudimentary structures which give rise to microtia.

1.3 Clinical presentation

Microtia has multiple forms of presentation, from its most severe case, anotia, to even minor changes in the form and auricular positioning. There are several classifications of microtia. The most used in our practice is Tanzer (4) which divides this malformation in 5 categories:

1) Anotia
2) Complete hipoplasia (microtia)
    A) With atresia of the external auditory canal
    B) Without atresia of the external auditory canal
3) Hypoplasia of the middle third of the ear
4) Hypoplasia of the upper third of the ear
    A) Constricted (cup and lop) ear retracted
    B) Cryptotia
    C) Hypoplasia of the entire superior third
5) Prominent ear

The patient with microtia is at risk for hearing impairment due to structural changes in the auricular region. Auricular physiological defects can influence the way in which each individual carries out the development of language, as this language development requires the patient to have acceptable hearing. When hearing levels are altered, understanding and the expression of language is compromised.

Language is a code with which ideas about the world are represented through a conventional system of arbitrary signs. This is used for communication and for other purposes, most of which involve interaction with other people, to give and get information and achieve specific goals.

Taking the definition of what language is and how it works, we can identify three major components: content, form, and use. This vision of the 3 dimensions is essential to describe the development of language and understand the problems that arise during development. Within language development, we found that in the first 4 years of life there is an explosion of language, however this is continuously increasing and enriching throughout our lifetime. (5)

1.4 Language

Language learning is regarded as a process that involves cognitive, semantic (including linguistic and non-linguistic communication), and social development. These three aspects of development work as an indivisible and integrated system that result in the linguistic expression of content, form, and use. Therefore, the interaction allows the child to conceptualize the physical and social environment, to function as an active participant in their environment, and to integrate a linguistic code with knowledge of the world. (6)
From a practical standpoint, language is not conceived as an independent system. It is closely related to other cognitive abilities and representation and is not influenced by linguistic variables such as motivation, experience, learning and anxiety. Moreover, the language is itself an integrated system. Each of the components of language (phonology, morphology, and syntax) or each of the processes involved in the use of language (listening, speaking, or writing) are closely related. The individual components or processes can not be changed without affecting or being affected by the other components or processes. (7)
An area of language that is decisive for intelligibility is articulation. Articulation disorders can be phonetic or phonological in nature. Phonetic disorders relate to learning or incorrect anatomical and/or physiological changes. In contrast, it is considered that the phonological disorders have a linguistic basis and reflect difficulties in the organization and representation of the sound system of language. (7,8,9)
Microtia patients are at risk for phonetic disorders as a consequence of the physiological auricular deffects they present. However, these patients may also have phonological disorders over time. (10) The errors caused by low hearing are incorporated into the system of rules that is developing in the child, causing a phonological disorder. (8)

1.5 Phonology

Phonology is a broader concept than articulation and it refers to the component of language that governs how speech sounds are ordered. This concept involves the repertoire of phonemes found in language, that is, those sounds whose function is to mark a change in meaning. (9)

There are two important aspects to be taken into account. First, the child must learn a complete phonology, more complex articulation patterns associated with words, and second, the patterns found in children´s speech suggest that neither auditory discrimination and articulation are the only sources of learning or speech erros. It was considered that a cognitive and phonological processing at the central level should be included in any description of phonological acquisition.

1.6 Background

There are few published articles about speech and language disorders in patients with microtia. The prevalence of language disorders in school children published by the American Academy of Pediatrics (11) to its population is 2-3% and 3-6% of speech, this being highest in preschool up to 15%. The census of the National Institute of Statistics and Geography in Mexico (INEGI) published a prevalence of 9% of language disability among the Mexican population with an average age of 27, thus being a poorly studied health problem despite this prevalence .

The incidence of inner ear abnormalities associated with microtia is between 10-47%, and it shows that hearing levels in patients with microtia correlate with the formation of the oval and round window and the ossicular chain, and are not influenced by alterations in the middle and outer ear (12), so studying this population further into the specific services of each hospital and creating an algorithm for treatment is useful in preventing early and late complications as well as to prevent voice, language, and even psychological complications.

It is important to mark out that in the previously published articles on this topic there are no reports that specifically indicate the incidence or prevalence of speech and/or language disorders in patients with microtia.

1.7 Justification

It is important to know whether patients diagnosed with microtia, have speech and language alterations, in order to prevent latter complications and help proper interaction at an early age, thus improving the quality of life of patients and those around them.

Patients with hearing issues have three major problems: voice, speech, and psychological. Within the main problems of the voice and speech they have difficulty articulating, nasal voice, inability to master the ring and the tone of voice output, absence of language. There may also be attention defecit resulting in diminished school performance, low cognitive development, and negative impact on learning to read and write. Therefore it is important to know the frequency of speech and language disorders in patients with microtia, this being an easily reproducible study.

1.8 Problem

What is the frequency of speech and language disorders in patients with microtia?

1.9 Objectives

To determine the frequency of speech and language disorders in patients with microtia, by audiometric means, clinical assessment, and speech therapy service.

Secondary objective: know the hearing threshold of patients with microtia either unilateral or bilateral, by audiometry.

1.10 Material and Methods

1.10.1 Type of Study

Descriptive, open, observational, retrospective and prospective, Transversal.

1.10.2 Study Universe

Patients diagnosed with microtia who have been treated at the Plastic and Reconstructive Surgery Department at "Dr. Manuel Gea González " General Hospital.

1.10.3 Selection Criteria

Sample: All patients diagnosed with microtia that have been treated at the Plastic and Reconstructive Surgery Department in"Dr. Manuel Gea González " General Hospital and who have attended the outpatient clinic from January 2005 to December 2010.

Inclusion criteria

- All patients diagnosed with microtia in "Dr. Manuel Gea González" General Hospital
- All ages

Exclusion Criteria

- Patients who did not attend their consultation in the Plastic and Reconstructive Surgery Department form January 2005 to December 2010.
- Patients with microtia Tanzer V
- Incomplete medical record
- Lack of an evaluation form the Speech Therapy Department
- Lack of an audiometry

Elimination criteria

There is no exclusion criteria

1.10.4 Variables

Conceptual and Operational Definition:

1. Age: the number of completed years from their date of birth at the time evaluation.

2. Sex: genotypic gender of the patient, defined as male or female.

3. Microtia: Congenital malformation of the outer ear, which may or may not include changes in the middle and inner ear. Microtia Classification: Tanzer´s Classification used to determine the degree of auricular malformation. Which includes:

1) Anotia
2) Complete hipoplasia (microtia)
    A) With atresia of the external auditory canal
    B) Without atresia of the external auditory canal
3) Hypoplasia of the middle third of the ear
4) Hypoplasia of the upper third of the ear
    A) Constricted (cup and lop) ear retracted
    B) Cryptotia
    C) Hypoplasia of the entire superior third
5) Prominent ear

4. Uni or bilateral: refers to whether the affected ear is unique or bilateral.

5. Laterality: refers to define if the affected side is either right or left.

6. Auditory threshold: Minimum intensity or pressure required for a sound to be perceived. It is calculated by measuring the average decibels at 500, 1000 and 2000 Hz.

7. Audiometric Diagnosis: Measuring hearing a tone audiometry diagnosed patient. The result of the auditory threshold is assigned by will range: < 20 is normal, mild

20 to 40, moderate 40 to 60, severe 60 to 80, deep 80 and 100, and residual hearing >100.

8. Nasal resonance: Participation of nostrils in the resonance of the vocal tract during speech. It can be balanced what is considered normal or decreased (hyporhynophony) or increased (hyperhrhynophony).

9. Phonetic: simple alteration in the mode of articulation. On examination, one or more speech pronunciation deffects are detected.

10. Phonological: articulation disorder that involves higher aspects of language organization. In a sample of spontaneous speech, a systematic rule disorder for sound pronunciation is seen.

11. SDS Model: Model that analyzes and systematically orders alterations in the linguistic code. (Table 1)

12. Language Level: Range of chronological age in which language development occurs normally. (Table 2)

13. Speech therapy: Techniques taught to rehabilitate the cognitive and language area.

14. Hearing aid: use of a hearing aid to the magnificate sound.

15. Surgeries performed: If corrective microtia surgeries you have been performed.

16. Other conditions: If other conditions have been diagnosed aside from microtia.

1.10.5 Statistical analysis

Descriptive stadistics were used to validate the data: measures of central tendency and dispersion: median, standard deviation, and proportions.

1.10.6 Ethical considerations

All procedures are in accordance with the provisions of the Regulations of the General Law of Health in Research for Health.
Second title, Chapter I, Article 17, Section I, no risk research, doesn´t require informed consent.

2 Preliminary Results

2.1 Operative description of the study

All medical records from patients diagnosed with microtia from the Plastic and Reconstructive Surgery Department at "Dr. Manuel Gea González " General Hospital are reviewed. The active patients and those who atended a consult from January 2005 to December 2010 are identified.

Records of these patients were reviewed and epidemiological variables such as name, registration, sex, age, place of residence, date of birth, if their condition is unilateral or bilateral, laterality, and classification of microtia according to Tanzer, are obtained. The audiometry studies and the audiometric diagnosis were corroborated with the Otorhinolaryngology and Phoniatrics Departments. The notes from Phoniatry were checked to identify the type of resonance of the voice, if there were phoniatric disorders, if the patients took some form of speech therapy, if they used a hearing aid, if they had surgery, on which dates, assessments from the Genetics Department, and the presence of associated medical conditions, were also registered.

In order to evaluate language development, all patients were videotaped interacting during free play with a speech therapist trained in the procedures. A transcript of the videotape was

made and analyzed using the Situational-Semantic- Speech model. (13) This model is a tool for thinking about language and its use in an effort to organize the existing knowledge of language in a meaningful context. It is useful for a descriptive assessment, as well as to establish short and long term intervention goals. The model can be used considering each evaluation or intervention from three perspectives simultaneously interacting. First, it is necessary to examine the characteristics of the event or activity, referred in the model as the situational context. Second, the speech´s characteristics and context used during the activity must be observed. Finally, they must determine the characteristics of the concepts used to refer to language or ideas. The model referred to as the semantic context. Additionally, a phonological analysis was performed in order to know the process used by each patient and to determine if there was an alteration in this area. Each child was assigned a level at which at least 60% of their emissions could be classified accurately. Using a blind procedure, each patient was independently evaluated by two speech therapists.

3 Main Results

According to the patients studied, a total of 506 patients diagnosed with microtia were obtained from the database from "Dr. Manuel Gea González " General Hospital. Of these group, only 210 of these patients are active or go for consultation and 60% (125 patients) met the selection criteria.

With a total population of 125 patients, we found that 50 patients (40%) were female and 75 patients (60%) were male. 21 cases (16.8%) were presented as bilateral microtia and 104 (83.2%) were unilateral; of these, 64 (61.5%) were right deformities and 40 (38.5%) were left. Figures 1,2,3

The average age was 11.9 years, median of 11, minimum of 2, maximum of 50, and standard deviation of 6.98 years. Figures 1,2

According to the Tanzer classification: there are 2 type I malformations (1.36%), 130 type IIa (89.04%), 5 type IIb (3.42%), 3 type III (2.05%), 4 type IVa (2.73%), and 2 type IVc (1.36%). Figure 3

Microtia was found as an isolated malformation in 59 cases (47.2%) and associated with other pathologies in 66 patients (52.8%). Out of these, 19 cases (15.2%) had hemifacial microsomia (HFM), 7 cases (5.6%) HFM with Oculo-auriculo-vertebral spectrum (OAVS). Two of these with genitourinary tract malformations, 1 with contralateral poliotia, and 1 with syndactyly. 12 cases (9.6%) presented OAVS (one with phimosis and one with duplication of contralaeral helix); 4 cases (3.2%) of cleft lip and palate (CL/P) (1 with contralateral poliotia); 4 cases (3.2%) of HFM with CL/P, one of these with strabismus and one with Patent ductus arteriosus (PDA); 4 cases Goldenhar syndrome (1 case with CL/P, one with contralateral poliotia and one with mild autism); 3 cases (2.4%) with Treacher Collins; 1 patient (0.8%) with Moebius syndrome; 6 patients (4.8%) with bone disorder syndrome, and craniosynostosis (trigonocephaly, plagiocephaly, escafocelia, micrognathia, bilateral scoliosis and flat feet); 2 patients (1.6%) with genitourinary malformations; 1 patient (0.8%) had mental retardation; 1 patient (0.8%) presented epilepsy; 2 cases (1.6%) of motor delay. Figure 4

The average hearing loss (for every affected ear) hearing threshold was 72.6 dB H, with a standard deviation of 17.36 dB HL, median 75, minimum of 22 dB HL, and maximum 113 dBHL.

The average microtia related surgeries was 1.5 per patient, with a maximum of 7 and there were patients without surgery.

Of the total number of patients, 84 (67.2%) did not have language disorders, 21 patients (16.8%) had a phonetic disorder, and 20 patients (16%) had a phonological disorder. 43 patients (34.4%) with alterations in the SDS model. Based on the linguistic level, 11 patients (8.8%) were in group IV, which is determined with simple sentences; 114 patients (91.2%) at level V, with complex sentences. 108 patients (86.4%) presented normal nasality, 5 patients (4%) had hyponasality, and hypernasality was found in 12 patients. Figure 5

Twenty three patients (18.4%) have been afforded speech therapy and 13 (10.4%) use some type of hearing aid.

We separated our population into 2 groups, patients with unilateral microtia and those with bilateral microtia.

Patients with unilateral microtia sum 104 cases, 44 (42.3%) female and 60 (57.7%) male. 64 cases (61.5%) have right alterations and 40 cases (38.5%) are left. The average age is 11.7 years with a median of 10, minimum of 2 and maximum of 50, with a standard deviation of 7.06. Based on the Tanzer classification, there are 2 (1.92%) type I malformation, 97 (93.26%) type IIa, 2 (1.92%) type IIB, 1 (0.96%) type III, and 2 (1.92%) type IVa malformation.

Unilateral microtia was found as an isolated malformation in 49 cases (47.1%), and associated with other pathologies in 55 patients (52.9%). Of these, 17 cases (16.3%) had hemifacial microsomia, 6 (5.7%) had HFM with OAVS (2 of these with genitourinary tract malformations, 1 with contralateral poliotia and 1 with syndactyly). 12 cases (11.5%) with OAVS (one with phimosis and one with duplication of contralaeral helix). 2 cases (1.9%) of CL/P (1 with contralateral poliotia), 4 cases (3.8%) of HFM with CL/P (one of these with strabismus and one with PDA), 4 cases of Goldenhar Syndrome (1 case with CL/P, another with contralateral poliotia and one with mild autism), 4 patients (3.8%) with bone disorders and craniosynostosis (trigonocephaly, plagiocephaly, bilateral scoliosis and flat feet), 2 patients (1.9%) with genitourinary malformations, 1 case (1%) of mental retardation, 1 case (1%) of epilepsy, and 2 cases (1.9%) motor delay.

The average hearing loss in unilateral microtia (for every affected ear) hearing threshold was 75.8 dB H, with a standard deviation of 16.1 dB HL, median 78, minimum and maximum of 22dB HL 113 dBHL. It is noteworthy that bilateral hearing loss was found in 4 patients with unilateral microtia.

The average microtia related surgeries was 1.4 per patient, with a maximum of 7 and there were patients without surgery.

Of the total unilateral microtia patients, 77 (74%) didn´t have language disorders, 17 (16.4%) had phonetic disorder, and 10 patients (9.6%) had phonological disorder. 27 patients (26%) had alterations in the SDS model. Based on the linguistic level, 7 patients (6.7%) were in group IV which is determined with simple sentences and 97 patients

(93.3%) at level V with complex sentences. They found 97 (93.3%) patients with normal nasality, 2 patients (1.9%) with hyponasality and 5 (4.8%) with hypernasality.
Twelve patients (11.5%) have been afforded speech therapy and 2 (1.9%) use some type of hearing aid.

In the second group, bilateral microtia, 21 patients were included, for a total of 42 auricular malformations. 15 cases (71.4%) were male and only 6 (28.6%) were female, with an average age of 13.1 years, a median of 12, minimum age of 6, maximum of 32, and standard deviation of 6.28. Based on the Tanzer classification, 33 ears (78.575) were type IIa, 3 (7.14%) were type IIb, 2 (4.76%) type III, 2 (4.76%) type IVa, and 2 (4.76%) type IVc.
Microtia was found as isolated malformation in 10 cases (47.6%) and associated with other pathologies in 11 patients (52.4%), of these 2 cases (9.5%) had hemifacial microsomia, 1 case (4.8%) of HFM with OAVS. 2 cases (9.5%) of CL/P, 3 cases (14.3%) of Treacher Collins, 1 patient (4.8%) with Moebius syndrome, 2 patients (9.6%) with bone abnormalities and craniosynostosis (escafocelia and micrognathia) syndrome.
The average hearing loss (per ear) hearing threshold was 64.9 dB HL, with a standard deviation of 18.22 dB HL, median of 67, minimum of 23 and maximum of 108 dB HL.
The average microtia related surgeries was 2.2 per patient, with a maximum of 5 and there were patients without surgery.
Of the total of bilateral microtia patients, 7 (33.3%) did not have language disorders, 4 (19%) had phonetic disorder, and 10 patients (47.7%) had phonological. 16 (76.2%) patiens had an altered SDS model.
Based on the linguistic level, 4 (19%) patients were found in group IV which is determined with simple sentences and 17 (81%) patients at level V with complex sentences. Normal nasality was found in 11 patients (52.4%), 3 (14.3%) presented hyponasality, and 7 (33.3%) were found with hypernasality.
Eleven (52.4%) patients received speech therapy and 11 (52.4%) use some type of hearing aid.

3.1 Advantages

It is important to evaluate speech and language in patients diagnosed with microtia, to avoid latter complications and help proper interaction at an early age, thus improving the quality of life of patients and those around them.

This is an easily reproducible study.

3.1.1 Cost

The study didn´t have any cost since the patients' clinical records were taken from the archives. All of the population studied had already undergone Plastic Surgery consultation, surgical procedures, and all consultation, studies, and treatment by the Speech Therapy Service.

4 Labels of figures and tables

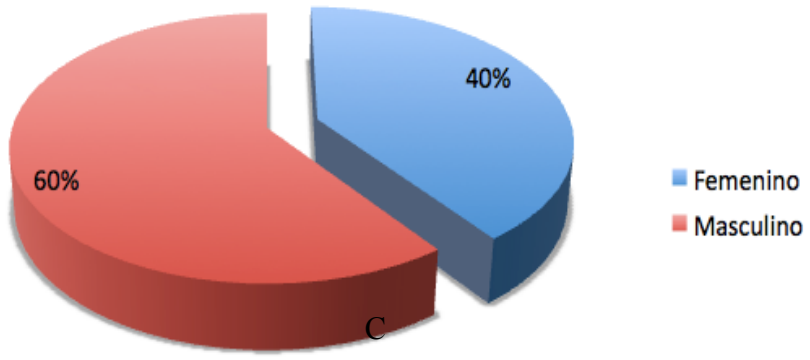

Figure 1. Gender of total study population with microtia

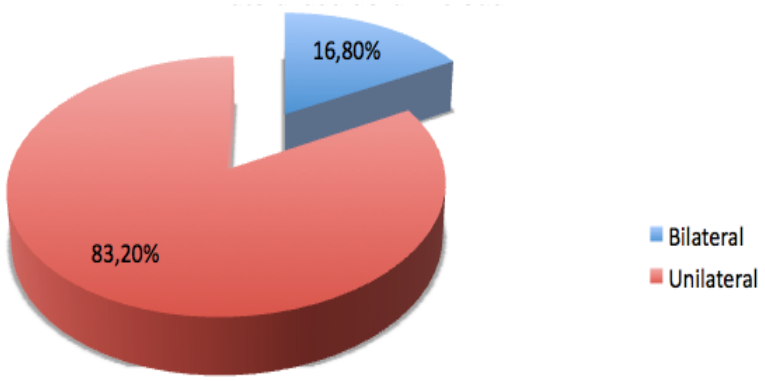

Figure 2. Laterality of microtia

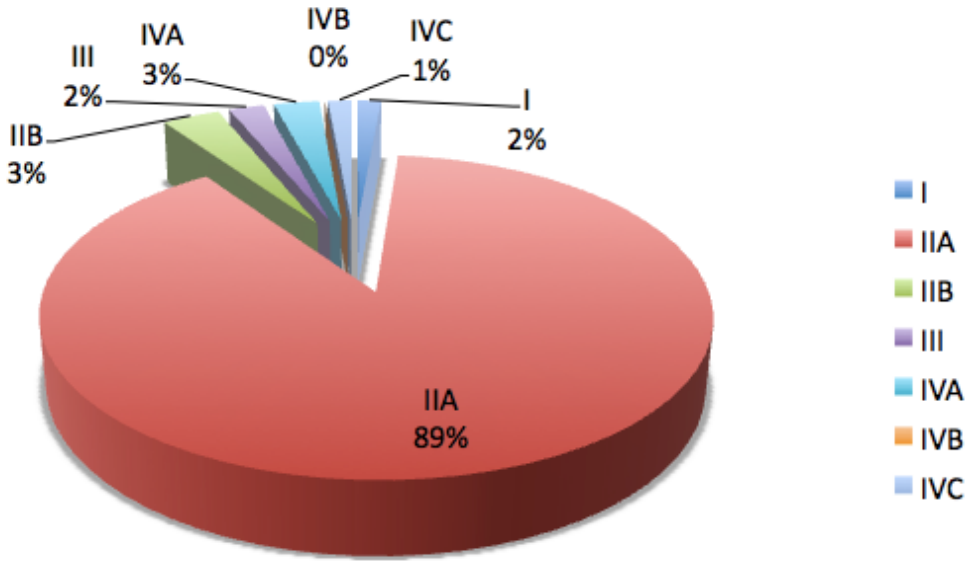

Figure 3. Tanzer classification per patient

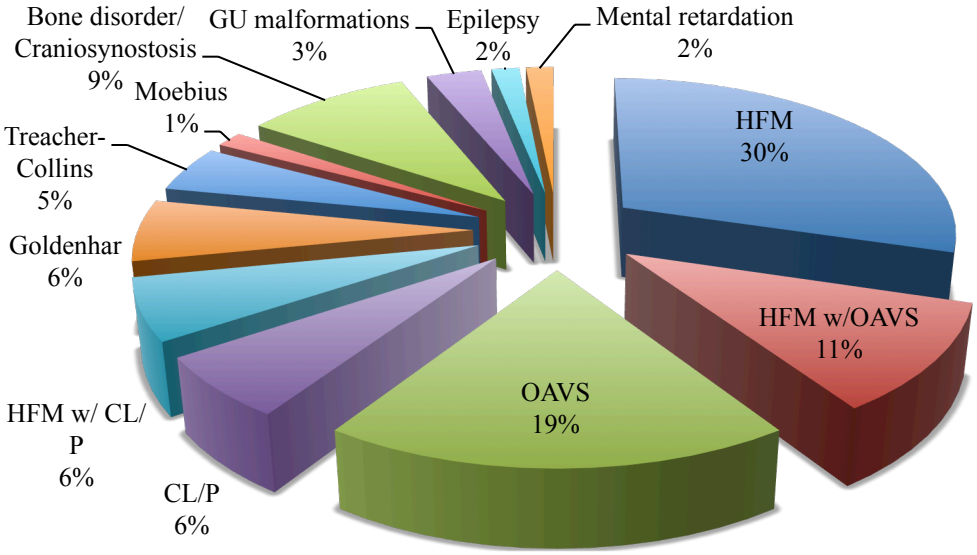

Figure 4. Pathologies associated with microtia

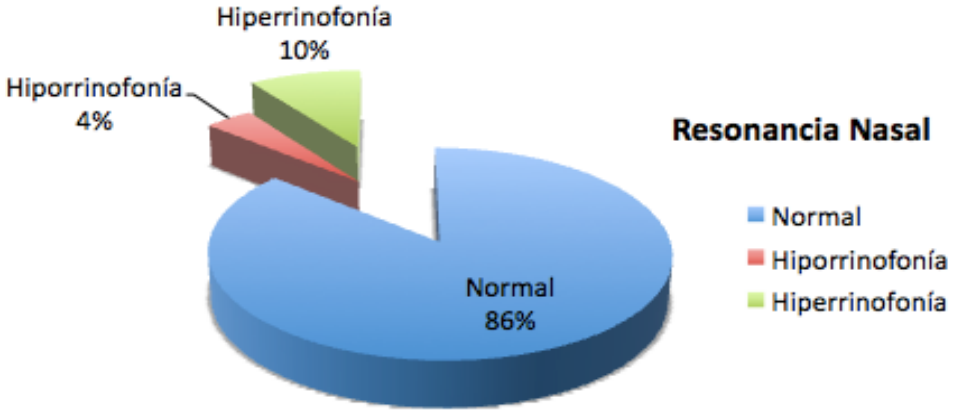

Figure 5. Nasal resonance

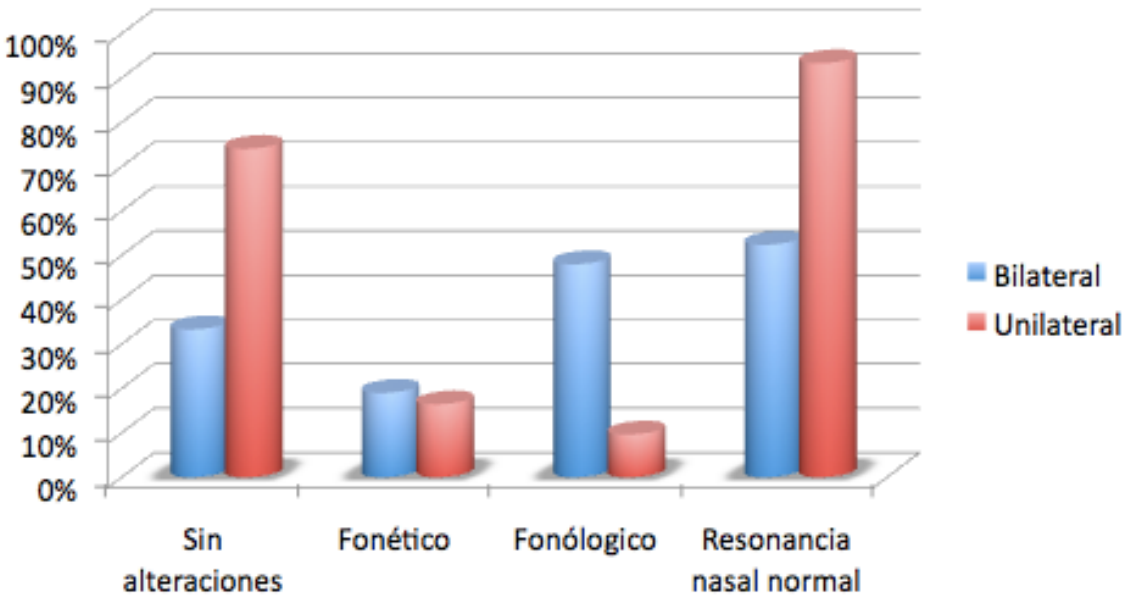

Figure 6. Conclusions of speech disorders in microtia patients

Table 1. Dependent Variables

Variable	Scale
Nasal resonance	Nominal (Yes or No)
Phonetic	Binary (Yes or No)
Phonological	Binary (Yes or No)
SDS	Binary (Yes or No)
Linguistic level	Categorical I. Prelinguistic II. One Word III. Telegraphic Language IV. Phrases or simple sentences V. Complex sentences
Speech therapy	Binary (Yes or No)

Table 2. Independent Variables

Variable	Scale
Age	Numeric (0-100 years)
Sex	Nominal (masculine, femenine)
Microtia	Categorical (I, IIa, IIb, III, IVa, IVc, V)
Uni-Bilateral	Nominal (Unilateral or Bilateral)
Laterality	Nominal (Right of Left)
Auditory threshold	Interval (0-150 db)
Audiometric Diagnosis	Categorical - Normal - Mild, moderate, severe, or deep conductive hipoacusia - Mild, moderate, severe, or deep sensorial hipoacusia -Residual hearing
Hearing aid	Binary (Yes or No)
Surgeries performed	Interval (0-100)
Other conditions	Nominal

5 Discussion

There are few published articles about speech and language disorders in patients with microtia.

The prevalence of language disorder in school children published by the American Academy of Pediatrics (11) for this population disorder is 2-3% and 3-6% of speech, this being highest in preschool up to 15%. The census of the National Institute of Statistics and Geography (INEGI) published a prevalence of 9% of language disability among the Mexican population with an average age of 27. In this study we report that the frequency of speech disorders in the population of active microtia patients in "Dr. Manuel Gea González" General Hospital is 32.8%; 16.8% of these are phonetic and 16% phonological. Thus, the frequency reported in our population is higher than that reported in the literature for patients without auricular alterations.

The incidence of abnormalities of the inner ear associated with microtia varies from 10 to 47%. This shows that hearing levels in patients with microtia correlate with the formation of the oval and round window and the ossicular chain and are not influenced by alterations in the middle and outer ear (12). In the study group analyzed in this paper, it is reported that the average hearing loss in auditory threshold was 72.6 dB H, with a standard deviation of 17.36 dB HL and 100 % of the population has some type of hearing loss either unilateral or bilateral.

We now know that patients with language disorders have early and/or delayed complications, mainly voice, speech, and psychological. These have a great impact in learning to read and write, which are essential for socialization and daily life. All these complications lead to a poor quality of life. On the other hand, patients diagnosed with microtia, due to their underlying disease, have a large percentage of structural alterations involving the middle ear and the middle and inner ear (12). If these two variables are associated with the structural alterations, the odds for the results being catastrophic for our patients are enhanced.

There are few reports in the literature that talk about the association of these two types of patients, so it is essential to know whether patients diagnosed with microtia have disorders of speech and language, to provide early and adequate therapy, so as to greatly avoid the multiple complications triggered by a deficit in language.

6 Conclusion

With this study, we could conclude that the frequency of speech disorders in the active microtia population in "Dr. Manuel Gea González" General Hospital is 32.8%, which means an increase 3 times higher compared to the prevalence of language disorder in the general population. From this finding, we can infer that microtia, even unilateral, as in most cases, can cause an increase in the frequency of speech disorder.

We found 16.8% are for phonetic disorder and 16% for phonological disorder. However, if we divide the patients with auricular alterations in unilateral and bilateral, we found that in the unilateral pathology only 26% have language disorders, 16.4% of patients present a phonetic disorder and 9.6% have some kind of phonological disorder. In contrast, in patients with bilateral pathology, we found that two thirds (66.7%) have language disorders, 19% had a phonetic disorder, and up to 47.7% have some kind of phonological disorder. Figure 6.

From these data, we can infer that bilateral microtia, which involves binaural hearing loss, affects language development much more frequently than uniaural hearing loss, which is found in most cases of unilateral microtia. However, it is important to note, that in this group, we found 4 patients with unilateral microtia who had hearing loss in the contralateral ear. These findings highlight the need for detailed and comprehensive audiological study in all cases of microtia, whether they are unilateral or bilateral.

The total population of our study was 125 patients, in which we found a male to female ratio of 3:2. The laterality ratio was Right:Left:Bilateral 3.7: 2.3 :1. According to the Tanzer classification, we conclude that the most common malformation in almost 90% is

the type IIA, which is equivalent to full hypoplasia with atresia of the external auditory canal. We also conclude that microtia is an isolated condition in 47.2% cases and is associated with other pathologies in 52.8%.

7 Perspective

This study opens the door to the study of patients with microtia, and teaches us that these patients must be handled in a multidisciplinary manner, there are things we miss as doctors and that the nature of the disease proves us otherwise. Using this study as a basis can increase the income designated to diagnosis and treatment of these patients to prevent future complications, resulting in significant savings.

This is the only study reported in patients with speech and language disorders with microtia, and the database of this institution is probably the largest in Mexico, so the window of knowledge is open to the imagination of attending physicians.

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