SPECIAL ARTICLE

Survey on the State of Otoneurology in Spain

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Received 15 November 2014; accepted 14 December 2014

KEYWORDS
Otoneurology; Neurotology; Neurotology trends; Neurotology organisation and administration

Abstract Otoneurology is a sub-specialty of otolaryngology-neurology, which has experienced extraordinary progress in the last 50 years and is currently fully consolidated in our environment. Through this study, prepared by the Otoneurology Commission of the Spanish Society of Otorhinolaryngology (SEORL), we have attempted to design an approach to provide information on what the current situation regarding the exercise in Spain is, trying to determine who practice it and where, what resources are available and what the teaching and scientific productions are.

The results obtained are generally satisfactory and reflect the strength of the exercise of otoneurology. The number of centres with otoneurology units is significant and the majority of centres that lack such a unit consider it necessary. However, there are aspects to be established, related to minimum requirements for its performance in satisfactory conditions, as well as determining future guidelines to ensure improved teaching and increased scientific production.

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Encuesta sobre la situación de la otoneurología en España

Resumen  La otoneurología es una subespecialidad de la otorrinolaringología-neurología que ha experimentado avances extraordinarios en los últimos 50 años y que en este momento se encuentra plenamente consolidada en nuestro medio.

Mediante este trabajo, elaborado por la Comisión de Otoneurología de la Sociedad Española de Otorrinolaringología (SEORL), se ha querido hacer una aproximación que aporte información sobre cuál es la situación actual en cuanto a su ejercicio en España, tratando de determinar quién la practica y dónde, con qué medios se cuenta y cuál es la actividad docente y la producción científica.

Los resultados obtenidos, en general, son satisfactorios y reflejan la solidez del ejercicio de la otoneurología. El número de centros que cuentan con Unidad de Otoneurología es significativo, y la mayor parte de centros que carecen de unidad la consideran necesaria. No obstante, quedan por establecer aspectos relacionados con los requerimientos mínimos para su ejercicio en condiciones satisfactorias, así como establecer las directrices futuras que garanticen la mejora en la docencia y el incremento en la producción científica.

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PALABRAS CLAVE
Otoneurología;
Neurotológía;
Tendencia en neurología;
Organización y administración en neurología

Introduction

Otoneurology covers a broad range of common pathologies. It originated in Ear, Nose and Throat Neurology, and was formally recognised more than 50 years ago. It studies the vestibular system and its interactions with the central and peripheral nervous systems to maintain oculocephalic coordination, balance and spatial orientation. The first otoneurological society appeared in the United States in 1963, and since then, different training programmes have emerged which, in a non-standardised way, offer instruction in this field.

In 1995, the American Council of Graduate Medical Education approved the sub-speciality of otology–otoneurology, with a common structure and content in all of its training programmes in the USA. Nevertheless, otoneurology, like other medical specialities, originated in Europe in the second half of the 19th century thanks to the development of large hospitals in the continent, such as Hospital de Salpêtrière in France, the Hospital General in Vienna or Guy’s Hospital in London.

This process is the logical outcome of increasing knowledge in the field of medical sciences. It was achieved thanks to pioneers who with few technical resources and much effort opened up the way for what are now different medical specialities and sub-specialities.

In the case of otoneurology, we have to underline the importance of Jean Pierre Flourens (1794–1867), who, surpassing the anatomical studies of the inner ear by Corti and Scarpa, and using the physiological observations of Purkinje, paid special attention to the physiology of the semicircular ducts, differentiating the vestibular and auditory functions of the inner ear.

Friedrich Leopold Goltz (1834–1902) stands out too in this line of physiological research. He postulated that the hydrostatic pressure of the endolymph played a role in the stimulation of the ampullary nerves; this research was continued by his disciple Ernest Julius Richard Ewald (1885–1921), who, after exhaustive and meticulous work, established the well-known “Ewald’s laws”, the basic pillars of vestibular physiology that, with few modifications, are still valid.

Another of the outstanding researchers who contributed to the construction of what is now otoneurology was Josef Breuer (1842–1925), a clinician and researcher who introduced the concept of receptors that respond to the force of acceleration, located in the semicircular canals.

All of the information about vestibular physiology made available before 1914 would be subsequently used by Robert Barany (1876–1936) to create the works that led him to win the Nobel Prize for Medicine in that year. His research led to the birth of modern otoneurology.

Nevertheless, among all of the precursors and founders of otoneurology as a science, the figure of Prosper Ménière (1799–1862) stands out. His work “Mémoire sur des lésions de l’oreille interne donnant lieu à des symptômes de congestion cérébrale apoplectiforme”, which was presented to the Imperial Academy of Medicine, Paris, in January 1861, means that he can be considered to be the father of otoneurology. Ménière postulated that the disease which today bears his name originated in the inner ear and not in the brain, as was then believed.

In our own country, Spain has 2 world-famous figures in the field of otoneurology, doctor Santiago Ramón y Cajal (1852–1934) and his disciple Dr. Rafael Lorente de Nó (1902–1990). Both had brilliant careers in the field of histological and physiological vestibular research, and their discoveries in this area played a fundamental role in attaining the current level of knowledge about vestibular physiology and its connections to the brain.

The period in which otoneurology may be said to have developed into an independent discipline in Spain dates from the start of the 20th century, when brilliant ear, nose and throat specialists appeared and made major contributions
to the field. These include Dr. Ricardo Botev (1855–1927),
Dr. Antonio García-Tapia (1875–1950) and most especially
Dr. Adolfo Azoy (1901–1988), who in 1948 published El Vér
tigo: Estudio Fisiopatológico, a work ahead of its time and
the first book in Spanish to be completely devoted to this
material. 6,12

More recently, special mention should be made of Dr.
Vicente Honrubia (1934), whose clinical and research
career mainly took place in the UCLA School of Medicine
in the United States, as well as Dr. César Gavilán Alonso
(1929–2004), Dr. Miguel Ciges Juan (1933) and Dr. Juan
Bartual Pastor (1937) (Fig. 1). 13 Dr. Bartual is the otorhi
nolaryngologist who has contributed the most to the
development of otoneurology in Spain over the recent years.
Due to his intense scientific and research work, as well as his
organisation of many congresses in this field and active par
ticipation in the same, together with his fundamental books
on the subject, he has been and will be an example for all
specialists with a vocation for otoneurology.

His legacy is now being continued by many of the neuro
logists he helped to train, ensuring that this speciality will
remain in good health in the future.

The Aim of This Study

The overall aim of this study is to examine the current situa
tion of otoneurology within the Spanish Sistema Nacional
de Salud (SNS) (National Health System).

Methods

This is a descriptive and qualitative study. Information was
obtained by means of a survey sent using the mailing list
of the Sociedad Española de Otorrinolaringología (SEORL) to
all the Heads of Department or otherwise, the Section Heads
of SNS hospitals and centres that work with them.

The survey was anonymous and contained 23 multiple-
choice (Appendix A) questions, which for statistical purposes
were transformed into 66 variables. It was sent out on 24 May
2013, and replies had to be sent in within 30 days.

The questionnaire structure aimed to investigate specific
aspects of the practice of otoneurology in Spain, with special
emphasis on the following points:

- Who practices it, and where (questions 1–6).
- How is it practiced (questions 7, 9, and 11).
- The resources it uses (questions 8, 10, 12, and 13).
- Teaching activity (questions 14–17).
- Scientific production (questions 18–23).

The replies were received using Google Docs by an on-line
link, which in turn transformed them into an Excel database.
From here they were checked one by one and then sent to
the SPSS v17 statistical programme for processing.

All of the surveys that may have been duplicated were
eliminated. The criterion for duplication was that 2 surveys
were exactly the same and had been sent in at least 1 min
apart. This is because the same survey may have been sent
in twice by accident. Neither were those surveys which con
tained less than 80% of the required information taken into
account.

A total of 115 questionnaires were received, of which 10
were eliminated, 2 due to the suspicion of duplication and
8 because they contained less than 80% of the requested
information. Finally the information contained in 105 ques
tionnaires was used.

Results

The answers given by different types of hospitals, according
to their size, were homogeneous (Fig. 2). More than half of
them (60) were university hospitals.

Fifty-nine of the hospitals that answered the survey have
an otoneurology unit, although only they are only recognised
as such within the organisational chart of the hospital in 34
of these. Of the university hospitals, 68% have a unit.

When the hospitals with no otoneurology were asked
whether they considered one to be necessary, in 70% of cases
(33 of the 45 hospitals that do not have an otoneurology
unit), it was considered to be either necessary or very nec
essary (24 and 9 hospitals, respectively). The need for an
otoneurology unit increased proportionally to hospital size;
thus 30% of the hospitals with 200 or fewer beds did not
consider one to be necessary, while this percentage fell to 5% in hospitals with more than 800 beds.

Of the 12 hospitals that do not have a unit and do not consider one to be necessary, 11 have fewer than 400 beds.

Regarding the number of specialists who work in the otoneurology surgery, 2 specialists do so in the majority of hospitals (Fig. 3). The larger the hospital, the higher the number of specialists who work there.

The majority of the work involved in this sub-speciality covers vestibular pathology and hearing loss in adults, while only half of the hospitals work in the field of paediatric hearing loss (Fig. 4).

Of the equipment used, videoystagmography is the most common vestibular examination instrument in the hospitals that answered the survey. It is followed, in order of frequency, by cervical myogenic evoked vestibular potentials, dynamic posturography and static posturography (Fig. 5). Other resources, such as Semont’s manoeuvre, electrocochleograph or the self-rotating vestibular test, are used in very few hospitals (Fig. 6).

Instrumental vestibular rehabilitation is only used in 30 hospitals, i.e., in only half of those which have an otoneurology unit. A dynamic platform is used for this in 20 hospitals, while 12 use a static platform. Only 7 hospitals use Semont’s manoeuvre (Fig. 7). It should be underlined that only 7 hospitals have a rehabilitator, while 5 have a physiotherapist.

The time spent with each patient is most often from 5 to 20 min, while the duration mentioned most frequently in different hospitals is from 11 to 15 min (Fig. 8).

In almost half of the hospitals, assistance is provided by a technical assistant, and in a quarter of them, by an auxiliary nurse; there are practically no psychologists or psychiatrists within the unit, as the unit has the aid of a psychiatrist in only 2 hospitals, while 2 are aided by a psychologist.

Respecting teaching work in the field of otoneurology, 40 of the hospitals which answered the survey train interns in otorhinolaryngology. The time spent in the unit by interns is shown in Fig. 9. In 10 hospitals, the interns do not rotate
through otoneurology, as rotation there is simply through otology–otoneurology. Of these 40 hospitals, 32 (80%) have an otoneurology unit.

Finally, the data on scientific production with the field of otoneurology are shown in Tables 1 and 2. In half or more of the hospitals that answered the survey, no papers or publications have been presented in Spain in the last 3 years. An even higher percentage of the hospitals answered in the negative when they were asked about international studies. On the other hand, only 11% of the hospitals had mentored a doctoral thesis or undertaken research work in connection with otoneurology during the last 3 years.

Discussion

The most important qualities in a survey are reliability and validity. Reliability measures the capacity of an instrument to supply consistent measurements, i.e., results that are similar when it is used by different researchers or by the same researcher for the same subjects. Validity refers to the capacity of a questionnaire to measure the material for which it was designed.14

In our case and due to the nature of the survey, it is to be expected that the resulting data will be valid; nevertheless, its reliability would have to be studied by using a specially designed additional test or other instruments parallel to the survey. The data obtained in this survey have therefore to be accepted with caution.

Nevertheless, and in spite of the fact that this is a qualitative study, some data indicate that the information obtained by it should be taken into account.

Firstly, a large number of replies were received. According to the National Catalogue of Hospitals for the year 2013,15 in December 2012 there were 255 hospitals in the SNS; in this survey, we received valid replies from 105 hospitals, so that we can conclude that replies were received from approximately 40% of SNS hospitals.

On the other hand, in 2012 there were 68 hospitals accredited for teaching interns in otolaryngology,16 of which 40 took our survey. This means that information was obtained from 59% of the hospitals which teach otolaryngology at postgraduate level.

We therefore consider the information obtained and presented here to be relevant. We would like to underline the following points:

- More than half of the hospitals which answered the survey (59 hospitals) have an otoneurology unit, although only half of them are recognised within the hospital organisational chart.

![Figure 8](image1.png) Time spent in an otoneurological visit (first visit).

![Figure 9](image2.png) Rotation times of interns in otoneurology in 37 of the 40 hospitals that have an otolaryngology training programme.

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<th>Table 1</th>
<th>Publications and Communications in Connection With Otoneurology in the Last 3 Years.</th>
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The majority of hospitals without an otoneurology unit believe one to be necessary (72% of the hospitals which have no otoneurology unit consider one to be necessary or very necessary).

- The item of technical equipment used the most in these units is, outstandingly, the videoystagmograph.
- Only half of the hospitals with the potential capacity to offer instrumental vestibular rehabilitation do so.
- In more than 30% of the hospitals, the average time spent with patients who consult is from 11 to 15 min.
- The time spent by interns in otoneurology is usually from 1 to 3 months.
- 80% of the hospitals with a training programme for interns in otorhinolaryngology have an otoneurology unit.
- There is generally very little scientific production, and it is concentrated in a very small number of specific hospitals.

Based on the analysis of this information, we are able to confirm that otoneurology is a consolidated sub-speciality in our country. This was to be expected, given the high prevalence and in many cases the complexity of the pathology they cover, as these lead to its being studied in units with accumulated experience in diseases of this type.

In fact, the creation of units specifically for this field was generally considered to be highly recommendable. Debate is still required on where they should be and the minimum human and material resources that they would require. Although these criteria are necessary, they are yet to be determined. These questions will have to be analysed in the future by the Otoneurology Commission.

We believe that in the centres where certain members of staff work exclusively in this field, this should be recognised within the organisational chart of the ear, nose and throat service or section, as well as the chart of the hospital itself. This would ensure they receive proper support to allow them to work in the best possible way; this support runs from granting the necessary time for them to see otoneurological patients (at least 30 min for their first visit and 15 min for check-ups), to a minimum supply of technical and human resources.

One of the most frequent problems is probably the lack of sufficient staff and time to attend to a complex and growing group of patients. This eventually finds expression in the incapacity to perform other parallel activities such as keeping proper records of information, designing personalised programmes for vestibular rehabilitation or offering clinical check-ups for patients. In turn, this situation probably also leads to the lack of scientific work or research projects, both of which, as was shown, should be encouraged.

On the other hand, in spite of the fact that in all of the teaching hospitals the interns rotate through the otoneurology unit (or the otology-otoneurology unit in those hospitals where both fields are covered without distinction), the time they spend seems to us to be insufficient, given that the majority only spend 3 months here during their whole internship. This period is clearly very short if the prevalence and complexity of this pathology is taken into account, as well as the large number of instrumental studies which future specialists have to learn.

Following this first step to discover the current state of things within the field of otoneurology, the Otoneurology Commission of the SEORL intends, with the support of all the specialists who work in this field, to establish general guidelines for specific aspects. These include the minimum conditions that a unit must have to be considered as such, obtaining formal recognition of the speciality, recommending minimum times for seeing these patients to the administration, recommending the training time that interns should spend on otoneurology, and continuing to seek ways of increasing scientific production within this field.

Conclusions

This survey confirms that otoneurology is a consolidate sub-speciality in our country. In fact, the majority of hospitals that lack an otoneurology unit consider one to be necessary.

Specific aspects in connection with planning the work of otoneurology in the future have yet to be determined. These include setting minimum times for patient visits, deciding on the criteria for hospitals which should have a unit, or stipulating the minimum human and material resources which such units must have.

It is also recommendable to improve teaching structure and promote scientific production.

We hope that the information included in this study will be used as the starting point in undertaking these important tasks.

Conflict of Interests

The authors declare that they have no conflict of interests.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.otoeng.2014.12.001.

References

EDITORIAL COMMENTARY

Commentary: “Survey on the State of otoneurology in Spain”

Comentario editorial: “Encuesta sobre la situación de la Otoneurología en España”

Dear Colleagues,

From the first, the Otoneurology Commission set itself the challenge of undertaking a study to discover how Otoneurology is practiced in our country. Finally, and after months of work, we can present the results in one of the papers in this edition of the Journal of our society. These findings are a cause for satisfaction for the members of the commission and for all Spanish otoneurologists. We were aware of the great rise in Otoneurology in Spain over recent years, due to the number of courses taught throughout our country and due to the influx of colleagues, especially young ones, which we saw in the Otoneurological sessions and courses in the National Congress of the SEORL.

Two key points must be kept in mind if we are to understand the current situation and plan for the future: how we have got to where we are, and what it is that currently arouses interest in this field of medicine. The first point covers the pillars and individuals on which our history is built. Although until recently there was no general interest in Otoneurology, it cannot be denied that those individuals who worked in the field achieved great worth and recognition. You only have to mention Santiago Ramón y Cajal, Rafael Lorente de No, Ricardo Botey, Antonio García-Tapia, Adolfo Azoy, César Gavilán Alonso, Miguel Ciges Juan, Juan BARRANTPastor and Vicente Honrubia López, among others. They kept the flame of Otoneurology alight, thanks to the tremendous quality of their papers and scientific research, as well as their great teaching ability.

Regarding the second point, although special attention has always been paid to problems that affect a large part of the population, recently this has come to occupy an outstanding position. More specifically, the pathology that Otoneurology focuses on, dizziness, vertigo and lack of balance, affects a great many people and leads to a large number of visits and medical and social costs. These may be the reasons, together with recent fascinating technical advances, that interest in the speciality has grown so much.

To practice Otoneurology knowledge is required of vestibular and auditory anatomy and physiology, together with grounding in Neurology and expertise in Pharmacology and the new technologies which are continuously arising in the field of diagnosis as well as treatment. This means that any ENT specialist who wishes to practice Otoneurology has to spend hours studying it and practicing beside an expert colleague. Due to this reason it may be thought, as is expressed in the study we present, that technical and human resources should be dedicated to this speciality within the organisation of the ENT Department and the hospital itself. Otoneurology is a consolidated sub-speciality in our country. In fact, the majority of hospitals that lack an Otoneurology Unit consider one to be necessary.

See related content at doi: http://dx.doi.org/10.1016/j.otoeng2014.12.001