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Tumarkin's Otolithic Crisis: Role of the Corticothérapie in Support

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Abstract

Patients with the disease Meniere can present crises of Tumarkin consisting of the sudden drop to the ground without a prodrome prior to or loss of consciousness, lasting a few seconds. The diagnosis is clinical and based on the typical description of the patient. The treatment of the crisis of Tumarkin is still a subject of discussion. We report 3 cases of Tumarkin crisis in three patients followed in our department for Meniere's disease, whose diagnosis of otolithic Tumarkin crisis was made by the description of each of sudden falls to the ground without prodrome or loss of consciousness beforehand, for a few seconds and comforted by vestibular explorations (VHIT and caloric tests) deficient at low frequencies and normal at high frequencies. All patients received an installation of a tympanic aerator with injection of corticosteroids. The follow-up after injection was carried out for at least 2 years, marked by the improvement of the balance, the disappearance of the symptoms of Menière's disease with absence of recurrence of the Tumarkin crisis for the three. The injection transtympanic of corticosteroide promises to be a conservative treatment of first intention for the crisis of Tumarkin related to the disease of Ménière since the steroid has no toxicity to the inner ear.

Subject Areas

Clinical Medicine

Keywords

Tumarkin's Otolithic Crisis, Meniere's Disease, Treatment, Transtympanic Corticosteroid, Drop Attacks, Vertigo

1. Introduction

The disease ménière's is a specific condition of the inner ear in which the diagnosis

rests on the presence of clinical symptoms cochléo-vestibular described for the first time by Prosper Meniere in 1861 [1]. It is characterized by the association of a hearing loss that is fluctuating affecting typically the low and medium frequencies, crises, dizzy with signs of autonomic marked, and tinnitus, or a feeling of fullness of the ear [2]. These symptoms evolve through crisis, more or less intense, and more or less frequent. The etiopathogenesis of this disease remains poorly elucidated, but the role of changes in pressure of the liquid labyrinthine, defining the hydrops endolymphatic, is the most likely [3]. In some cases, patients may experience falls brutal, sudden, and without prodromes. This is what has been described by Alex Tumarkin in 1936, in his article "The disaster otolithique, a new syndrome" [4]. It is sensations brutal thrusts linear, dropping the patient, occurring without foundations and without a triggering factor, and which is not accompanied by loss of consciousness, and may, however, be the cause of injuries or fractures as they were brutal [5]. The crises of Tumarkin are brief, lasting less than 1 minute. They often occur at a final stage of the affection, and are interested in 6% to 10% of patients' carriers of the disease Meniere [6] [7]. The crisis otolithique of Tumarkin is a symptom, not a disease entity. Its occurrence guides regularly the treatment to the options in the spirit of the potential severity of some of the falls.

The objective of our work is to put the focus on the crises of Tumarkin by studying the clinical, paraclinical and therapeutic aspects of clinical cases of three patients with known carriers of the disease Meniere defined, collected at the Department of Otorhinolaryngology and Maxillofacial Surgery of the Military Hospital of Instruction Mohammed V of Rabat.

2. Results

Observation 1:

It is a 57-year-old patient without pathological antecedents noticeable outside that it is followed in our department since 2017 to recurrent attacks of dizziness rotary with tinnitus and hearing loss, fluctuating at the level of the right ear. The diagnosis of ménière's right to been selected on the criteria of clinical and comforted by the highlighting to tone audiometry opening just after one of his attacks, a sensorineural hearing loss, unilateral, right side (**Figure 1**) more marked on the bass frequencies.

The exploration vestibular by Vidéonystagmogrpahie (VNG) has highlighted a deficit ductal right to 68% in the tests calorie bithermales (**Figure 2**). The Video-Head Impulse Test (VHIT) has shown gains of the RVO on the 6 semicircular canals (**Figure 3**).

The patient was put under Bétahistine at a dose of 48 mg per day in 2 divided doses, with a sodium-reduced diet. 4 months after the last crisis typical, the patient was reported to have made 3 falls for the past 3 weeks, occurring without prodromes usual (tinnitus, feeling of fullness of the ear or hearing loss), no signs of vegetative and without loss of consciousness. The patient reports that during the fall that lasts for a few seconds, he had the impression that it is projected by the

earth. The neurological examination is normal. A cerebral magnetic resonance imaging was requested that came back normal.

The diagnosis of a crisis of Tumarkin has been selected. The patient has received an establishment of an aerator transtympanique with injection of Dexamethasone (4 mg/mL), in through the aerator, once per day for 3 successive days. The follow-up 3 years after these injections has been marked by the improvement in its balance, the disappearance of the crisis dizzying and especially by the absence of recurrence of the crisis of Tumarkin.

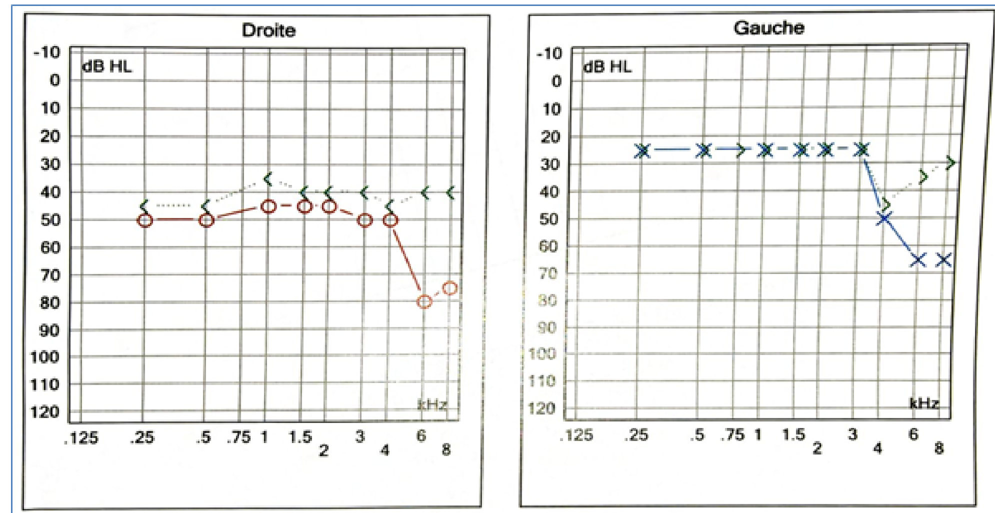


Figure 1. The audiogram of the patient 1 objective a sensorineural hearing loss average on the right (ENT Service and CCF-HMIMV).

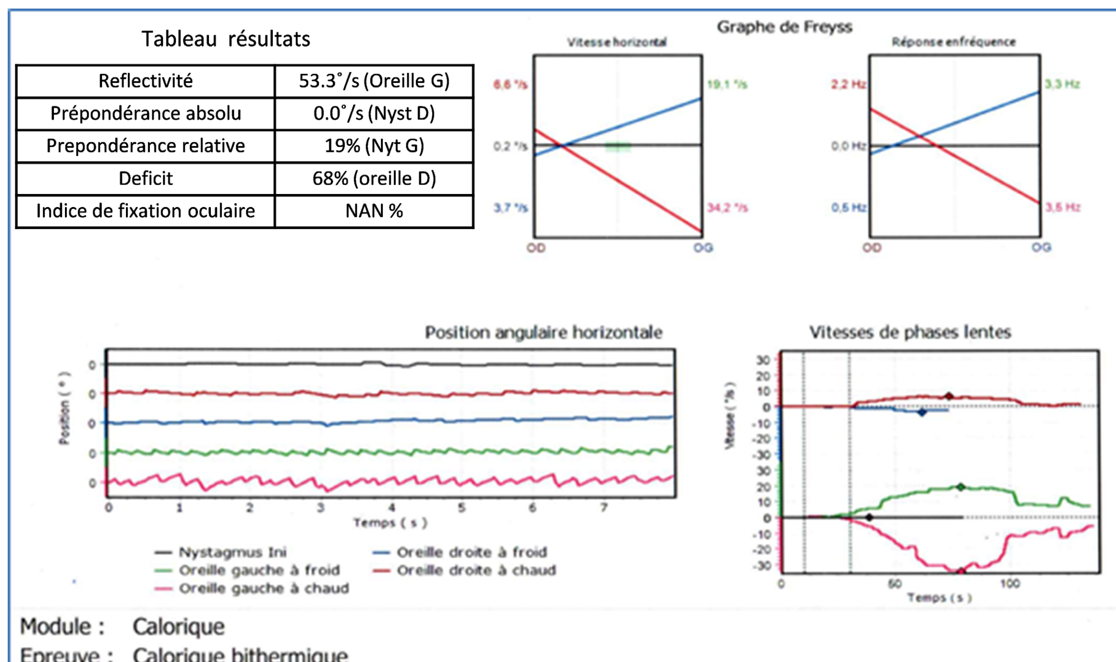
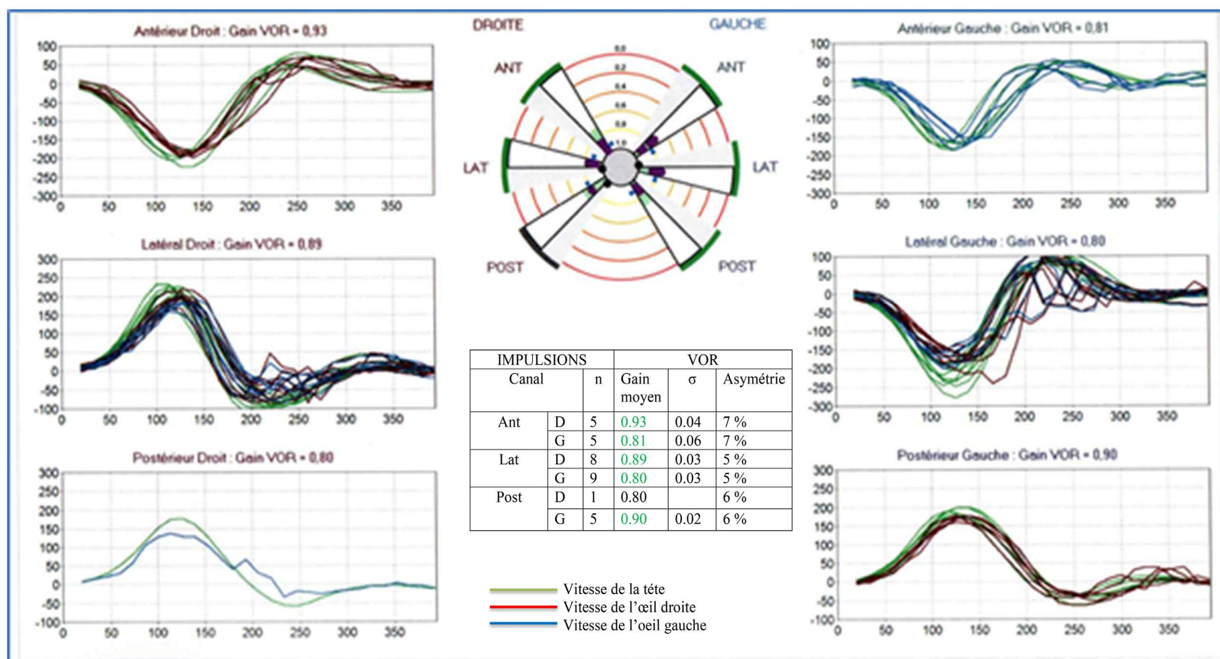


Figure 2. Tests-calorie bithermales of patient 1 showing a deficit ductal right to 68% (ENT Service and CCF-HMIMV).



IMPULSIONS			VOR		
Canal		n	Gain moyen	σ	Asymétrie
Ant	D	5	0.93	0.04	7 %
	G	5	0.81	0.06	7 %
Lat	D	8	0.89	0.03	5 %
	G	9	0.80	0.03	5 %
Post	D	1	0.80		6 %
	G	5	0.90	0.02	6 %

Figure 3. The gains of the RVO of 6 SCC normal on the VHIT (ENT Service and CCF-HMIMV).

Observation 2:

He is a patient of 64 years, followed in our department since 2016 for disease ménière's right with attacks of vertigo rotary accompanied by tinnitus and hearing loss, to the right (**Figure 4**). The patient was under Bétahistine 24 mg 2 times per day. His explorations of the vestibular showed a deficit ductal law of 26% in the tests (**Figure 5**) caloric bithermales and gains of RVO normal on the 6 semicircular canals (**Figure 6**).

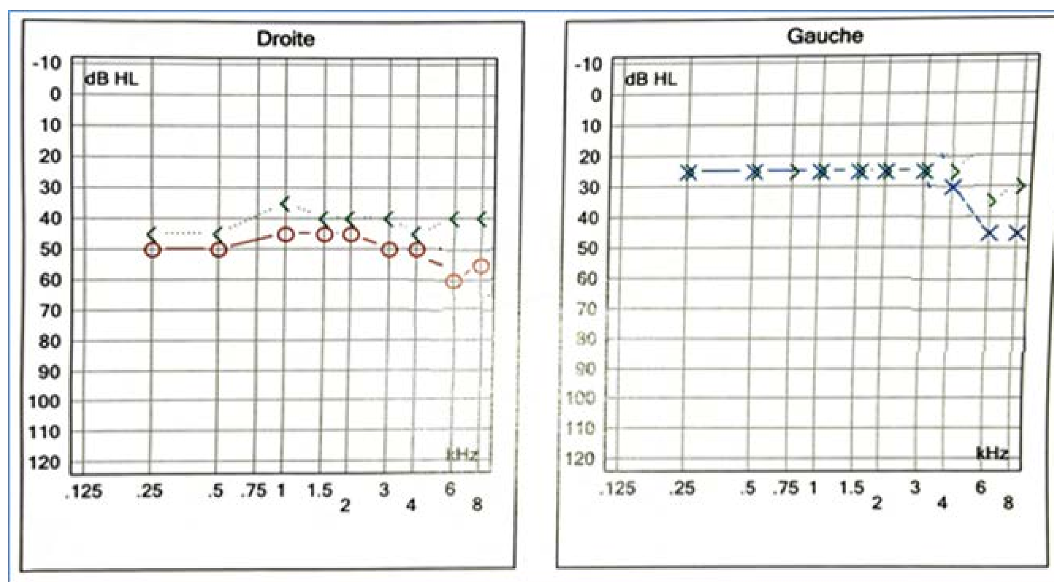


Figure 4. The audiogram of the patient 2 objective a sensorineural hearing loss average on the right (ENT Service and CCF-HMIMV).

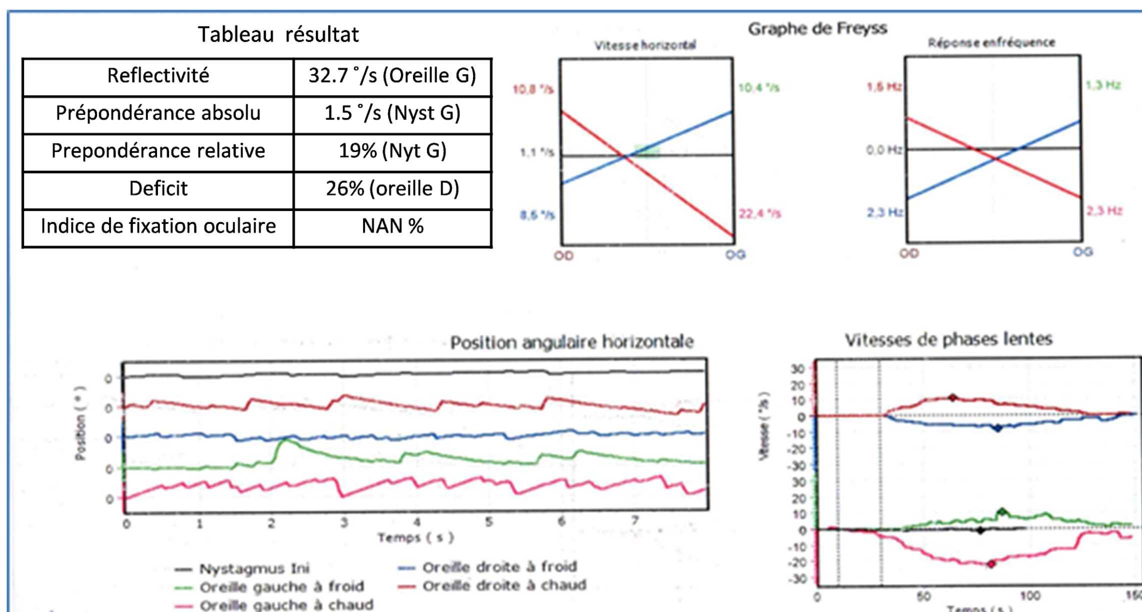
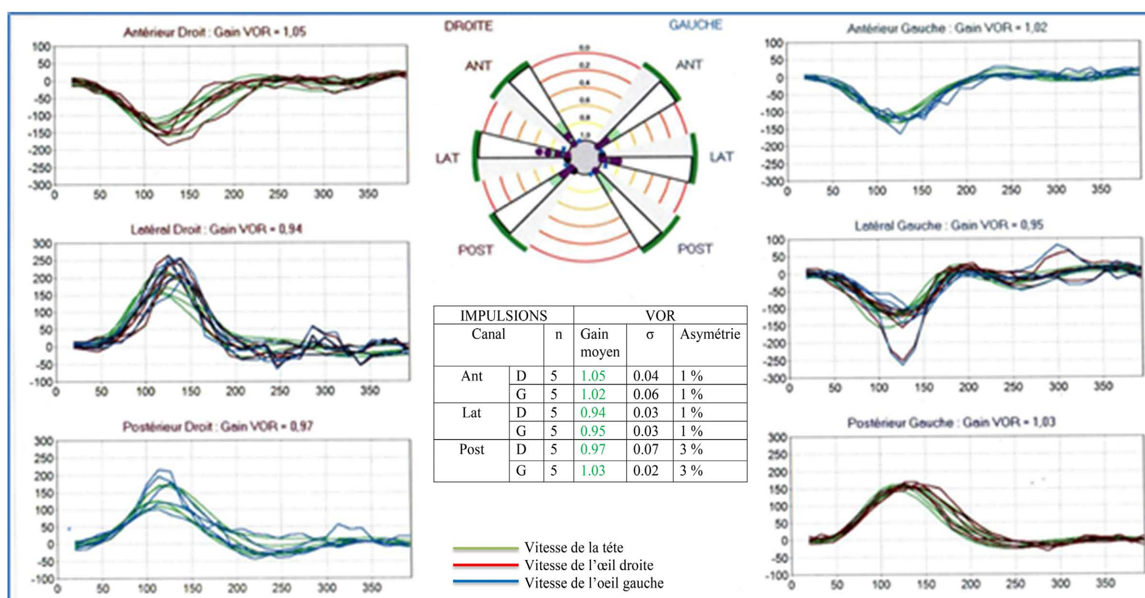


Tableau résultat

Reflectivité	32.7 ˚/s (Oreille G)
Prépondérance absolu	1.5 ˚/s (Nyst G)
Prepondérance relative	19% (Nyt G)
Deficit	26% (oreille D)
Indice de fixation oculaire	NAN %

Figure 5. The trials of calories bithermales of patient 2 showing a deficit ductal law of 26% (ENT Service and CCF-HMIMV).



IMPULSIONS			VOR		
Canal		n	Gain moyen	σ	Asymétrie
Ant	D	5	1.05	0.04	1 %
	G	5	1.02	0.06	1 %
Lat	D	5	0.94	0.03	1 %
	G	5	0.95	0.03	1 %
Post	D	5	0.97	0.07	3 %
	G	5	1.03	0.02	3 %

Figure 6. The gains of the RVO of 6 SCC normal on the VHIT (ENT Service and CCF-HMIMV).

In 2021, following a domestic dispute, it is submitted to the service with an emphasis of his dizziness and instability marked. It describes a sensation of sudden be thrown forward, so that she was sitting on a chair, inducing a fall, with no signs of hearing or vegetative, corresponding to a crisis otolithique of Tumarkin. A cerebral magnetic resonance imaging was requested, which was normal.

The patient has received an establishment of an aerator transtympanique and injections of dexamethasone (4 mg/mL) once daily for 3 successive days.

The follow-up after injection was made about 2 years ago, marked by the

improvement of balance, the disappearance of vertigo, and the absence of recurrence of the crisis of Tumarkin.

Observation 3:

He is a patient of 68 years follow-up in our department since 2020 for disease ménière's left with attacks of vertigo rotary accompanied by tinnitus and hearing loss in the left (Figure 7), it was under Bétahistine 24 mg 2 times per day. His explorations of the vestibular showed a deficit ductal left of 44% in the tests calorie bithermales (Figure 8) and gains of RVO normal on the 6 semicircular canals (Figure 9).

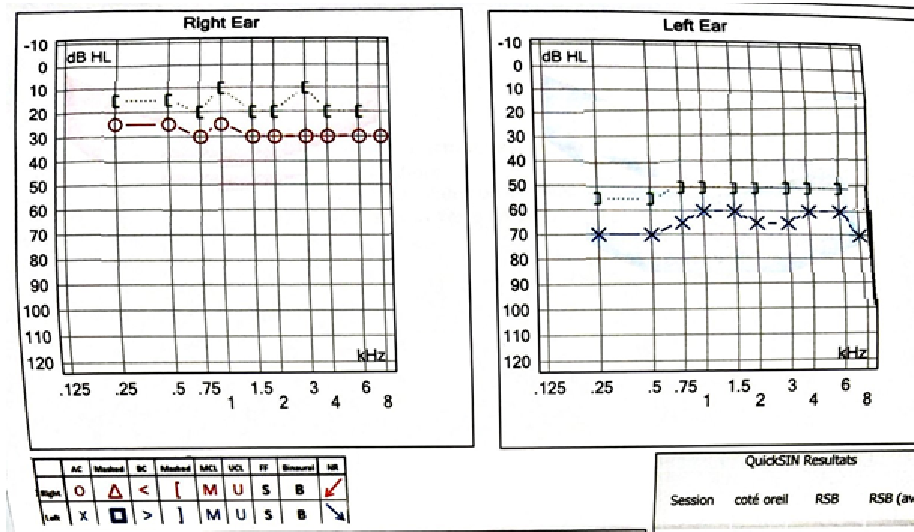


Figure 7. The audiogram of the patient 3 objective a sensorineural hearing loss average to the left (ENT Service and CCF-HMIMV).

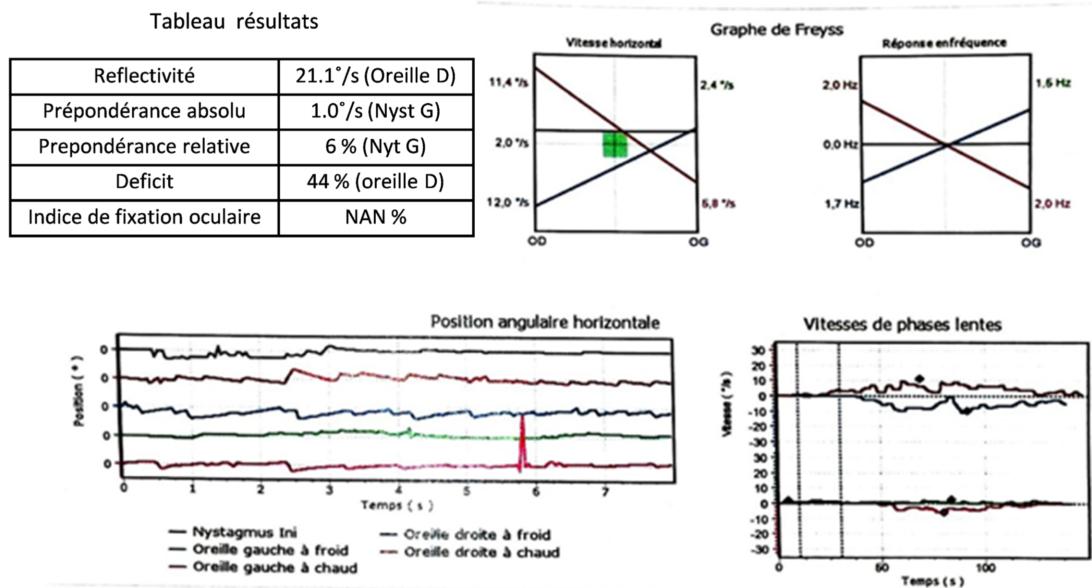
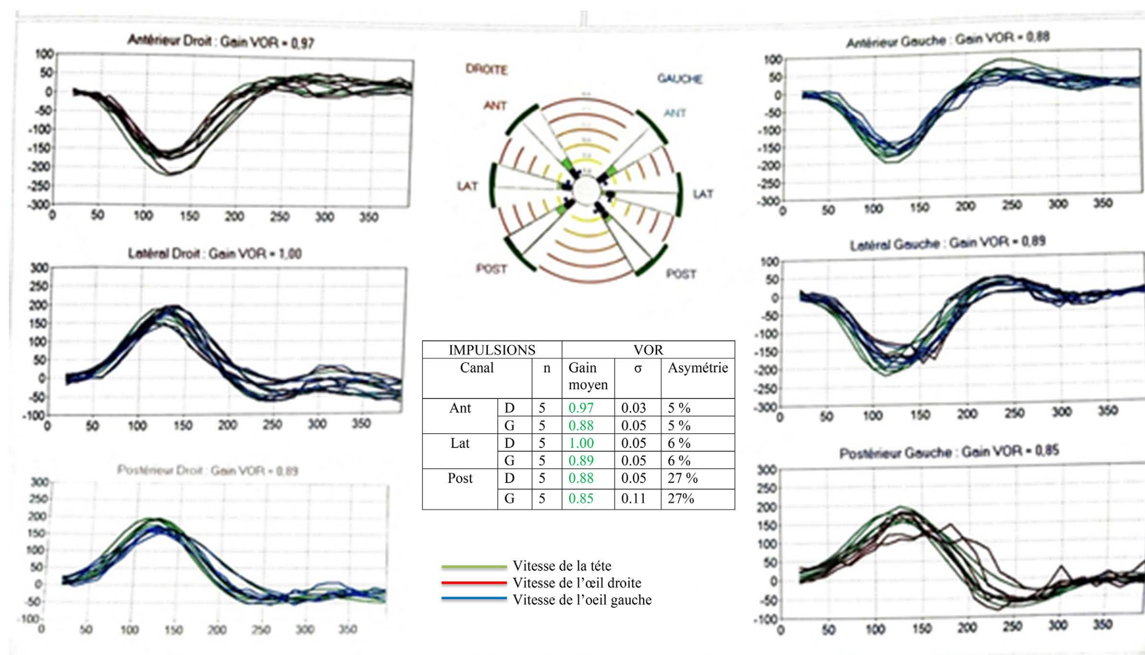


Tableau résultats

Reflectivité	21.1˚/s (Oreille D)
Prépondérance absolu	1.0˚/s (Nyst G)
Prepondérance relative	6 % (Nyt G)
Deficit	44 % (oreille D)
Indice de fixation oculaire	NAN %

Figure 8. The trials calorie bithermales of patient 3 showing a deficit ductal law of 44% (ENT Service and CCF-HMIMV).



IMPULSIONS			VOR		
Canal		n	Gain moyen	σ	Asymétrie
Ant	D	5	0.97	0.03	5 %
	G	5	0.88	0.05	5 %
Lat	D	5	1.00	0.05	6 %
	G	5	0.89	0.05	6 %
Post	D	5	0.88	0.05	27 %
	G	5	0.85	0.11	27%

Figure 9. The gains of the RVO of 6 SCC normal on the VHIT (ENT Service and CCF-HMIMV).

In 2021, it is submitted to the service with an emphasis of his dizziness and instability marked, it describes a feeling sudden to be projected to the front, leading to a fall, with no signs of hearing or vegetative, corresponding to a crisis otolithique of Tumarkin. A cerebral magnetic resonance imaging was requested, which was normal.

The patient has received an establishment of an aerator transtympanique and injections of dexamethasone (4 mg/mL) once daily for 3 successive days.

The follow-up after injection was made about 2 years ago, marked by the improvement of balance, the disappearance of vertigo, and the absence of recurrence of the crisis of Tumarkin.

3. Discussion

Tumarkin's otolithic crisis is an otological emergency and requires prompt and comprehensive treatment. The exact mechanism of Tumarkin's otolithic crisis is still unknown. However, in patients with Meniere's disease and endolymphatic hyrops, Tumarkin's otolithic crisis can result from a sudden mechanical deformation of the otolithic membrane due to an increased pressure gradient in the inner ear, which leads to a reflex vestibulo-spinal loss of postural tone [7].

A significantly higher incidence of otolithic membrane damage has been pathologically proven in patients with Tumarkin's otolithic crisis (AD) caused by Meniere's disease (MD) and delayed endolymphatic hyrops (DEH) than in their counterparts without of endolymphatic hyrops [8].

Therefore, we assume that the transtympanic dexamethasone injection (ITD) could work on the DA linked to MD or DEH by lowering the high pressure gradients in the inner ear and subsequently improving the mechanical deformation

of the otolithic membranes. It is well known that endolymphatic hydrops is related to impaired water transport, such as an increase in endolymph secretion and/or a decrease in endolymph reabsorption.

The aquaporins (AQP) are a family of proteins of the water channels, allowing the transmembrane transport of water, and are omnipresent in different types of cells of the inner ear.

A recent study detected the presence of AQP3 in the human utricle and discovered that dexamethasone could promote water reabsorption by upregulating the expression of AQP3 [9].

Based on the results, we are led to assume that the effect of ITD on DA linked to MD and DEH could be explained by the fact that dexamethasone promotes endolymphatic reabsorption of water.

Recently, ITD is considered as an alternative to transtympanic gentamicin injection due to its ototoxicity and surgical methods such as labyrinthectomy and vestibular neurectomy [10].

A recent retrospective study, on 150 cases of Meniere's disease collected 08 cases developed AD and all received ITD which gave an excellent response with no recurrence of DA and a clear improvement in vertigo for 07 cases and the remaining case presented a recurrence of DA and the persistence of vertigo and balance which motivated a transtympanic injection of gentamicin with a titration protocol and the DA completely disappeared and dizziness was significantly controlled [11].

These results are close to ours, after an implementation of a transtympanic aerator with Dexamethasone injection (4 mg/mL), through the aerator, once a day for 3 successive days, the improvement of balance, the disappearance of the symptomatology of Meniere's disease with absence of recurrence of Tumarkin's crisis for the three were obtained after a follow-up of at least 2 years.

Large-scale controlled studies and long-term follow-up surveys are justified to understand the effect of intratympanic steroids on the DA associated with endolymphatic hydrops.

4. Conclusions

The crises otolithiques of Tumarkin may occur during the natural evolution of the MD. The diagnosis of ad is based on clinical presentation typical; other causes must be excluded, particularly in older patients.

The steroids intratympaniques promises tent to be a conservative treatment of first intention for the DA related to the MD or to the DEH since the steroid does has no toxicity to the inner ear. In addition, for Méniere's Disease or Tumarkin's otolithic crisis related DEH refractory, the transtympanic dexamethasone injection can be an alternative effective.

Conflicts of Interest

The authors declare no conflicts of interest.

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