36th world congress of audiology 19 & 22 sep, 2024

Tinnitus blast treatment protocols

K.salhi, A.Dadouche ; Central Hospital of army; Algiers ; Algeria

INTRODUCTION:

- The treatment of tinnitus occurring following an explosion is not unanimous among researchers.
- Corticosteroids have long been established as a reference method in the treatment of the inner ear without any truly controlled study having proven this.
- The role of hemodilution and Pentoxifylline has not been evaluated in a rational manner.

MATERIAL AND METHODS:

- Our patients were divided into 3 groups, according to an unbalanced randomization.
- a group (D1) treated in the first 24 hours (n= 85)
- a group (D2) treated between 24 hours and 15 days (n=32)
- a group (D3) treated after 15 days (n=39)
- The trial was conducted in simple anonymity, controlled by a valid control group. THE protocols were allocated using balanced randomization (previously established 6-column list):

1- For the attack phase: 10 j

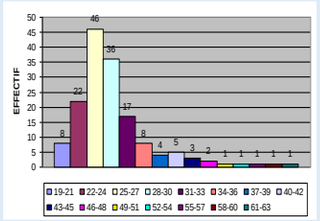
- the standard protocol: corticosteroids, vasodilators;
- protocol 1: P std , Hypervolemic hemodilution ;
- protocol 2: P1, pentoxifyline .

2- Maintenance phase: 3 months

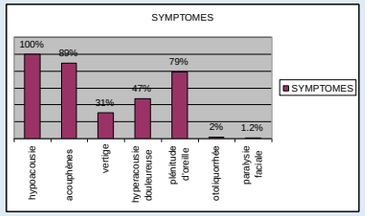
- the standard protocol: vasodilators, Vit B1, B6;
- protocol P1: vasodilators, Vit E;
- protocol P2: vasodilators, Pentoxifylline , Vit E.
- The assessments were carried out:
- at inclusion;
- D5, D10, D40, D70, D100, D180 (6th month 3 months after the end of the treatment).
- Clinically:
- symptomatology was assessed according to intensity scores (tinnitus);
- Evaluation of treatment tolerance.

RESULTS:

Age distribution:



Frequency of call signs



Symptomatic association

SYMPTOMS	NOT	%
Hearing loss	11	07%
Tinnitus	00	00%
Vertigo	00	00%
Hearing loss + Tinnitus	95	60.8%
Hearing loss + Vertigo	06	03.8%
Tinnitus + vertigo	00	00%
Hearing loss Tinnitus + Vertigo	39	25%
Hearing loss + Tinnitus + Vertigo + otoliquorrhea	3	2%
Hearing loss + Tinnitus + facial paralysis	02	1.2%

Overview of tinnitus

SYMPTOMS	BAND 1	BAND 2	BAND 3	TOTAL	
Tinnitus absent Score=0	12	8	10	30 10.4%	
Tinnitus iterative Score=1	21	21	21	63 22%	256
Tinnitus permanent Score=2	52	34	29	115 40.1%	
Tinnitus insomniacs Score= 3	37	16	25	78 27%	
Total	122 42.6%	79 27.6%	85 29.8%	286 100%	

Treatment results based on tinnitus intensity (Standard medication)

Evolution Presentation Clinical	Normali -sation	Improve -ration	Stabili -sation	Aggrav - vation
Tinnitus iterative n=21	15 71%	-	5 23.8%	1 4.7%
Tinnitus permanent n=52	23 44%	11 21%	13 25%	5 9.6%
Tinnitus insomniacs n=37	4 11%	16 43%	17 45%	-
Total N=110	42 38%	27 24.5%	35 31.8	6 5.4%

Treatment results based on tinnitus intensity (Protocol 1)

Evolution Presentation Clinical	Stand ardiza tion	Improv ement	Stabili zation	Worse ning
Tinnitus iterative n=21	17 80%	--	3 14.8%	1 4.7%
Tinnitus permanent n=34	20 58.8%	5 14.7%	8 23.5%	1 5.8%
Tinnitus insomniacs n=16	2 12.5.5 %	10 62.5%	4 25%	-
Total N=71	39 55%	15 21.1%	15 21%	2 2.8%

Treatment results based on tinnitus intensity (Protocol 2)

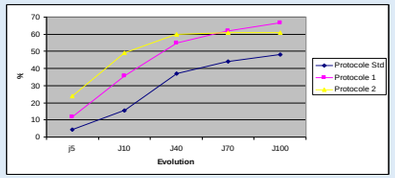
Evolution Presentation Clinical	Standardi zation	improvem ent	stabilizati on	Worseni ng
Tinnitus iterative n=21	18 85.7%	--	2 9.5%	1 4.7%
Tinnitus Permanent n=29	24 82.7%	3 10.3.%	1 3.4%	1 3.4%
Tinnitus insomniacs n=25	3 12%	19 76%	3 12%	-
Total N=75	45 60%	22 29.3%	6 8%	2 2.6%

Summary table of results according to the intensity of the tinnitus.

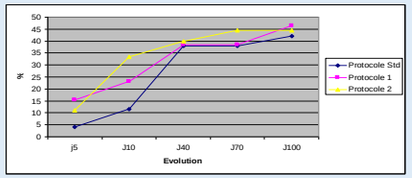
Evolution Presentation Clinical	Stand ardiz ation	Improveme nt	Stabilizati on	Worseni ng
Tinnitus iterative N=63	50 79.3 %	-	10 15.8%	3 4.7%
Tinnitus Permanent N=115	67 58.2 %	19 16.5%	22 19.1%	7 6%
Tinnitus insomniacs N=78	9 11.5 %	45 57%	24 30.7%	-
Total N=256	126 49.2 %	64 25%	56 21.8%	10 3.5%

Clinical data during treatment
Evolution of tinnitus

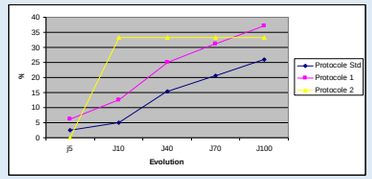
Pick-up time < 24 hours
Full regression (normalization)



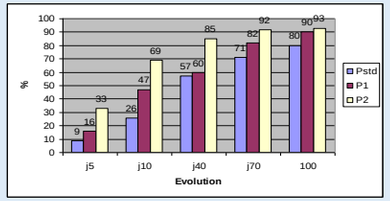
Treatment time 24 hours – 15 days
Full regression (normalization)



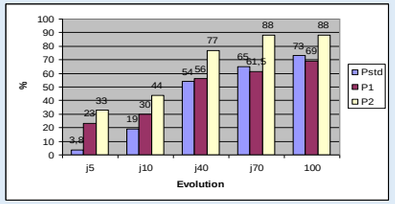
Treatment time > 15 days
Full regression(normalization)



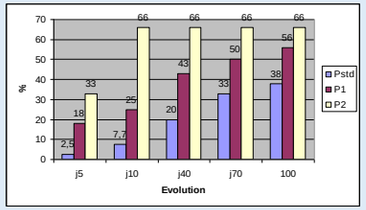
Global regression (normalization + improvement)



Global regression (normalization + improvement)



Global regression (normalization + improvement)



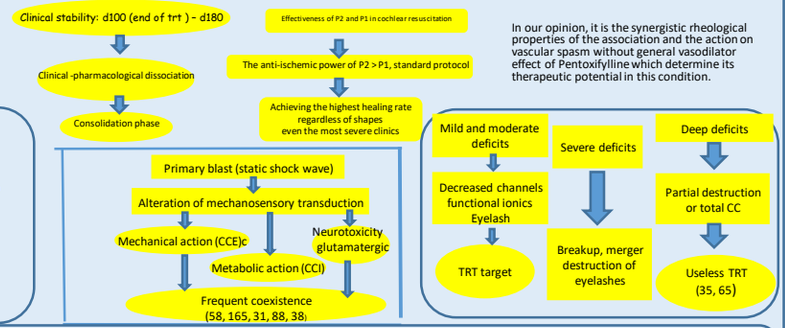
Clinical data before and after treatment

Symptoms at J0	End of treatment d100	
	Workforce of damage	Percentage
Hypoacusis n=286 100%	155	54.2%
Tinnitus n=256 89%	129	45.1%
Vertigo n=48 16.7%	34	11.8%

DISCUSSION:

- The aim of our treatment is to combat the suffering of sensory cells by improving their metabolism by reducing inflammation and increasing the oxygen supply to sensory tissues;
- It was difficult for us to compare the different studies for the percentages of recovery of hearing, tinnitus and dizziness, due to the variability of the methodologies used. Indeed, the inclusion criteria for patients, the expression of audiometric results and the analysis of hearing recovery differ from one author to another;
- With randomization → 3 comparable treatment groups as proven by the distribution of their initial values → calculate the probability of neurosensory recovery → determine if treatment is indicated in all patients .

Results analysis



In our opinion, it is the synergistic rheological properties of the association and the action on vascular spasm without general vasodilator effect of Pentoxifylline which determine its therapeutic potential in this condition.

CONCLUSION

- On an epidemiological level, despite their social, economic and political impact, ear blasts have to date not been the subject of any global study bringing together all the players involved in this multidisciplinary nosological framework. The national literature is very poor in this area and shows that the work done to date is piecemeal and does not respond to an overall vision of the pathology linked to the hearing system.
- The therapeutic actions carried out in our trial allowed us to test two new therapeutic protocols in comparison with standard medication . Independently of the delays in starting treatment, the comparative analysis of the evolution of tinnitus in the three groups indicates that the therapeutic effectiveness of P2 is greater than that of P1 and standard medication.

Bibliography

1. **BUFFE P, CUDENNEC YF, GRATEAU P**. Les ruptures tympaniques liées à l'exposition aux ondes de souffle. Rapport technique de l'institut franco allemand des recherches 1987, CO 220. 2. **BUFFE P, CUDENNEC YF, GRATEAU P.** Le Blast. Etat actuel des connaissances et perspective d'étude. Med et Armées 1987 ; 15 : 5. 3. **COHEN JT , ZIV G, BLOOM J**. Blast injury of the ear in a confined space explosion, auditory and vestibular evaluation. Isv med assoc j 2002; 4: 559 - 562., 116: 181- 184. 4. **CUDENNEC YF, LORY D, PONCET JL**. Traumatisme sonore aigue. EMC orl 1994 ; 20-185A 10 : 5p. 5. **GRATEAU P** et al. Nuisance due au bruit dans les armées : Evaluation, perspectives. Rapport technique du comité consultatif de santé militaire 1983 : 211p. 6. **GUY RJ, WATKINS PE**. Physiology responses to primary blast. J Trauma 1998; 45: 83 - 87. 7. **LEIBOVICI D, GOFRIT O, SHAPNA S**. Eardrum perforation in explosion survivor, is it marker of pulmonary blast injury, Ann emerg med 1999; 34: 168 - 172. 8. **PARNES N, COHEN JT, KLUGER Y**. Blast injury of the ear, harefuah 2000: 138. 9. **PROBST R, TSCHOPP K**. Randomized Double Blind, Placebo Controlled Study of dextran/ pentoxyphilline. Acta Otolaryngol 1992 ; 112 : 435-443.
10. **SPREM N, SACKO B, DAWIDOSKY K**. Tympanoplasty after war blast lesions of eardrum retrospective study; croat med 2001