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Sensorineural deafness due to the primary effect of the Blast ; What support ?

K.SALHI, C.DADOUCH Algiers, Algeria

Summary:

- *The management of neurosensory ear damage from wave shock is not unanimous among the authors and several recurring questions continue to fuel the debate surrounding the reality of this management. Until this day we still don't know how to treat it?*
- *Corticosteroids have emposed themselves as the reference means in the treatment of the inner ear without any truly controlled study having proven this.*
- *The place of solutes with rheological effects and Pentoxifylline has not been evaluated in a rational manner. We offer you a prospective, randomized study carried out in simple anonymity at the Army central hospital, which involved 111 patients with sensorineural hearing loss caused by the primary effect of the wave shock.*
- *Our patients were divided into two homogeneous groups according to balanced randomization.*

Group 1, whose patients received standard medication (Pstd) based on corticosteroid and vasodilator (n=67).

Group 2 (P2): patients received standard medication associated with an infusion of a rheological solution (SSI) and Pentoxifylline (n=44)

I. INTRODUCTION

Auricular wave shock constitutes a particular nosological entity (traumatic pressure otopathies) which has never ceased to be a worrying subject for researchers and clinicians. Relevant initially from wars and military medicine, *wave shock* deafness is also encountered in civilian environments, both at the industrial and domestic levels.

***wave shock* lesions affect several parts of the human body, the ear is the most vulnerable organ, its damage indicates the passage of the breath and therefore makes the diagnosis. On the other hand, laryngo-tracheal and pulmonary damage makes the diagnosis serious.**

Several questions continue to fuel the debate on the reality of the management of ear *wave shock* .

who to treat?

why treat?

when to treat?

how to process and analyze the results?

The results of old protocols = the range of spontaneous recoveries Encouraging result → hemodilution therapy;

A disadvantage of these studies is the fact that they initiate treatment as soon as possible after the onset of deafness.

Only a clinical trial → provides answers → to therapeutic dogma.

Unlike other series which suffer from methodological deficiencies, our essay is :

- **Randomized;**
- **controlled by a valid command group, simple anonymity;**
- **treatment initiation times vary in relation to the date of the accident.**

II- MATERIAL AND METHODS

Single-center trial, June 2004 to June 2006.

I – Patients:

- > 7 - 70 years <
- evocative context (primary *wave shock*)
- deafness, tinnitus and dizziness.
- inclusion after a minimum time (72 hours from the accident and included:
  - the mechanism, the environment of propagation of the shock wave, the anatomopathological lesions generated, cooperation and consent of patients and the means implemented to carry out the trial.
- Patients with psychological disorders, otological history were not included.

II. Methods

The 111 patients included were divided into 2 treatment groups (balanced randomization)

- 67 in group 1: std protocol;
- 44 in group 2: protocol 2.

Unbalanced randomization.

- a group (D1) treated in the first 24 hours (n= 60)
- a group (D2) treated between 24 hours and 15 days (n=23)
- a group (D3) treated after 15 days (n=28)

1 For the attack phase: 10 D

- the standard protocol: corticosteroids, vasodilators;
- protocol 2: Pstd, hypervolemic hemodilution, Pentoxifylline.

2- Maintenance phase: 3 months

- the standard protocol: vasodilators, Vit B1, B6
- protocol P2: vasodilators, Pentoxifylline, Vit E, B1, B6.

The assessments were carried out:

- at inclusion;
- D5, D10, D40, D70, D100, D180 (6th visit 3 months after the end of treatment.

Clinically:

- symptomatology was assessed according to intensity scores;
- the clinical examination included (at inclusion): otoscopy and acoumetric tests.

the functional explorations included:

- on the cochlear level: tonal audiometry, EVOKED AUDITORY POTENTIALS(J40-J100);
- CT: if suspected Peri-Lymphatic Fistula or retro-cochlear involvement. Assessment of treatment tolerance.

The two groups were homogeneous in characteristics and cochleo-vestibular pathology.

Statistical comparisons were carried out using two-sided tests of Chi square for qualitative variables and by the Student test for quantitative variables. The significance level was p=0.05.

The calculation of the sample size was done according to the equation of the arcsine approximation for a bilateral test.

For our test, we estimated from the start of the study a % "el" loss of: 30%.

Distribution of damage according to therapeutic times

PROTOCOLE / Délai de prise en charge	G1 (pstd)	G2 (P2)	Total
D1 : < 24 H	50	70	120 58.%%
D2: 24H - 15 j	29	10	39 18.8 %
D3 : > 15 j	43	05	48 23 %
Total	122 59%	85 41%	

Distribution of treatment groups according to type of deafness

PROTOCOLES / TYPE DE DOMMAGE	P std	P2	TOTAL
Surdité de Perception	72	68	140 68%
S Mixte	45	15	60 29%
Cophose	5	2	7 3%
Total	122 59%	85 41 %	207 100%

Initial hematocrit(D0)

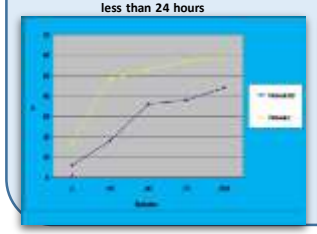
Groupe de traitement / Hématocrite	Groupe 1	Groupe 2	Total
< 44 %	58	85	143
44 - 48,5	38	10 Patients normaux de Vitesse	35
> 48 %	25	10 Patients normaux de Vitesse	29
Total	122	85	207

Electrophysiological data (EPA) EPA at 90 dB

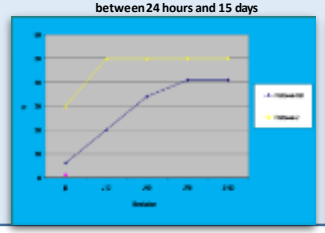
Données des P.E.A (j40)	Nombre de Dommages	% de dommages
Atteinte Endocochléaire	85	77.4%
Atteinte Retrocochléaire	12	11.4%
Atteinte Centrale	12	11.2%
Total	109	100%

III- RESULTS

Complete regression (normalization) time to support less than 24 hours



Complete regression (normalization) time to support between 24 hours and 15 days

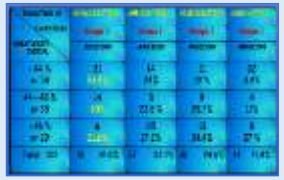


Full regression (normalization) Delivery time > 15 days

Audiometric status before and after treatment

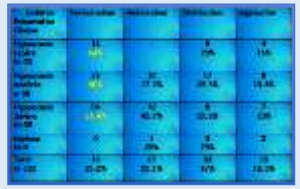
Evolution / Statut initial J0	S p J 100	S mixte J 100	Transmission J 100	Cophose J 100	Normalisation J 100
S p n:140 68%	52 37%	00	00	7 5.1%	81 57.9%
S mixte n=60 29%	13 22.5%	24 40%	05 8.7%	04 6.2%	14 22.5%
Cophose n= 7 3%	04 54.5%	00	00	03 45.5%	00
Total N=207: 100%	69 33.5%	24 11.18%	05 2.4%	14 6.9%	95 45.8%

Treatment results according to initial Hte level

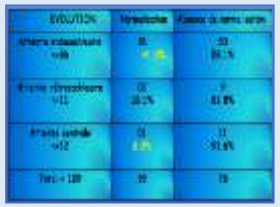


Treatment results depending on rheological variations

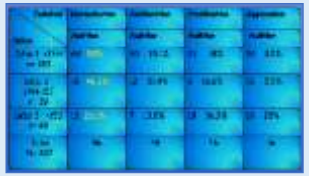
Treatment results depending on intensity hearing deficits (Standard protocol)



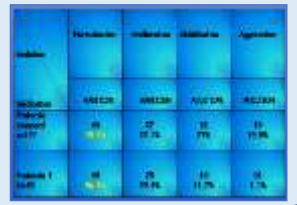
Treatment outcomes based on electrophysiological data

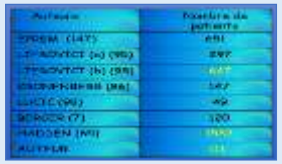


Treatment results based on delivery times

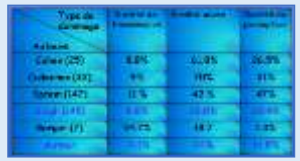


Treatment results based on the proposed protocols





Distribution of damage according to type of deafness



Effectiveness of P2 and P1 in cochlear resuscitation → The anti-ischemic power of P2 > Standard protocol → Achieve the highest healing rate regardless Of forms even the most severe clinics

Early treatment (first 15 days) → Better neurosensory recovery

Beyond the 15th day → Recovery less-marked

Mild and moderate deficits → Decreased channels functional ionics cilia → TRT target

Severe deficits → Breakup, merger destruction of cilia

Deep deficits → Partial destruction or total cilia Cells → Useless TRT

V.CONCLUSION

- **Despite the centripetal bias → Our results reflect a good part of reality.**
- **No definitive conclusion → Remain cautious and modest.**
- **Interest in comparing our results with other, more specific research.**
- **We hope that this modest research will serve as a basis for other multicenter studies that would use more rigorous methodology**

Bibliographic references: 1.O.DEGUINE,JJ;PESSEY,G.WANNA EMC 2004 - 2.CUDENNEC YF. *wave shock* : Medical and surgical emergencies for adults. Arnette 1991; 6: 88-98 - 3. DANCER A. Effect of noise on sensory transduction. Soc Biol 1993: 187: 650-665. 4. GRATEAU P et al. Nuisance due to noise in the armed forces: Evaluation, perspectives. Technical report of the military health advisory committee 1983: 211p. - 5. GROS AM, DAUMAN R. Contribution of normovolemic hemodilution for the treatment of sudden deafness. Ann Français of anesthesia and resuscitation 1986: VS: 231-236. - 7. PROBST R, TSCHOPP K. Randomized Double Blind, Placebo Controlled Study of dextran/pentoxyphilline. Acta Otolaryngol 1992; 112:435-443.