VOICE RELATED QUALITY OF LIFE IN SPASMODIC DYSPHONIA : A DETAILED VHI-ANALYSIS BEFORE AND AFTER BOTULINUM TREATMENT

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COST-Action 2103 Advanced Voice Function Assessment

***Abstract*: The Voice Handicap Index (VHI) is a widespread self-evaluation instrument for measuring the psycho-social handicapping effect of a voice disorder over 3 domains, the physical (P), the emotional (E) and the functional (F) domain. It consists of 30 items/statements to be scored from 0 to 4 . An abridged version (VHI-10) has been proposed and validated. Patients with SD report a severe psycho-social handicapping effect of their disease, but a significant reduction after treatment with Botulinum toxin. Both VHI-30 and VHI-10 appear to be (equally) sensitive instruments within this scope. Factor and principal component analysis fail to identify the 3 "domains" of the VHI-30. Statements P14 ("I feel as though I have to strain to produce voice") and E30 ("I'm ashamed of my voice problem") show the strongest changes after treatment.**

I. INTRODUCTION

Spasmodic Dysphonia (SD) is an uncommon focal dystonia affecting the laryngeal muscles, and resulting in a characteristic involuntary disruption of phonation [1]. Prevalence has been estimated about one case per 100,000 (American National SD Association). Adductor SD, considered in this study, is by far the most frequent type [2], and is characterized by a strained, strangled, effortful and dysfluent speech [1].

When visualized with laryngoscopy during speech true and false vocal spasms become perceptible [2]. It is well known that SD-patients experience their communication impairment as severely disabilitating : they report unusually high scores on the Voice Handicap Index (VHI) [3], scoring in average even higher than total laryngectomees [4]. Actually the VHI quantifies the psycho-social handicapping effect of a voice disorder over 3 domains, the Physical (P), the Emotional (E) and the Functional (F) domain, and consists of 30 items/statements (10 in each domain), which are to be scored from 0 to 4 with a maximum score of 120 (Annex). The functional domain encloses items that define the "impact of a person's voice disorders on his or her daily activities." The physical domain represents the patient's "self-perceptions of laryngeal discomfort and the voice output characteristics". The emotional domain covers the patient's "affective responses to a voice disorder." The higher the score, the more there is a self perceived handicapping effect caused by the voice disorder.

In 2004 Rosen et al. proposed an abbreviated version of the VHI containing only 10 statements instead of 30 [5]. Selected items are F1, F3, F16, F19, F22, P14, P17, P10, E23 and E29. The authors provided arguments showing that the shortened VHI, or VHI-10, was as valid and as powerful as the original version.

This article presents a detailed analysis of VHI results in SD patients before and after the treatment with botulinum toxin injection. Main research questions are :

(1) Does the VHI-score improve after treatment ?
(2) Which items of the VHI are most sensitive to pre-/post changes ?
(3) Does factor or cluster analysis identify the 3 domains (physical – functional – emotional) ?
(4) Is there a superiority of the original VHI when compared with the abbreviated VHI-10 ?

II. MATERIAL AND METHODS

28 VHI forms were filled in and analyzed : they are originating from 12 patients diagnosed with adductor SD, and investigated (just) pre- and (a few weeks) post treatment. 3 patients had no post-treatment self-evaluation. 1 patient had 2 pre- self-evaluations at different moments, with a time interval of several months. There were 9 females and 6 males. Mean age was 60,6 (+/- 9,3) years. This is a part of a larger study.

III. RESULTS AND DISCUSSION

VHI-30 pre- and post-treatment

Fig. 1 shows the paired pre- and post-treatment VHI-scores for the individual subjects. A Wilcoxon test for matched pairs shows a significant difference (p = 0.015). The average reduction in VHI-score is 24.33, from 69,58 (+/-12.99) to 45.25 (+/- 16.60). This means a reduction of 35%. However 2 patients report worsening. A reduction of 15,41 points may be considered as clinically relevant for a group design [6].

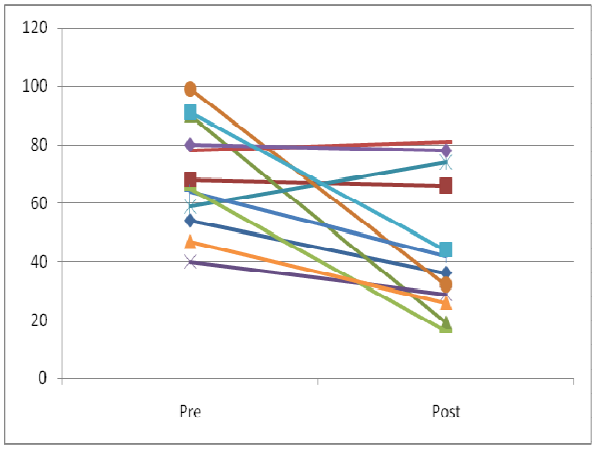

Fig. 1 : Paired comparisons of VHI-30 scores pre-/post

The effect size is to be considered as medium to large (Cohen's d = .7). The median value for the VHI-score in the general population is 6 with an asymmetrical distribution (p 25 = 2; p75 = 12; p90 = 23; p95 = 32.8) [7]. None of our patients originally scores within the p95 range of the general population, but 33% shift to this range after treatment. No clear age or gender related effect is observed.

Most sensitive items

The physical domain reveals the highest improvement, followed by the emotional and the functional ones. When considering items separately, 11 items (F1, F5, F12, F19, P14, P17, P20, E7, E24, E29 en E30) display a significant improvement after treatment, none a worsening . The two most significant items from each subscale appear to be : Subscale functional: F5 and F12; subscale physical: P14 and P17; subscale emotional: E29 and E30. Statements P14 ("I feel as though I have to strain to produce voice") and E30 ("I'm ashamed of my voice problem") show the strongest changes after treatment.

Factor and cluster analysis

Factor and principal component analysis fails in identifying the 3 domains, as well pre- as post-treatment.

Fig. 2 (pre-treatment) shows e.g. the lack of any clear conglomeration of items.

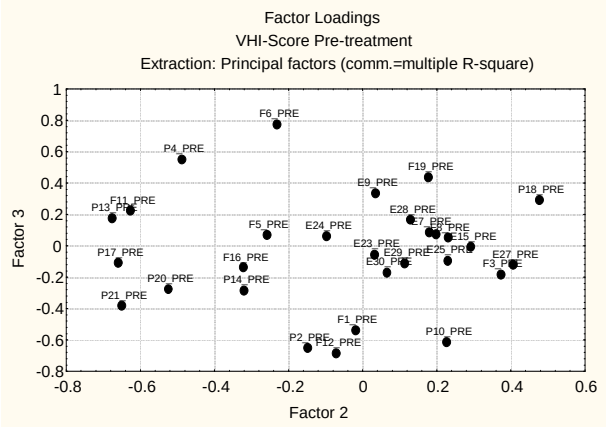

Fig. 2 : Two-dimensional plot of items (VHI-30) ccording to factor loadings.

Cluster analysis of all data identifies 2 clusters, related to the pre-/post effect (Fig. 3) Cluster 1 includes 22 items : F5, F6, F8, F11, F12, F16, F19, F22, P2, P10, P14, P18, P20, P21, P26, E7, E9, E24, E27, E28, E39 and E30
Cluster 2 includes 8 items : F1, F3, P4, P13, P17, E15, E23 and E25.

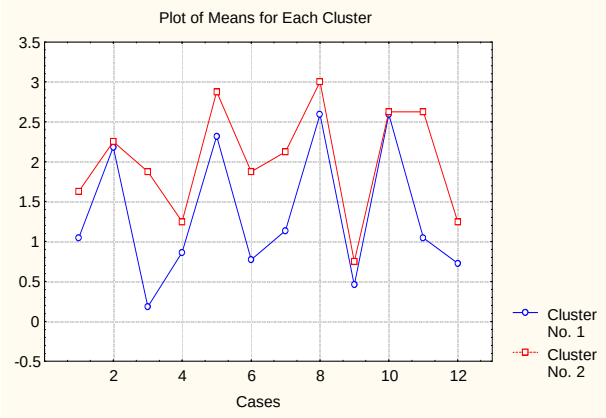

Fig. 3 : Cluster analysis of pre- and post-data, for 12 patients

VHI-30 vs. VHI-10

The average reduction in VHI-10 score is 8,17 , from 24.42 (+/- 4.85) pre-treatment to 16.25 (+/- 5.23) post-treatment. This means a reduction of 33%, comparable with that of the reduction in VHI-30 score. The individual VHI-10 score pre- and post-treatment is shown in fig 4.

The pre-/post matched paired analyses confirm a significant improvement in the VHI-10 score (Maximum score 40) (Wilcoxon test for matched pairs p = 0.019). Again 2 patients report worsening. This is globally comparable with the results for the VHI-30.

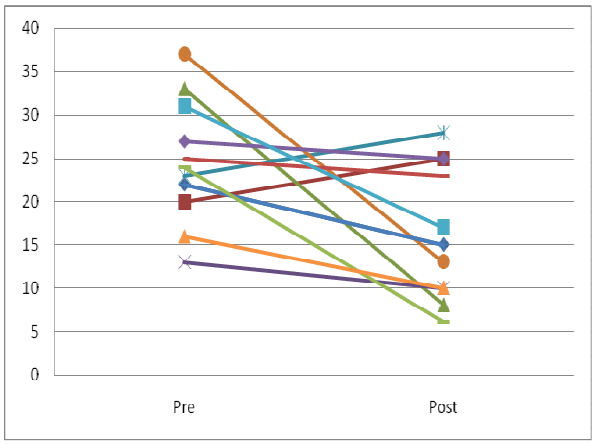

Fig. 4 : Paired comparisons of VHI-10 scores pre-/post

IV. Conclusion

Patients with SD report a severe psycho-social handicapping effect of their disease, but a significant reduction after treatment. Both VHI-30 and VHI-10 appear to be (equally) sensitive instruments within this scope. Factor and principal component analysis fail to identify the 3 "domains" of the VHI-30. Statements P14 ("I feel as though I have to strain to produce voice") and E30 ("I'm ashamed of my voice problem") show the strongest changes after treatment.

V. References

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Annex : the VHI-30

F1. My voice makes it difficult for people to hear me.
P2. I run out of air when I talk.
F3. People have difficulty understanding me in a noisy room.
P4. The sound of my voice varies throughout the day.
F5. My family has difficulty hearing me when I call them throughout the house.
F6. I use the phone less often than I would like.
E7. I'm tense when talking with others because of my voice.
F8. I tend to avoid groups of people because of my voice.
E9. People seem irritated with my voice.
P10. People ask, "What's wrong with your voice?"
F11. I speak with friends, neighbors, or relatives less often
because of my voice.
F12. People ask me to repeat myself when speaking face-to-face.
P13. My voice sounds creaky and dry.
P14. I feel as though I have to strain to produce voice.
E15. I find other people don't understand my voice problem.

F16. My voice difficulties restrict my personal and social life.
P17. The clarity of my voice is unpredictable.
P18. I try to change my voice to sound different.
F19. I feel left out of conversations because of my voice.
P20. I use a great deal of effort to speak.
P21. My voice is worse in the evening.
F22. My voice problem causes me to lose income.
E23. My voice problem upsets me.
E24. I am less outgoing because of my voice problem.
E25. My voice makes me feel handicapped.
P26. My voice "gives out" on me in the middle of speaking.
E27. I feel annoyed when people ask me to repeat.
E28. I feel embarrassed when people ask me to repeat.
E29. My voice makes me feel incompetent.
E30. I'm ashamed of my voice problem.