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Role of OM-85 BV in the prevention of recurrent acute tonsillitis: a retrospective study and literature review

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Abstract

Background This study aims to assess the effectiveness of OM-85 BV in treating recurrent acute tonsillitis in children and adults during the first year after treatment, as well as to identify response predictors.

Results The study included 92 patients, and there was a significant decrease in the number of acute tonsillitis cases after OM-85 BV treatment ($p < 0.001$). Exposure to tobacco smoke predicts non-response or partial response to treatment (OR 5.24, $p = 0.005$, 95% CI 1.646–16.671/OR 4.57, $p = 0.014$, 95% CI 1.362–15.339).

Conclusions The study concludes that OM-85 BV is effective in preventing new episodes of tonsillitis in patients with a history of recurrent acute tonsillitis. Patients exposed to tobacco smoke tend to have a poorer response to treatment.

Keywords Bacterial lysates, Immunomodulators, OM-85 BV, Acute recurrent tonsillitis

Background

Acute tonsillitis is a common ENT infection, with a prevalence of 11 to 12.3%, and is more frequent in children than in adults [1–3]. Diagnosis is clinical, and odynophagia is mandatory, in association with at least one of the following signs/symptoms [4]: fever (> 38.3 °C), cervical adenopathy, tonsillar exudate, and/or a positive RADT (rapid antigen diagnostic test) for group A beta-hemolytic Streptococcus.

Acute tonsillitis is associated with significant morbidity and absenteeism from school and work. The objective of treating tonsillitis is to alleviate symptoms; prevent local complications such as peritonsillar and retropharyngeal abscesses and systemic complications such as sepsis and rheumatic fever; and reduce absenteeism from school and work. For the initial treatment, a short-spectrum antibiotic like penicillin is used. In cases of recurrence, tonsillectomy may be necessary [5–7]. The accepted indications for tonsillectomy in children are as follows [4]: at least seven documented episodes in the previous year, or at least five episodes in each of the previous 2 years, or at least three such episodes in each of the previous 3 years.

In adulthood, the indications for this surgical procedure are not widely agreed upon. The decision to operate must consider the potential risks [8].

Patients with recurrent acute tonsillitis may consider bacterial lysates as a therapeutic option. Bacterial lysates are produced through the chemical or mechanical lysis of specific bacterial cultures. This process has the potential to activate loco-regional non-specific innate and adaptive immune responses, such as polyclonal production of immunoglobulins [9–12]. Therefore, they can be useful in patients with recurrent infections, regardless of whether the cause is viral or bacterial.

OM-85 BV is a product resulting from the alkaline lysis of 21 strains of pathogenic microorganisms found in

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the respiratory tract, including *Haemophilus influenzae*, *Streptococcus pneumoniae*, *Klebsiella pneumoniae*, *Klebsiella ozaenae*, *Staphylococcus aureus*, *Streptococcus pyogenes*, *Streptococcus viridans*, and *Moraxella catarrhalis*. The recommended dosage is one capsule every morning for the first 10 days of each month, for 3 months. A second cycle of administration may be given 6 months after the initial dose. Studies, including a meta-analysis, have demonstrated that OM-85 BV provides greater benefits for pre-school children and children with a history of lower respiratory tract infections [13–16].

The objective of this study is to evaluate the effectiveness of OM-85 BV treatment in children and adults with recurrent acute tonsillitis during the first year after treatment and to determine predictors of treatment response.

Methods

Study population and data collection

This is a retrospective observational study conducted between January 2018 and December 2022, which includes patients diagnosed with recurrent acute tonsillitis and evaluated at Pedro Hispano Hospital. The diagnosis of acute tonsillitis was established based on the current definition in the Guidelines of the American Society of Otolaryngology and Head and Neck Surgery [4]. The study's exclusion criteria were limited to individuals who were under 6 months of age, had experienced fewer than three episodes of acute tonsillitis in the past year, or had incorrectly used the OM-85 BV.

For each patient, we conducted a retrospective analysis of their clinical files, recording variables such as age, gender, history of atopy (cutaneous and/or respiratory), exposure to tobacco smoke, number of tonsillitis episodes in the year before and after taking OM-85 BV, and surgical treatment (adenotonsillectomy/tonsillectomy). The clinical records were maintained by various doctors in the department, including specialists and interns. Recurrent acute tonsillitis is defined as experiencing three or more episodes of acute tonsillitis within the last year [17]. All patients were treated with OM-85 BV.

The effectiveness of OM-85 BV was evaluated 1 year after treatment. The clinical response was categorized as total if the number of tonsillitis episodes per year decreased by more than 50%, partial if the reduction was 50% or less, and null if there was no change or an increase. Broncho-Vaxom® 7 mg is recommended for adults (≥ 18 years), while Broncho-Vaxom® Infant 3.5 mg is recommended for children (< 18 years and ≥ 6 months). The recommended dosage is one capsule per day for 10 days during 3 consecutive months.

Statistical analysis

The statistical analysis was conducted using SPSS software (version 28.0, IBM Corporation, Chicago, IL). Descriptive analysis was used to characterize the sample, presenting categorical variables as frequencies and percentages and continuous variables as means and standard deviations or medians and interquartile ranges. Normality was assessed using the Shapiro–Wilk test or by analyzing the asymmetry and flatness values. The study analyzed the temporal variation of variables using statistical tests. Categorical variables were compared using the chi-square test and continuous variables using either Student's t-test or the Mann–Whitney test. Logistic regression was used to predict the response to treatment, with independent variables selected based on the bivariate analysis ($p < 0.05$). The significance level was set at $p < 0.05$.

Results

A final sample of 92 patients was obtained out of the initial 101 patients selected due to incomplete clinical information.

Descriptive analysis

The sample consisted of 92 patients, with a median age of 5 years and a mean age of 8.8 years (range, 1–35 years; SD, 8.57 years). Of the patients, 50 were female (54.3%) and 42 were male (45.7%). A total of 25 patients (27.2%) had been exposed to tobacco smoke (active or passive smoking). A descriptive analysis of the sample is shown in Table 1.

Prior to taking OM-85 BV, the average number of cases of acute tonsillitis per year was 5.3 ± 2.3, with a minimum of 3 and a maximum of 12. After 1 year of treatment, the

Table 1 Clinical and demographic characteristics of the patients included in the study

Variables	Patients ($n = 92$)
Age, years	
Mean ± standard deviation	8.8 ± 8.57
Minimum	1
Maximum	35
Age group, no (%)	
Pediatric age	75 (81.5)
Adult age	17 (18.5)
Gender, no (%)	
Female	50 (54.3)
Male	42 (45.7)
History of atopy, no (%)	20 (21.7)
Tobacco smoke exposure, no (%)	25 (27.2)

Table 2 Average number of tonsillitis cases analyzed

Patients ($n=92$)			
	Year prior OM-85 BV	**Year after OM-85 BV**	***p* Value**
Average number of tonsillitis ± standard deviation	5.26 ± 2.334	2.95 ± 2.482	**< 0.001****

***p* Value < 0.05 statistically significant

average number of acute tonsillitis cases decreased to 2.95 ± 2.5, with a minimum of 0 and a maximum of 9.

Of the 92 patients, 22 (23.9%) did not respond to treatment with OM-85 BV (null response), 19 (20.7%) showed a partial response, and 51 (55.4%) showed a complete response. Furthermore, 47 (51.1%) required surgical intervention due to experiencing more than 3 cases of tonsillitis per year.

Data analysis

Following the administration of OM-85 BV, there was a statistically significant reduction ($p < 0.001$) in the average number of tonsillitis cases per year, as determined by the paired samples t-test (Table 2).

Association between response and clinical-demographic variables

There were statistically significant differences observed between tobacco smoke exposure and the type of response ($p = 0.005$). Patients exposed to tobacco smoke tended to have a null response (adjusted residual = 2.2), while patients not exposed to tobacco smoke tended to have a total response (adjusted residual = 3.2).

There were no statistically significant differences in age, gender, history of atopy, or previous number of tonsillitis prior to taking OM-85 BV (Table 3).

Logistic regression

Multivariate analysis was performed using logistic regression to predict the type of response (null/partial/total) 1 year after taking OM-85 BV, with the variables selected in the bivariate analysis ($p < 0.05$) as independent variables. A total response was considered as the reference category in the dependent variable. The exposure to tobacco smoke remained as an independent predictor for the type of response (Table 4). The risk of a person exposed to tobacco smoke having a null response is 5.24 times higher than the risk of having a complete response ($p = 0.005$). Similarly, the risk of a person exposed to tobacco smoke having a partial response are 4.57 times higher than the risk of having a complete response ($p = 0.014$).

Table 3 Analysis of the association between the variables studied and the type of response

Patients ($n=92$)				
Variables	**Null response ($n=22$)**	**Partial response ($n=19$)**	**Total response ($n=51$)**	***p* Value**
Age group				
Pediatric	16 (21.3)	13 (17.3)	46 (61.3)	0.054
Adult	6 (35.3)	6 (35.3)	5 (29.4)	
Gender				
Fem	15 (30.0)	9 (18.0)	26 (52.0)	0.316
Masc	7 (16.7)	10 (23.8)	25 (59.5)	
Atopy				
Yes	7 (35.0)	4 (20.0)	9 (45.0)	0.402
No	15 (20.8)	15 (20.8)	42 (58,3)	
Exposure to tobacco smoke				
Yes	10 (40.0)	8 (32.0)	7 (13.7)	
No	12 (17.9)	11 (16.4)	44 (86.3)	**0.005***
Previous number of tonsillitis	4.86 ± 1.55	5.63 ± 1.61	5.29 ± 1.80	0.579

**p* Value < 0.05 statistically significant

Table 4 Logistic regression for the response type

Patients ($n=92$)				
	Null response		**Partial response**	
	OR	**(CI 95%)**	**OR**	**(CI 95%)**
Exposure to tobacco smoke				
Yes	5.24*	(1.646–16.671)	4.57*	(1.362–15.339)
No[a]	1		1	

[a] Reference category

**p* Value < 0.05 statistically significant

Discussion

The study results indicate that OM-85 BV is effective in reducing the number of acute tonsillitis cases in children and adults with a history of recurrent acute tonsillitis.

Similar studies on its effect on recurrent acute tonsillitis, especially in pediatric age, are consistent with the obtained results [17, 18]. Studies have also shown that OM-85 BV is effective in preventing lower respiratory

tract infections in children for at least 6 months, with a reduction of up to 35–40%, regardless of the cause [18–21]. However, the effectiveness of this immunomodulator in other respiratory infections, such as acute rhinosinusitis, is more controversial [9, 13, 22–25].

Although our study included both children and adults, it is important to note that the majority of the sample (81.5%) consisted of children. This may be due to the higher incidence of recurrent acute tonsillitis in pediatric patients compared to adults [1–3], which could explain the sample asymmetry. It is crucial to consider this information when interpreting the results.

In the present study, no statistically significant association was found between response type and age (pediatric/adult); however, the p value was marginally significant. The total response rate was higher in the pediatric age group (adjusted residual = 2.4) compared to the adult age group (adjusted residual = -2.4) ($p = 0.054$). As there are no known studies evaluating the effectiveness of this immunomodulator in adults, the findings cannot be refuted.

A recent study [13] conducted on pediatric patients found that age and the number of previous acute tonsillitis episodes were significant predictors of treatment response. Specifically, younger age and a higher number of previous episodes were associated with a better treatment response. However, in the present study, these factors were not found to be associated with a better response. Neither of the other factors showed any association with treatment response. The study found that exposure to tobacco smoke was the only predictor of treatment response type, with increased risk of null or partial response compared to complete response.

The study has some limitations. It is retrospective and not an RCT (randomized controlled trial), which would provide stronger evidence to confirm the efficacy of OM-85 BV. Also, there was no control group (patients not taking OM-85 BV) to compare responses. Additionally, the study did not evaluate the number of antibiotics used by each patient before and after taking OM-85 BV. Prolonged or excessive antibiotic therapy, especially in the period following the use of OM-85 BV, may overestimate its role in preventing new episodes of acute tonsillitis.

Conclusion

OM-85 BV is an immunomodulatory therapy that has been shown to be effective in preventing new episodes of tonsillitis in patients with a history of recurrent acute tonsillitis. Patients who are exposed to tobacco smoke tend to have a poorer response to treatment. Additional research is necessary to confirm the effectiveness of this treatment in preventing acute tonsillitis and other ear, nose, and throat infections.

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Authors' contributions
PMG: contributions to the conception and design of the work; the acquisition, analysis and interpretation of data; drafted the work; revised it; and approved the submitted version. DCC, JB, AIG, DD, and PA: drafted the work, revised it, and approved the submitted version.

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Availability of data and materials
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
This study was approved by the Ethics Committee of Hospital Pedro Hispano in December 2022. Written consent was provided by all participants (or their parents or legal guardians in the case of children under 16).

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

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