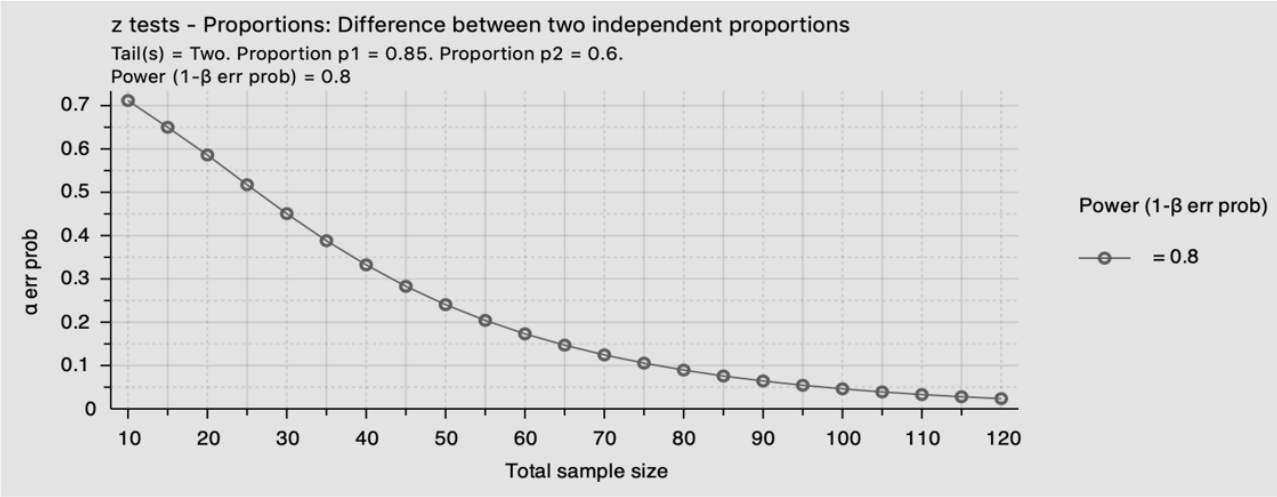
Supplementary File 1

Detailed description of the sample size calculation

For the sample size calculation the following approach has been adopted:

1. Test: z-test for difference between two independent proportions.
2. Tail(s): two-tailed.
3. p1 (group 1) = 0.85
4. p2 (group 2) = 0.60
5. Target alpha = 0.05
6. Target power (1-β) = 0.80 (80%)
7. Sample size: group 1 (treated) = 53, group 2 (control) = 52
8. Allocation ratio N2/N1 = 52/53, about 0.98



To detect a further decrease of 25%, and therefore a resolution in 85% of patients in the group treated with the class II medical device, with 80% power and a type I error of 0.05, our analysis required 94 participants. By enrolling 100 patients the type I error became 0.039 and therefore clearly lower than 0.05. By enrolling 105 patients, the type I error dropped further to about 0.034.

Supplementary File 2

Description of drug used in the 15 days before the enrolment in the two groups and consequences on statistics

In the UWLO group, 1 patient had taken paracetamol (3 days), 2 patients had taken ibuprofen (for 2 days and 4 days, respectively), and 1 patient had taken oral cortisone (1 mg/day) for 2 consecutive days. In the 0.9% NaCl group, 2 patients had taken paracetamol for 3 days each, and 1 patient had taken ibuprofen for 4 days. Paracetamol and ibuprofen were always administered because of mild fever. Oral cortisone was administered to control cough. Statistical calculations of the results obtained by removing from the analysis only the child treated with oral cortisone or all children also treated with paracetamol or ibuprofen did not demonstrate any significant impact on the results.

Supplementary File 3

Distribution analysis of mucous rhinitis severity in the two treatment groups

Test Response Homogeneity

Response Dimension Label	Sample Dimension Label	LR Chisq	LR PValue	Pearson Chisq	Pearson PValue
Response	Time = T0, Treatment	8,26752	0,0160*	6,70241	0,0350*
Response	Time = T1, Treatment	0,87783	0,6447	0,87617	0,6453
Response	Time = T2, Treatment	1,46174	0,4815	1,41918	0,4918
Response	Time = T3, Treatment	2,33924	0,3105	2,2901	0,3182
Response	Time = T4, Treatment	0,25107	0,6163	0,25095	0,6164
Response	Time = T5, Treatment	3,99688	0,0456*	3,95509	0,0467*
Response	Time = T6, Treatment	9,04376	0,0026*	8,76335	0,0031*

The Response Dimension Label and Sample Dimension Label parameters shown in the table indicate the variables being compared. That is, the severity of mucous rhinitis is analyzed by comparing it between the two treatments for each day of observation. LR Chisq (Likelihood Ratio Chi-square) and Pearson Chisq (Pearson Chi-square). These are the values of the Chi-square test statistics. They measure the discrepancy between the observed frequencies and those that would be expected if there were no difference between the groups (i.e., if they were homogeneous). Higher values of these statistics suggest a greater difference between the groups. LR PValue (P-value of the Likelihood Ratio Chi-square) and Pearson PValue (p-value of the Pearson Chi-square): these are the p-values associated with the respective Chi-square statistics. The p-value is the probability of observing a difference as large as (or larger than) the one found in the data, assuming that there is no real difference between the groups (homogeneity assumption). Values of p in black, red or orange are respectively not significant, significant, highly significant.

Supplementary File 4

Transition in severity of mucous rhinitis symptoms in the two treatment groups by Markov chain analysis

UWLO-treated group		T6			Tot.
		mild	moderate	severe	
T0	mild				
	moderate	24	2		26
	severe	22	5		27
	Tot.	46	7		53

NaCl-treated group		T6			Tot.
		mild	moderate	severe	
T0	mild	4			4
	moderate	25	6		31
	severe	3	14		17
	Tot.	32	20		52

Supplementary File 5

Statistical details of the transition in severity of mucous rhinitis symptoms in the two treatment groups by Markov chain analysis

NaCl-treated group		
	N	%
improved	42	80,77
unchanged	10	19,23
worsened	0	0,00
Tot.	52	

UWLO-treated group		
improved	51	96,23
unchanged	2	3,77
worsened	0	0,00
Tot.	53	

Tests

N	DF	-LogLike	RSquare (U)
105	1	3,3424358	0,0459

Test	ChiSquare	Prob>ChiSq
Likelihood Ratio	6,685	0,0097*
Pearson	6,195	0,0128*

Significant values ($p<0.05$) are shown in red; highly significant values are shown in orange.

Supplementary File 6

Distribution analysis of stuffy nose presence in the two treatment groups

Test Response Homogeneity					
Response Dimension Label	Sample Dimension Label	LR Chisq	LR PValue	Pearson Chisq	Pearson PValue
Response	Time = T0, Treatment	4,30626	0,0380*	3,14762	0,0760
Response	Time = T1, Treatment	0,23183	0,6302	0,2305	0,6312
Response	Time = T2, Treatment	0,10182	0,7497	0,1016	0,7499
Response	Time = T3, Treatment	6,32019	0,0119*	6,24386	0,0125*
Response	Time = T4, Treatment	11,0714	0,0009*	10,8376	0,0010*
Response	Time = T5, Treatment	3,51995	0,0606	3,47765	0,0622
Response	Time = T6, Treatment	4,33425	0,0374*	4,27292	0,0387*

The Response Dimension Label and Sample Dimension Label parameters shown in the table indicate the variables being compared. That is, the presence of stuffy nose is analyzed by comparing it between the two treatments for each day of observation. LR Chisq (Likelihood Ratio Chi-square) and Pearson Chisq (Pearson Chi-square). These are the values of the Chi-square test statistics. They measure the discrepancy between the observed frequencies and those that would be expected if there were no difference between the groups (i.e., if they were homogeneous). Higher values of these statistics suggest a greater difference between the groups. LR PValue (P-value of the Likelihood Ratio Chi-square) and Pearson PValue (p-value of the Pearson Chi-square): these are the p-values associated with the respective Chi-square statistics. The p-value is the probability of observing a difference as large as (or larger than) the one found in the data, assuming that there is no real difference between the groups (homogeneity assumption). Values of p in black, red or orange are respectively not significant, significant, highly significant.

Supplementary File 7

Distribution analysis of nocturnal catarrhal cough presence in the two treatment groups

Test Response Homogeneity

Response Dimension Label	Sample Dimension Label	LR Chisq	LR PValue	Pearson Chisq	Pearson PValue
Response	Time = T0, Treatment	4,18858	0,0407*	3,02997	0,0817
Response	Time = T1, Treatment	8,56087	0,0034*	6,24357	0,0125*
Response	Time = T2, Treatment	5,19189	0,0227*	4,82844	0,0280*
Response	Time = T3, Treatment	2,94559	0,0861	2,91282	0,0879
Response	Time = T4, Treatment	13,3588	0,0003*	13,0701	0,0003*
Response	Time = T5, Treatment	10,7452	0,0010*	10,5473	0,0012*
Response	Time = T6, Treatment	13,7805	0,0002*	13,4361	0,0002*

The Response Dimension Label and Sample Dimension Label parameters shown in the table indicate the variables being compared. That is, the presence of nocturnal catarrhal cough is analyzed by comparing it between the two treatments for each day of observation. LR Chisq (Likelihood Ratio Chi-square) and Pearson Chisq (Pearson Chi-square). These are the values of the Chi-square test statistics. They measure the discrepancy between the observed frequencies and those that would be expected if there were no difference between the groups (i.e., if they were homogeneous). Higher values of these statistics suggest a greater difference between the groups. LR PValue (P-value of the Likelihood Ratio Chi-square) and Pearson PValue (p-value of the Pearson Chi-square): these are the p-values associated with the respective Chi-square statistics. The p-value is the probability of observing a difference as large as (or larger than) the one found in the data, assuming that there is no real difference between the groups (homogeneity assumption). Values of p in black, red or orange are respectively not significant, significant, highly significant.

Supplementary File 8

Distribution analysis of halitosis presence in the two treatment groups

Test Response Homogeneity					
Response Dimension Label	Sample Dimension Label	LR Chisq	LR PValue	Pearson Chisq	Pearson PValue
Response	Time = T0, Treatment	0,08275	0,7736	0,08274	0,7736
Response	Time = T1, Treatment	1,06749	0,3015	1,06317	0,3025
Response	Time = T2, Treatment	4,54708	0,0330*	4,5046	0,0338*
Response	Time = T3, Treatment	7,04645	0,0079*	6,96616	0,0083*
Response	Time = T4, Treatment	5,16864	0,0230*	5,03855	0,0248*
Response	Time = T5, Treatment	3,65735	0,0558	3,51768	0,0607
Response	Time = T6, Treatment	8,20567	0,0042*	7,24376	0,0071*

The Response Dimension Label and Sample Dimension Label parameters shown in the table indicate the variables being compared. That is, the presence of halitosis is analyzed by comparing it between the two treatments for each day of observation. LR Chisq (Likelihood Ratio Chi-square) and Pearson Chisq (Pearson Chi-square). These are the values of the Chi-square test statistics. They measure the discrepancy between the observed frequencies and those that would be expected if there were no difference between the groups (i.e., if they were homogeneous). Higher values of these statistics suggest a greater difference between the groups. LR PValue (P-value of the Likelihood Ratio Chi-square) and Pearson PValue (p-value of the Pearson Chi-square): these are the p-values associated with the respective Chi-square statistics. The p-value is the probability of observing a difference as large as (or larger than) the one found in the data, assuming that there is no real difference between the groups (homogeneity assumption). Values of p in black, red or orange are respectively not significant, significant, highly significant.

Supplementary File 9

Distribution analysis of retropharyngeal mucous discharge presence in the two treatment groups

Test Response Homogeneity					
Response Dimension Label	Sample Dimension Label	LR Chisq	LR PValue	Pearson Chisq	Pearson PValue
Response	Time = T0, Treatment	6,17188	0,0130*	6,05818	0,0138*
Response	Time = T6, Treatment	32,6627	<,0001*	28,6814	<,0001*

The Response Dimension Label and Sample Dimension Label parameters shown in the table indicate the variables being compared. That is, the presence of retropharyngeal mucous discharge is analyzed by comparing it between the two treatments for each day of observation. LR Chisq (Likelihood Ratio Chi-square) and Pearson Chisq (Pearson Chi-square). These are the values of the Chi-square test statistics. They measure the discrepancy between the observed frequencies and those that would be expected if there were no difference between the groups (i.e., if they were homogeneous). Higher values of these statistics suggest a greater difference between the groups. LR PValue (P-value of the Likelihood Ratio Chi-square) and Pearson PValue (p-value of the Pearson Chi-square): these are the p-values associated with the respective Chi-square statistics. The p-value is the probability of observing a difference as large as (or larger than) the one found in the data, assuming that there is no real difference between the groups (homogeneity assumption). Values of p in black, red or orange are respectively not significant, significant, highly significant.

Supplementary File 10

Features of patients needing antibiotic therapy at follow-up (from day 6 onward)

Group	N (sex, age)	Antibiotic at day 6	Mucous Rhinitis (0-6)	Halitosis (0-6)	Pharyngeal Discharge (0-6)	Stuffy Nose (0-6)	Night Cough (0-6)
UWLO	1 (M, 4)	Amoxicillin Clavulanate	Severe (0-1) Moderate (2-6)	Present (0-6)	Present (0-6)	Present (0-6)	Present (0-4)
NaCl	1 (M, 10)	Amoxicillin	Moderate (0-6)	Present (0-6)	Present (0-6)	Present (0-6)	Present (0-6)
NaCl	1 (M, 2)	Amoxicillin	Moderate (0-3) Mild (4-6)	Present (0-6)	Present (0-6)	Present (0-3)	Present (0-6)
NaCl	1 (M, 4)	Clarithromycin	Moderate (0-4) Mild (5-6)	Present (0-3)	Present at day 0	Present (0-6)	Present (0-6)

One patient of the UWLO group were treated with amoxicillin clavulanate. The 4-year-old male patient, enrolled after 1 day of symptoms, presented with severe rhinitis that progressed to moderate on the second day, with persistent retropharyngeal discharge, halitosis, and a stuffy nose that persisted until the end of therapy, and a nocturnal cough that improved on the fifth day. Three patients in the NaCl group were treated with amoxicillin (2 patients) and clarithromycin (1 patient) following the follow-up on day six. A 10-year-old male patient, subsequently treated with amoxicillin, presented with moderate rhinitis, stuffy nose, halitosis, nocturnal cough, and retropharyngeal discharge that persisted from enrollment, which occurred after 4 days of symptoms, until the sixth day. Another 2-year-old male patient, subsequently treated with amoxicillin, presented with rhinitis, initially moderate and then mild from the fourth day, and a nocturnal catarrhal cough, along with a retropharyngeal discharge and halitosis, which were present from enrollment, which occurred two days after symptoms began, until day six. Only the "stuffy nose" symptom resolved from day four onward. The third patient, a 4-year-old male, enrolled one day after symptoms began, presented with moderate rhinitis that became mild on day five, a retropharyngeal discharge present only at enrollment, halitosis present until day three, and a nocturnal catarrhal cough and a stuffy nose that persisted until the end of therapy.

Supplementary File 11

Tolerability to treatments

Tolerability	UWLO-treated group	NaCl-treated group
Excellent	38	30
Good	13	21
Fair	2	1

Tolerability was reported by the patient and/or parent during the sixth-day visit. Parents were asked to rate their patient's tolerance of the treatment and the occurrence of any signs or symptoms attributable to the treatment (allergic reactions, nosebleeds, severe itching, prolonged increase in rhinorrhea following treatment) on a daily diary.