

## Relative Upper Respiratory Tract Infections (URTI) Therapeutic Correlation, on Complementary Use of Aerotherapy at $\pm 7^{\circ}\text{C}$ with Physiologic Serum (0.9% Sodium Chlorate + 0.1% Benzalkonium Chloride) and $100^{\circ}\text{C}$ Boiled Water ( $\text{H}_2\text{O}$ Vapourization)

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### Abstract

**Introduction:** About 50% of children attended by pediatricians presents acute respiratory complaints and mostly average of 6 to 8 episodes per year of (URTI) upper respiratory tract infections, are due to specific respiratory virus and pneumonia. In infants of around the age of 3 years, there is co-relation of infections by Syncysial virus of the most important pathogen associated to bronchiolitis and type 1 and 3 Para-influenza agents that pre-dominates on Oropharynx and sometimes associated to Diphtheria Laryngitis and Tracheobronchitis. In upper respiratory disease, the classic method of thoracic examination and anatomical lymph nodes distribution is of great merit and deserves considerations even after disvalue of roentgenography and other image techniques.

**Objectives:** The objective of this research is to verify any existence of therapeutic correlation of different conditions of comparative temperature that favors stable physical defense mechanism (ciliary standard) of airway tract during treatment of airway infections.

**Methodology and Results:** Randomized out-patient medical center of fifty (50) to hundred (100) patients were attended and divided into; Group-A: 50% of patients that underwent complementary treatment of URTI based on  $100^{\circ}\text{C}$  of boiled water vaporization; Group-B: 50% of patients that underwent complementary treatment of URI based on  $\pm 7^{\circ}\text{C}$  inhalation of physiologic serum (0.9% sodium chlorate + 0.1% benzalkonium chlorate).

**Conclusion:** Both complementary therapeutic treatments were useful for URTI. But the adoption of boiled water at  $100^{\circ}\text{C}$  vaporization, reduces the effect of regional congestion of airways at the presence of acute phlogistic signs, favors regional vasodilation and promotes denaturalization of microbes agents on the air ways.

**Keywords:** Upper Respiratory Tract Infections (URTI); Aerotherapy; Sodium Chlorate; Benzalkonium Chloride

### Introduction

In upper respiratory diseases, classic method of to examine the thorax and anatomic distribution of lymph nodes deserves great merit and consideration even after resent disvalue of roentgenography and other techniques of image.

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Tachypnea is the most respiratory disturbance and most important trail to pulmonary dysfunction. Upper air-way obstructive lesions provokes prolonged inspiration along with high pressure that leads to soft tissues retraction or depression. While, lower air way obstruction is linked to prolonged expiration accompanied with adventitious murmur by snoring and/or whistle. Compensatory hyperventilation and ketoacidosis are of consequence to metabolic acidosis. Drug intoxication or cerebral dysfunction provokes metabolic alkalosis due to irregular or periodic deep breathing with hypoventilation.

Thoracic and abdominal paradoxical movements signs and symptoms are encountered observed on inspection are of similarity to xiphoid-scoliosis, pleural disease seen in diaphragmatic fatigue or paralysis of abdominal muscle including asthma. As from 5 grams of unsaturated hemoglobin, hypoxemia and even peripheral cyanosis, edema, club finger, cardiac anomaly, can be consequences of cystic fibrosis and adenomatoid malformation, pleural hemorrhage, expansive thoracic diseases, pulmonary agenesis or hypotrophy. Hyperdistension and poor ventilation presented in lobar emphysema or air bubble in pneumothorax are characterized by hypersonic and consolidation noted by percussion of dense sound useful to detect regional lung differences. In infants, palpation to detect asymmetry or snoring vibration is an alternative to percussion as sound is transmitted with difficulty.

About fifty percent (50%) of children attended by pediatricians presents acute respiratory complaints out of which average of 6 to 8 episodes per year are (URTI) upper respiratory infection due to specific respiratory virus and pneumonia mycoplasma. Children up till the age of 3 years acquire pathogenic bronchiolitis associated to syncytial virus and predominant agent of type 1 and 3 para-influenza associated to oropharyngitis sometimes linked to diphtheritic laryngitis and tracheobronchitis [1]. Bacteria's like  $\beta$ -Hemolytic streptococcus group-A, pneumococci, or gram (+) coagulase staphylococci evolve from viruses and complicate with inflammatory process of URTI-lower/LRTI-lower respiratory tract infection and sometimes preceded by Otitis and Rhinitis extending to mucous membranes including the bronchi [2].

Air ways have cellular and ciliary physical defense mechanism. The physical mechanism depends on ciliary standard, nasal shell for inhaled defends particles around  $\geq 10\mu$  that collides against wet ciliary surface of the nose and particles less than  $\leq 10\mu$  for ciliary standard of nasopharynx collides at lower layer till particles of  $\leq 2\mu$  at ciliary mucous layer that can penetrate air way surface, particles of  $0.5\mu$  have aerodynamic stability enough to act as accelerator to detach until stimulate reflex of vagal mediator or trigeminal nerve mediator to later provoke 'sneeze' for nasal stimulus and cough for oropharynx and tracheal stimulus. Nasal coryza flux is slowly released and expelled by quick Air exhalation. Note that the production of mucous-ciliary layer depends on adequate hydration, mucus production by sub-mucus glands and epithelial cells (globlet). The mucous is composed of lipids, carbohydrates, mucocin, immunoglobulin, nucleic acids, electrolytes and amino acids. Tracheobronchial tree fluids are directed by ciliary movements, of about 1000 to 1500 cycle beats per minutes ciliary to eliminate all material deposited on the trachea-bronchi tree in 24 hours. Slow mucous-ciliary release can be promoted by air pollution, cigarette smoke, sulfur dioxide and others, alcohol, general anesthesia and viral infections but better mucous-ciliary release improvement can be promoted by adrenergic, cholinergic, and methyl-xanthine [3]. During phagocytosis, proteolytic enzymes produced oxygen radicals to react with strange particles, like *Staphylococcus aureus*, pneumonia and klebsiella, mediated by defense mechanism by alveolar macrophages that ingests and kill microbes. Except *Pseudomonas aeruginosa* needs quimiotoxic secretion stimulus by alveolar macrophages and other means to be eliminated, therefore, macrophages is the principal immune stimulus trigger and regulator [4].

Tumor and atresia of amygdala, Hypertrophic adenoid of nasal mass and anomaly of oropharynx or nasopharynx like Pierre Robin syndrome and any airway inflammation process provokes upper air way obstruction. Air ways straitening or narrowness during intense striving prolonged inspiration or stridor is part of the physio-pathology of upper respiratory infection-URTI. Upper air way obstructions also occur in bronchial-asthma, cystic fibrosis,  $\alpha$ -1 Antitrypsin deficiency, bronchopulmonary dysplasia including ciliary dyskinesia, synovitis, and bronchitis are factors that provoke the straitening of intrathoracic air ways accompanied by striving prolonged expiration, sibelius causing increase in functional residual capacity-FRC to compensate the narrowness [5]. The nutritional state of any individual is important to determine the inspiration muscular force and the diaphragm is the main respiratory muscle as it's contraction provokes

the descent of xiphoid-appendix and the lower ribs elevation, costal diaphragm innervated by C5 is responsible for inspiration, however, the intercostal, abdominal, sternal and sternocleido-mastoid muscles are important for respiration during respiratory distress in neuromuscular diseases [6].

### Objective of the Study

The objective of this research is, to verify which complementary therapy favors the maintenance of a stable physical defense mechanism (ciliary standard) of air ways during air way infection treatments, between two different conditions indicated either inhalation of physiologic serum (0,9% sodium chlorate) at  $7^{\circ}\text{C}$  or vaporization of boiled water at  $100^{\circ}\text{C}$ .

### Material and Method

Fifty to 100 random out-patients at the City Council of São Paulo, Brazil, Pediatrics Out-Patient Medical Attendant Health Centre-AMA of Itaquera area, were divided into two groups. Group-A: Fifty percent (50%) of patients offered complementary treatment of URTI by boiled water at  $100^{\circ}\text{C}$  vaporization; Group-B: Fifty percent (50%) of the patients offered complementary treatment of URTI by inhalation of 10 milliliters  $\pm 7^{\circ}\text{C}$  physiologic serum (0.9%-sodium chlorate + 0.1% benzalkonium chlorate) by ultrasonic equipment ICEL US-800. Diagnosis hypothesis was determined by symptoms and signs of URTI by history and anamnesis with nasal coryza, palpable cervical and/or submandibular lymph nodes, fever, cough, or/and sneeze, inappetence, or/and regurgitation, or vomitus, hyperemia or/and edema of rhino/oropharynx and amygdala through direct oropharyngoscopy. All Patients had follow-up of one week or 10 days by pre and post comparative therapy of relative history of molestation, anamnesis and rhino-oropharynx examination.

### Results

Table 1 in Group-B, forty (40) of eighty percent (80%) maintained the signs and symptoms of cough, coryza, and paleness of the rhino-oropharynx till  $\leq 10$  days after complementary therapy recommended, five (5) of ten percent (10%) evolved maintaining cough, coryza, paleness and edema of rhino-oropharynx along with bronchospasm and five (5) of ten percent (10%) didn't return. In Group-A, ten (10) of twenty percent 20% maintained complaints of fever without cough that evolved to bacterial infection along with edema and purulent points of amygdala accompanied with inappetence and return  $\leq 7$  days for complementary antibacterial therapy, ten (10) twenty percent (20%) maintain nasal obstruction without cough but with partial sinusitis signs resolved with mucolytic and thirty (30) of sixty percent (60%) didn't return till  $\leq 10$  days.

### Discussion

The results obtained by this randomized research confirmed the consequence and effect of each therapy compatible with the pathophysiology state. URTI and/or LRTI are frequently associated to rhino-oropharynx regional inflammatory process, accompanied with sneezing, or cough due to the presence of secretions mostly transudate coryza on the respective commitment location of either upper or

Experiments	Pre-Therapeutic Diagnosis	Post Therapeutic $\leq 10$ Days Signs and Symptoms
Group - A	URTI/LRTI and/or (Sinusitis Pneumonia Bronchiolitis	(10) 20% with- Fever. (10) 20% With Nasal Obstruction. (30) 60% - No Return.
Group - B	URTI/LRTI and/or Sinusitis, Bronchiolitis, Pneumonia)	(40) 80% with Cough, Coryza, Rino-Oropharynx Paleness (5) 10% with Cough, Coryza, Rino-Oropharynx Paleness, Edema and Bronchospasm. (5) 10% - No Return

**Table 1:** Results of pre and post therapeutic of  $\leq 10^{\text{th}}$  day after complementary treatments of group a and b methods.



**Figure 1:** Above, oropharynx paleness, petechiae and edema after aerotherapy inhalation with  $\pm 7^{\circ}\text{C}$  of physiologic serum.



**Figure 2:** Above, hyperemia of oropharynx with edema of both amygdalas and bobbled sialorrhoea without aerotherapy.



**Figure 3:** Below, oropharynx paleness, and edema of amygdalas after aerotherapy inhalation with  $\pm 7^{\circ}\text{C}$  of physiologic serum.



**Figure 4:** Below, oropharynx paleness, and edema of both amygdalas after aerotherapy inhalation with  $\pm 7^{\circ}\text{C}$  of physiologic serum.



**Figure 5:** Below, oropharynx paleness, and edema of both amygdalas after aerotherapy inhalation with  $\pm 7^{\circ}\text{C}$  of physiologic serum with nasal obstruction.



**Figure 7:** Below, oropharynx paleness and mucous enanthema after aerotherapy inhalation with  $\pm 7^{\circ}\text{C}$  of physiologic serum.

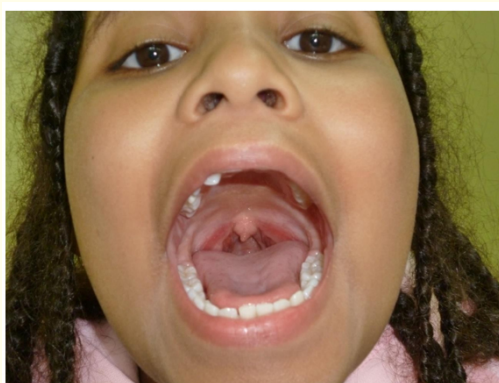




**Figure 8:** Above, hyperemia of oropharynx, petechiae and edema of both amygdalas and bobbled sialorrhea without aerotherapy.



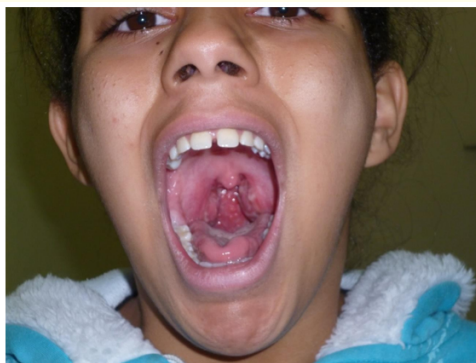
**Figure 8:** Above, hyperemia of oropharynx, petechiae and edema of both amygdalas and bobbled sialorrhea without aerotherapy.



**Figure 9:** Above, oropharynx paleness and nasal coryza obstruction after aerotherapy inhalation and with  $\pm 7^{\circ}\text{C}$  of physiologic serum.



**Figure 10:** Below, oropharynx paleness, edema, petechiae of left amygdala and nasal coryza obstruction after aerotherapy inhalation and with  $\pm 7^{\circ}\text{C}$  of physiologic serum.



**Figure 11:** Above, oropharynx paleness, petechiae, edema of left amygdala, mucous enanthema and nasal coryza obstruction after aerotherapy inhalation and with  $\pm 7^{\circ}\text{C}$  of physiologic serum.



**Figure 12:** Below, oropharynx paleness, edema of left amygdala, mucous enanthema after aerotherapy inhalation and with  $\pm 7^{\circ}\text{C}$  of physiologic serum.

lower airway tract. Therefore, odynophagia accompanied with hyperemia, mucous edema and straitened airways of rhino oropharynx provokes congestion and respiratory difficulty composed of nasal obstruction, dyspnea, to even bronchospasm. The Group-B method of complementary aerotherapy by inhalation of physiologic serum at  $\pm 7^{\circ}\text{C}$  contributes to the depollution of strange particles on airway tract and promotes the humidification and application of medications through natural means to the lungs. Although, unfavorable during inflammatory process of the airways for causing congestion by regional cooling and favoring vasoconstriction and micro-bacterial agent culture. The Group-A method of complementary vaporization with boiled water at  $100^{\circ}\text{C}$  is a means capable to denaturalize micro-bacterial agents, favors vasodilatation of airways and improves regional congestions. Patients of no return after complementary therapy implemented, by boiled water vapor method of group-A, are considered to have improved their malady or cured in this research. This permits us to have the impression that there is relative condition circumstance that warrant types of complementary therapy favorable to maintain cellular and ciliary physical defense mechanism of airways, based on remaining URTI or LRTI most frequent symptoms on patients returned after about ten (10) days pediatrician assistance.

In Group-B, forty (40) of eighty percent (80%) of the patients maintained signs and symptoms of cough at a prolonged period of 10 days after the method of complementary therapy at lower temperature incompatible and unfavorable to inflammatory process .and does not collaborate with regional mucus, however permits complications of airways obstruction and patients continuous complaints of cough. In Group-A, twenty (20) of forty percent (40%) of the patients returned about  $\leq 7$  days without complaints of cough or signs of respiratory airway obstruction maintaining fever residual of infection. Prove that complementary therapy by boiled water vaporization reduced congestion state and regional mucus inflammatory infiltration decreasing the effect of the phlogistic signs inspite of the presentation of secondary bacterial amygdalitis infection.

## Conclusion

Both Group-B method of complementary correlation therapy of URTI-Upper Respiratory Tract Infection by aerotherapy at  $\pm 7^{\circ}\text{C}$  with physiologic serum (0.9% sodium chlorate + 0.1% benzalkonium chlorate) and Group-A method of complementary correlation therapy of URTI by boiled water at  $100^{\circ}\text{C}$  vaporization, both methods useful during the treatment. However, the use of vaporization with boiled water reduces the effect of regional congestion of the upper airways in the presence of regional acute phlogistic tracts favor regional vasodilatation and promotes airways denaturalization of micro-bacterial agents.

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