



## La Ricerca Scientifica Delle Terme Di Levico E Vetriolo Tra Passato E Futuro

Da sempre le Terme di Levico sono impegnate, nel validare il ruolo terapeutico delle proprie Acque. A tal fine si avvalgono di un Comitato Scientifico di alto livello e di studi di efficacia e tollerabilità condotti in collaborazione con importanti atenei italiani. Ciò nella convinzione che solo il costante impegno nella ricerca possa garantire alla terapia termale lo status di pratica medica moderna e scientificamente provata a cui medici e pazienti si possano rivolgere nel trattamento complementare di alcune patologie croniche. In questa pubblicazione sono contenuti gli abstract degli studi già pubblicati su riviste internazionali impattate e i titoli delle ricerche inoltrate a riviste del settore e in attesa di pubblicazione. L'attività di ricerca non può considerarsi conclusa e i suoi obiettivi futuri saranno rappresentati dall'individuazione di nuove patologie che possano trovare beneficio dal trattamento termale con Acqua "Forte" di Vetriolo e dallo studio di nuove modalità di applicazione del mezzo termale. La ricerca indirizzata all'individuazione di nuove patologie suscettibili di trattamento potrà spaziare dalla reumatologia: sindrome fibromialgica, all'endocrinologia: ipertiroidismo, alla ginecologia: vaginiti aspecifiche e atrofiche, alla medicina riabilitativa: ruolo dell'idrokinesiterapia con Acqua Debole nella riabilitazione motoria e neurologica.

*Staff medico Terme di Levico e Vetriolo*

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## La Ricerca Scientifica E L'acqua Termale Di Levico E Vetriolo



## Acta Oto-Laryngologica, (2007) Jun; 127 (6) 613-617

STAFFIERI A, ABRAMO A.

*"Sulphurous-arsenical-ferruginous (thermal) water inhalations reduce nasal respiratory resistance and improve mucociliary clearance in patients with chronic sinonasal disease: preliminary outcomes."*

### Abstract

#### CONCLUSIONS:

In order to confirm these preliminary results, a prospective double-blind study has been instituted in Padova University ENT Section to compare the efficacy of sulphurous-arsenical-ferruginous thermal water nasal irrigations vs isotonic sodium chloride solution nasal irrigations after functional endoscopic sinus surgery for chronic sinusitis.

#### OBJECTIVES:

Despite their widespread use, much uncertainty exists about the indications and therapeutic mechanisms of nasal thermal water inhalations in the treatment of sinonasal chronic disease. The aim of the present study was to evaluate the effects of sulphurous-arsenical-ferruginous thermal water inhalations on nasal respiratory flow, mucociliary transport, nasal cytology, and chemo-physics of nasal mucus in a group of consecutive patients with chronic sinonasal disease.

#### PATIENTS AND METHODS:

Thirty-seven patients with chronic sinonasal disease underwent a 12-day course of sulphurous-arsenical-ferruginous thermal water warm vapour inhalations (38 degrees C) followed by nasal aerosol of the same thermal water (7 microns micelle).

#### RESULTS:

This preliminary study showed that a course of sulphurous-arsenical-ferruginous thermal water inhalations determined a significant improvement in nasal flow and reduction of nasal resistance; a statistically significant reduction of mean mucociliary transport time, from pathologic to physiologic values, has also been shown. Statistical analysis of our data confirmed that the presence of nasal bacteria was significantly reduced by thermal water inhalations.



## American Journal of Otolaryngology-Head and Neck Medicine and Surgery (2008) Jul-Aug; 29(4): 223-229

STAFFIERI A, MARINO F, STAFFIERI C, GIACOMELLI L, D'ALESSANDRO E, MARIA FERRARO S, FEDRAZZONI U, MARIONI G.

*“The effects of sulfurous-arsenical-ferruginous thermal water nasal irrigation in wound healing after functional endoscopic sinus surgery for chronic rhinosinusitis: a prospective randomized study.”*

### Abstract

#### PURPOSE:

Although several publications reported the benefits of nasal irrigation in the management of chronic rhinosinusitis and in sinonasal postoperative care, the available data are poorly controlled. The aim of this prospective randomized study was to compare the effects of sulfurous-arsenical-ferruginous thermal water nasal irrigation vs isotonic sodium chloride solution nasal irrigation after functional endoscopic sinus surgery (FESS) for chronic sinonasal disease considering the histomorphological characteristics of mucosal repair after sinus surgery.

#### MATERIALS AND METHODS:

Eighty patients who consecutively underwent FESS were randomly assigned (1:1) to postoperative nasal irrigation with sulfurous-arsenical-ferruginous thermal water or isotonic sodium chloride solution for 6 months. Intraoperative and postoperative (1, 3, and 6 months) mean counts of lymphocytes, neutrophils, eosinophils, plasma cells, histiocytes, and mast cells in ethmoid biopsies were blindly determined by a pathologist.

#### RESULTS:

Fifty-six patients underwent at least 2 postoperative biopsies. A statistically significant reduction of eosinophil count was disclosed 6 months postoperatively only after sulfurous-arsenical-ferruginous solution nasal irrigation (P = .04). After isotonic sodium chloride solution nasal irrigation, the mean eosinophil count in 6-month postoperative biopsies did not decrease. After both irrigation modalities, the mean mast cell counts in 6-month postoperative biopsies were significantly lower than in intraoperative biopsies (P < .05). Neutrophils, lymphocytes, histiocytes, and plasma cell counts were not significantly different between intraoperative vs 6-month postoperative biopsies independently from irrigation modality.

#### CONCLUSIONS:

Considering the important role of eosinophils in allergic response, we should suggest sulfurous-arsenical-ferruginous solution nasal irrigation in particular, which significantly reduces local eosinophil count, for allergic patients after FESS for chronic rhinosinusitis.

## American Journal of Otolaryngology-Head and Neck Medicine and Surgery. 2012 Nov-Dec; 33(6): 657-662.

OTTAVIANO G, MARIONI G, GIACOMELLI L, LA TORRE FB, STAFFIERI C, MARCHESE-RAGONA R, STAFFIERI A.

*“Smoking and chronic rhinitis: effects of nasal irrigations with sulfurous-arsenical-ferruginous thermal water: A prospective, randomized, double-blind study.”*

### Abstract

#### PURPOSE:

Smoking is a self-destructive behavior that is known to induce remodeling of the lower airways, leading to squamous metaplasia, but little is known about its effects on the nose and paranasal sinuses. Nasal irrigations are often mentioned as measures for treating sinonasal inflammations. The purpose of our study was to compare the effects of nasal irrigations with sulfurous-arsenical-ferruginous thermal water or isotonic sodium chloride solution in smokers with nonallergic chronic rhinosinusitis, based on clinical and olfactory evidence.

#### MATERIALS AND METHODS:

The present study was a prospective, randomized, double-blind study performed in a tertiary academic referral center. Seventy smokers with nonallergic chronic rhinitis were enrolled. Nasal endoscopy, rhinomanometry, nasal cytology, and odor threshold measurements were performed in subjects randomized to daily nasal irrigations with either thermal water or isotonic sodium chloride solution for 1 month.

#### RESULTS:

Immediately after the treatment, the thermal water irrigations revealed a positive pharmacologic action, judging from a tendency toward lower nasal resistances (P = .07) and larger numbers of ciliated cells in the patients treated (P = .003). Endoscopic findings in the thermal water group were still better than in the control group a further 2 months later (P = .03).

#### CONCLUSIONS:

Our results indicate that nasal irrigations with thermal water had a good effect on endoscopic objective signs, nasal resistances, and epithelial trophism.

## Rheumatology International 2007 Apr; 27(6): 523-529

CANTARINI L, LEO G, GIANNITTI C, CEVENINI G, BARBERINI P, FIORAVANTI A.

*“Therapeutic effect of spa therapy and short wave therapy in knee osteoarthritis: a randomized, single blind, controlled trial.”*

### Abstract

Spa therapy and short wave therapy are two of the most commonly used non-pharmacological approaches for osteoarthritis. The aim of this study was to assess their efficacy in comparison to conventional therapy in patients with osteoarthritis of the knee in a single blind, randomized, controlled trial. Seventy-four outpatients were enrolled; 30 patients were treated with a combination of daily local mud packs and arsenical ferruginous mineral bath water from the thermal resort of Levico Terme (Trento, Italy) for 3 weeks; 24 patients were treated with short wave therapy for the same period and 20 patients continued regular, routine ambulatory care. Patients were assessed at baseline, upon completion of the 3-week treatment period, and 12 weeks later. Spa therapy and short wave therapy both demonstrated effective symptomatic treatment in osteoarthritis of the knee at the end of the treatment, but only the spa therapy was shown to have efficacy persistent over time. Our study demonstrated the superiority of arsenical ferruginous spa therapy compared to short wave therapy in the treatment of osteoarthritis of the knee, probably in relationship to the specific effects of the minerals in this water.

## International Journal of Immunopathology and Pharmacology. 2013 Apr-Jun; 26(2): 495-501

BORRONI G, BRAZZELLI V, FORNARA L, ROSSO R, PAULLI M, TINELLI C, CIOCCA O.

*“Clinical, pathological and immunohistochemical effects of arsenical-ferruginous spa waters on mild-to-moderate psoriatic lesions: a randomized placebo-controlled study.”*

### Abstract

Thermalism and spa treatments are traditionally considered effective in a number of dermatologic inflammatory conditions, yet there is scarce evidence about spring water effectiveness on psoriasis in a daily setting. We enrolled 34 patients with mild-to-moderate psoriasis in a double-blind, randomized, placebo-contra-laterally-controlled trial, to evaluate Levico and Vetricolo arsenical-ferruginous water effectiveness on psoriatic lesions by daily 20-minute wet packing for 12 consecutive days. Clinical, histopathologic and immunohistochemical parameters were considered. A statistically significant difference between spa water-treated lesions and placebo-treated lesions in the same patients was demonstrated for histopathologic and immunohistochemical parameters. Since iron ions have an antiproliferative effect on epithelia, and magnesium ions have an anti-inflammatory effect, Levico and Vetricolo water effectiveness on psoriasis could be addressed to their content of these ions.

## Journal of Biological Regulators & Homeostatic Agents. 2013 Jul-Sep; 27(3): 891-902

FIORAVANTI A, LAMBOGLIA A, PASCARELLI NA, CHELESCHI S, MANICA P, GALEAZZI M, COLLODEL G.

*“Thermal water of Vetricolo, Trentino, inhibits the negative effect of interleukin-1&#946; on nitric oxide production and apoptosis in human osteoarthritic chondrocyte.”*

### Abstract

The thermal water of Vetricolo in Trentino, Italy (VW) has been known over 150 years for its therapeutic properties in the treatment of osteoarthritis (OA). This is a highly mineralized water, strongly acidic sulfate, rich in calcium, magnesium and iron and used for balneotherapy after dilution. The aim of our study was to investigate the possible in vitro effects of the VW in human OA chondrocytes cultivated in the presence or in the absence of Interleukin-1 beta (IL-1beta). OA chondrocytes were cultivated in Deionized Water (DW) (DW-DMEM, controls), or in one of three different VW-DMEM media, in which DW had been totally (100 percent) or in part (25 or 50 percent) substituted with VW. All samples were analyzed before and after treatment with IL-1beta at a concentration of 5 ng/ml. After 48 h, we evaluated the cell viability, the release of nitric oxide (NO) in culture medium, the inducible nitric oxide synthase (iNOS) expression, and the percentage of apoptosis and necrosis. Finally, we carried out a morphological assessment using a transmission electron microscope (TEM). Our data showed that VW alone at 25 or 50 percent concentration did not affect the viability of cultured OA chondrocytes, and determined a significant survival recovery rate in cultures stimulated with IL-1beta. On the contrary, the VW alone at 100 percent of concentration reduced, in a significant (P less than 0.05) manner, the cells viability. NO levels were low both in DW-DMEM cultures and in those reconstituted with 25 or 50 percent of VW, and were significantly (P less than 0.05) increased in cultures with 100 percent of VW. VW at 25 or 50 percent concentration significantly (P less than 0.001) reduced the NO production induced by IL-1beta. The data of the NO levels were confirmed by the immunocytochemistry assay for iNOS. Our experiments confirmed the pro-apoptotic effect of IL-1beta and demonstrated a protective effect of VW at 25 or 50 percent concentration. These findings were confirmed by TEM. In conclusion, our study demonstrated that VW alone at 25 or 50 percent concentration modifies neither morphology nor NO production and neither iNOS expression nor apoptosis, but it inhibits the negative effects of IL-1beta in chondrocytes cultures.