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SHORT AND LONG-TERM EFFECT OF SPA THERAPY IN CHRONIC LOW BACK PAIN

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SUMMARY

The effect of spa therapy on chronic low back pain (LBP) was assessed in a randomized trial comparing patients undergoing a 3-week therapy programme in a spa resort in France (n = 50) with patients receiving ambulatory care (n = 52). After 3 weeks, patients in the spa group had significant improvement in their spine mobility and functional score (Waddell index) and a reduction in their daily duration of pain, pain intensity and drug consumption. The long-term effect was assessed after 9 months and showed continued reduction in pain and drug consumption, and improvement in spine mobility but no longer in functional score which returned to baseline level. It is concluded that spa therapy has a positive short-term and a moderate long-term effectiveness on chronic LBP.

KEY WORDS: Balneotherapy, Clinical trial, Low back pain.

SPA therapy for low back pain (LBP), as developed in many European resorts, is generally a therapeutic programme comprised of physiotherapy with hydrotherapy administered in various forms using mineral spring waters at the spa resort. It is usually extended over a full 2- to 3-week period. Programmes vary from one spa to another, depending on the hydromineral water quality as well as on the associated programme of physiotherapy which may include different techniques. Spa therapy is allegedly beneficial for a number of chronic conditions including several rheumatic diseases. Many spa resorts in Europe offer treatment for rheumatic diseases. In France, over 250 000 patients a year spend a 3-week stay for the treatment of a variety of rheumatic diseases including LBP, OA and RA. Hence, it makes such rheumatic diseases the most common reason for spa attendance [1, 2]. This form of therapy is on the reimbursement list of the Social Security National Health Insurance in France and is commonly prescribed as a supplementary treatment to several chronic rheumatic conditions, especially chronic LBP. Very few controlled evaluations of the effectiveness of such programmes have been conducted. In acute LBP (less than 3 months), it has been shown in a controlled study that such specific techniques as balneotherapy, underwater traction bath and underwater massage are all equally effective in reducing pain and analgesic consumption [3]. The overall effectiveness of a spa therapy program on symptoms and disability in chronic LBP needs to be assessed. Moreover should it prove to be effective, the duration of the effectiveness has to be evaluated. Thus, a randomized controlled trial has been conducted in a spa resort in France with the objective of assessing both the short-term and the long-term effectiveness of spa therapy on chronic LBP.

PATIENTS AND METHODS

This study was performed at the spa resort of Bains-les-Bains, eastern France, between July 1989 and April 1990. Patients were recruited in the rural area within 30 km of the spa resort. The 10 general practitioners in the area agreed to refer all patients with chronic LBP satisfying inclusion criteria and with an indication for spa treatment. Based on usual practice, this latter concerns patients with persistent LBP unrelieved by standard medical care and physiotherapy and with recurrent episodes requiring analgesic drug treatment.

Patients of both sexes were included in the study if they satisfied the following criteria: (1) LBP for at least 2 yr and (2) ESR less than 30 mm/h. Patients were excluded when presenting with (1) sciatica, (2) documented lumbar disc herniation, (3) previous back surgery, (4) any inflammatory disease likely to affect the spine (AS and other spondylarthropathies), (5) any concurrent chronic disease (including cardiovascular disease), or (6) any spa treatment within the preceding year. Dorso-lumbar and pelvic X-ray films were checked for exclusion criteria by an independent reader blind to patient's clinical status. The following lesions were also recorded: intervertebral osteochondrosis, osteosclerosis, vertebral bony eburnation, disk space narrowing, osteophytosis or apophyseal joint osteoarthritis.

Patients satisfying eligibility criteria were asked for informed consent and randomly allocated to treatment and control groups, using a block randomization procedure. Patients in the treatment group were immediately admitted at the spa centre, while patients in the control group had spa therapy postponed for 9 months. The spa treatment was then administered to controls for ethical reasons and is not reported here. Patients in the treatment group received hydrotherapy comprised of 15 min underwater high pressure showers with water at 36°C and a series of 3 min showers with various pressures and temperatures ranging from 31 to 36°C. Local mineral water is 33 to 51°C with low mineralization (total mineralization <500 mg/l), mainly sulphate and sodium electrolyte. This treatment was administered 6 days a week for 3 weeks to the exclusion of any other intervention. Patients in the control group, as well as in

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TABLE I
Baseline characteristics of patients with chronic low back pain (n = 104)

	Treatment group n = 52 mean(S.E.)	Control group n = 52 mean(S.E.)	P
Age	58.8(2.3)	57.7(2.3)	N.S.
Sex ratio (F/M)	34/18	29/23	N.S.
Body mass index	25.7(4.2)	25.7(3.9)	N.S.
In the work force/retired	18/34	17/35	N.S.
Daily duration of pain (h)	5.5(0.6)	4.6(0.5)	N.S.
Pain visual analogue score (mm)	60.5(2.7)	52.6(2.8)	<0.05
Finger–floor distance (cm)	10.9(1.4)	9.7(1.2)	N.S.
Schober index (mm)	30.7(0.9)	34.1(1.2)	<0.05
Waddell score	0.43(0.3)	0.42 (0.2)	N.S.
Narrowed disk space	1.7(0.1)	1.9(0.1)	N.S.
Intervertebral osteochondrosis	86%	69.2%	<0.05
Apophyseal joint osteoarthrosis	78%	86.5%	N.S.
Drug consumption			
Analgesics	72%	80.7%	N.S.
NSAIDs	68%	76.9%	N.S.

the treatment group after the spa treatment, had regular routine ambulatory care by their general practitioner. This includes management of chronic pain by a variety of drugs. Massage and physiotherapy prescription were excluded. Patients in the study did not receive specific exercise recommendations.

Patients of both groups had three assessments performed by a physician (FC) independent of the spa staff and of general practitioners. To prevent observer bias, the random group allocation, the appointment of patients with the investigator and the treatment management course was the responsibility of the spa centre. Before every examination, patients were instructed not to mention whether they received spa treatment or were controls. The first examination occurred at baseline, before the randomization. The second examination was 3 weeks later, corresponding with the end of the spa management in the treatment group. It allowed for the assessment of the short-term effectiveness. The third examination was conducted 9 months after the baseline measure to assess the long-term effectiveness.

At each examination, the following characteristics were recorded: pain intensity on a 0 to 100 mm visual analogue scale (VAS) with 0 for the absence of pain, daily duration of pain, finger–floor distance with anterior flexion of the trunk, lumbar stiffness by the Schober index [4], and disability by the Waddell disability self-reported index [5]. This index is a questionnaire assessing the patient ability in nine domains of daily life activities (lifting, sitting, travelling, standing, walking, sleeping, social activities, sexual activity and footwear) which provides a score of 0 = normal status to 1 = completely disabled. The daily consumption of analgesics and anti-inflammatory drugs was noted as well. Pain measures and the Waddell score are the expression of patient's perception of LBP in symptoms and functional limitations, while other outcomes represent common assessments of disease severity by physicians.

Statistical analysis

Student's t-test for continuous variables and χ^2 test for categoric variables were used to compare baseline characteristics, the magnitude of change from baseline to the short-term and to the long-term examination between groups. All analyses were performed using BMDP software [6].

RESULTS

One hundred and four patients satisfied the eligibility criteria and were included in the study by the end of July 1989. There were 62 males and 42 females with a mean age of 58 yr.

The comparison between groups at baseline did not show discrepancies either in clinical characteristics nor in radiological features or in drug consumption, except a slightly lower Schober index, lower pain VAS and lower frequency of intervertebral osteochondrosis in the control group (Table I).

The short-term examination took place after an average 26 days from baseline. Two patients had withdrawn from the treatment group because of thermal reaction and were lost to follow-up. The 50 remaining patients showed a significant improvement in all clinical parameters, Waddell disability score, and a decrease in drug consumption as compared to the 52 patients in the control group (Table II).

At the long-term examination (9 months from baseline) four more patients were lost to follow-up in the

TABLE II
Short-term effect of spa therapy: magnitude of immediate post-treatment changes (3 weeks from baseline)

	Treatment group n = 50 mean(S.E.)	Control group n = 52 mean(S.E.)	P
Daily duration of pain(h)	−3.6 (0.5)	−0.3 (0.4)	<0.0001
Pain visual analogue score (mm)	−32.2 (2.9)	−0.2 (2.7)	<0.0001
Finger–floor distance (cm)	−4.2 (0.7)	+1.7 (0.6)	<0.0001
Schober index (mm)	+5.8 (0.6)	−3.5 (0.8)	<0.0001
Waddell score	−1.19(0.24)	−0.005(0.15)	<0.0001
Drug consumption			
Analgesics	−60%	−2.1%	<0.0001
NSAIDs	−58%	−5.8%	<0.0001

TABLE III
Long-term effect of spa therapy: magnitude of changes at 9 months from baseline

	Treatment group $n = 50$ Mean(S.E.)	Control group $n = 48$ Mean(S.E.)	P
Daily duration of pain(h)	−3.9 (0.5)	1.3 (0.4)	<0.0001
Pain visual analogue score (mm)	−34.4 (2.9)	7.1 (2.3)	<0.0001
Finger–floor distance (cm)	−4.9 (0.7)	3.4 (0.6)	<0.0001
Schober index (mm)	7 (0.6)	−5 (0.8)	<0.0001
Waddell score	0.09(0.32)	0.18(0.3)	N.S.
Drug consumption			
Analgesics	−40%	11%	<0.01
NSAIDs	−58%	4.3%	<0.0001

control group (one refused to participate further, one had intercurrent disease contra-indicating spa treatment and two underwent treatment in another spa resort). The comparison with baseline measures showed a significant improvement in all clinical variables in the treatment group. The consumption of analgesics was also less frequent in this group. The change in the Waddell disability score did not differ significantly between groups (Table III).

DISCUSSION

This controlled clinical trial shows a positive short-term and a more moderate long-term overall effectiveness of spa therapy in chronic LBP.

Previous studies [2, 7, 8] reported a favourable effect of spa therapy for LBP, but the absence of a control group provided weak evidence. The sociodemographic characteristics of the patients included in our study reflect the chronic LBP population of this rural area seen routinely by general practitioners.

The short-term effectiveness was consistent in all variables assessed and with the commonly expressed perception of patients. The long-term effect was more moderate. There was a long-term improvement in symptoms and analgesic consumption (pain, finger–floor distance and Schober index) but no significant change in disability status as assessed by the Waddell disability score. This scale has been designed and validated for descriptive and predictive purposes [4, 9], but the responsiveness of this instrument, an important property for evaluative studies [10], may be insufficient to detect a long-term effect of small magnitude.

There appeared to be deterioration in the control group. This change may reflect the evolution of their disease towards the deterioration of their status. However, patients in the control group were put on a waiting list at the time of randomization, after giving informed consent for the study, and were only given spa therapy after a delay of 9 months. Consequently, they may have artifactually worsened their condition at the 9-month measurement in order to make sure that were admitted for *spa* therapy after the examination. This may result in a possible bias towards an overestimation of the long-term treatment effect. The impossibility of providing controls with a placebo for the overall spa treatment did not allow us to overcome this limitation in the study.

This trial was designed with the purpose of assessing the overall effectiveness of spa therapy without consideration of any biological mechanisms that might apply to each part of this treatment. A combination of many factors may contribute to the effectiveness of spa therapy. First, spring water is believed to have a therapeutic effect in hydrotherapy, its mechanism of action is not clearly elucidated. The effect of the spring water could be related to the temperature [11], the mode of administration of the water (immersion or absorption) [12] and its mineral quality [13]. Second, the various programmes of physiotherapy (massages, traction, etc. . .) frequently associated with hydrotherapy may be independent and important contributors to the overall effect of spa treatment [3]. They were excluded from the spa protocol in this study. Third, the temporary change in climatic exposure may account for the frequent improvement reported by patients [13]. We were able to limit this effect by recruiting patients in the close area around the spa resort. Four, a change in lifestyle during the stay in the spa resort may also be a cause of improvement, at least temporarily. We could not control for this factor. However, it could hardly account for a long-term improvement.

Further research is still required to confirm these preliminary results in both the short- and long-term, given the difficulties in implementing proper scientific investigations of this form of treatment. These positive results may be related specifically to a spa resort, favouring the hypothesis of a biological effect of mineral hot water, or a more widespread effect independent of the spa location, favouring the hypothesis of a psychological effect. These two hypotheses should be explored using adequate health status and psychological outcomes as a combined biological and psychological effect has been suggested previously [15] and is very likely in chronic LBP [16].

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