Effect of plaster corset in acute low back pain in less developed country

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Abstract  Aim of the work: To evaluate the effect of plaster corset in patients with acute low back pain (LBP) in the Rheumatology Department of National Hospital University Hubert Koutoukou Maga of Cotonou (Benin).

Patients and methods: A prospective case-control study was conducted from January 2012 to June 2013. The selected patients suffered from acute low back pain and were treated with plaster corset for thirty days associated with medical drugs compared to a control-group with the same disease treated only with medical drugs. Demographic data, clinical parameters and outcomes during six months were collected. The primary endpoint was the reduction of visual analog score (VAS) for pain and the functional disability was evaluated using the EIFEL score.

Results: Thirty-three patients were recruited in the plaster corset group (PG) and 34 patients of matched age and sex in the control group. The mean VAS was 86.7 ± 21.3 and 88.3 ± 20.2 respectively in the “PG” and “CG”. The results showed a significant decrease of VAS after 3 months in PG than in the CG (p = 0.023) but no significant difference was present after 6 months. The EIFEL score significantly decreased in the PG compared to the CG after 6 months. The number of patients who did not take any medication after three months was higher in the PG in contrast to the CG (27 patients versus 12).

Conclusion: Plaster corset can be complementarily used in addition to the medical treatment to decrease the pain and functional disability and can help to reduce work stoppage.

1. Introduction

The prevalence of low back pain (LBP) is estimated at between 35 and 50% in both industrialized and less developed countries [1–3]. A high prevalence of LBP (74.5%) among Tunisian hospital staff was recently reported [4]. It is a public health problem because of the socio-economic losses. The effects are more important in the acute phases due to significant impairment of quality of life [2,5]. Evolution of LBP is frequently quickly
favorable in few days with frequent risk of recurrence [6]. Many propositions of treatment combined with immobilization and pharmacological drugs are used to reduce the pain to enable fast resumption of occupational and personal activities. The effectiveness of lumbar orthosis (corsets or belts) is controversial [7–9]. The role of lumbar supports for prevention and treatment of low back pain was reviewed by Van Duijvenbode et al. [10].

This study aims to evaluate the effect of plaster corset in patients with acute low back pain in the Rheumatology unit of the National University Hospital: Hubert Maga Koutoukou (NHU-HKM) of Cotonou.

2. Patients and methods

This was a prospective case-control study conducted from January 2012 to June 2013 in the rheumatology unit of the National Hospital University: Hubert Koutoukou Maga of Cotonou. The patients between 18 and 65 years old were recruited over a period of 12 months and those who took part met the following criteria:

- Having been consulted in the hospital rheumatology unit during the study period.
- Suffered from acute back pain (pain duration was less than 6 weeks [11]).
- No contraindications to step I or step II analgesics (according to Word Health Organization pain ladder [12]), non-stereoidal anti-inflammatory drugs, benzodiazepines and thiocolchicoside.
- Signing the consent form after being explained to them.
- Respected the follow-up visit for 6 months.

The exclusion criteria were applied for patients with any of the following:

- Nerve root pain.
- Suffered from LBP during the year before.
- Performed a spinal operation.
- LBP related to infection, inflammatory diseases or malignancy.
- Pregnancy.

The patients were randomly grouped. The first group called ‘plaster group’ (PG) treated with plaster corset for 30 days in addition to using the medical drugs including analgesics, anti-inflammatory and myorelaxant. The second group was the ‘control-group’ (CG) that received only medical treatment. The analgesics used included tramadol or acetaminophen combined with codeine and the anti-inflammatory drugs used were diclofenac, ketoprofen or piroxicam. Thiocolchicoside was the myorelaxant used for the study.

Analgelsic treatment (especially acetaminophen) was maintained throughout the study period upon request while the muscle relaxant thiocolchicoside was stopped after two weeks of continuous take. No complications were encountered after providing the plaster corset and no further medications were required.

Fitting of the plaster corset: In front, the corset goes from the pubic area to the lower tip of the sternum. It envelops the lower part of the chest under the breasts and forces the patient to recover. The lower cut allows the patient to sit, legs at 90 degrees. From the back, the upper cutting edge passes under the shoulder blades with a lower cutting so that the patient can sit. To allow easy sitting, a finger’s breadth is left between the seat and the bottom edge of the corset, not to pinch the buttocks. The corset should be well applied to the lower back and tight in the abdominal region (Figs. 1 and 2).

2.1. Scales

- The pain VAS: It is measured on a 100 mm horizontal scale from 0 (no pain) to 100 (maximal pain).
- The EIFEL scale: It is a valid and reliable self-questionnaire for assessing functional capacity in low back pain [13]. It is the French version of the Roland-Morris scale 10. It consists of 24 questions. The patient must answer each question in function of the difficulty applicable on the day the questionnaire is completed. Each question equals 1 point and the total EIFEL score corresponds to the sum. Thus, a score of 24 corresponds to the most unfavorable situation (total functional incapacity associated with their low back pain).

Data collection was done initially, using a survey form which identified the general characteristics (age, sex, occupation, address, visual analog scale and EIFEL score) of the two groups. The VAS for pain of patients was recorded in three follow-up visits at one, three and six months. The primary endpoint was the reduction of visual analog score (AVAS). The study evaluated also the reduction of EIFEL scale and medical consumption.

The patients provided informed consents and ethical approval was obtained.

Statistical analysis: Data was analyzed using EpiData and SPSS17.0 software. Student’s test was used to compare the differences between both groups. Chi square test was performed to compare between two qualitative variables. Statistical significance was set at $p < 0.05$. The data were expressed as frequency, range, mean ± standard deviation (S.D.).

Figure 1 A photo of a female patient with low back pain wearing plaster corset (from the front and back).
3. Results

Sociodemographic characteristics: Thirty-three patients were recruited in the plaster group (PG) and 34 in the control group (CG). The mean ages were 39.03 ± 12.1 and 38.02 ± 13.7 and the sex ratio (male/female) was 0.64 and 0.71 respectively. The age and sex distribution were not statistically significantly different between both groups. The characteristics of both groups are summarized in Table 1.

Evolution of pain intensity: The mean of VAS were initially 86.7 ± 21.3 and 88.3 ± 20.2 respectively in the “PG” and “CG”. There was a significantly higher decrease of VAS after 3 months in the PG (from 88 to 21) compared to the CG (from 88 to 39) (p = 0.023) (Fig. 3). No significant difference was found between the two groups after 6 months (p = 0.10).

Evolution of EIFEL scale: EIFEL score decreased more significantly in PG (from 15 to 2.2) compared to the CG (from 15 to 10.5) after 3 months (p = 0.035) but this decrease was not significant between the two groups after 6 months (p = 0.48) (Fig. 4).

Change in pharmacologic drugs consumption: Proportion of patients who did not take any medication after three months was higher in the PG than CG (27 patients versus 12). Drugs consumed daily in PG were acetaminophen (1000 mg) while drugs consumed in CG were tramadol (150 mg) and acetaminophen combined with codeine (1500/180 mg). The difference was significant at 1, 3 and 6 months; (p = 0.035, p = 0.031 and p = 0.04 respectively).

4. Discussion

The results of this study show the potential effects of plaster corset in acute low back pain on pain intensity after three months (p = 0.023), functional capacity after 3 months (p = 0.035) and drug consumption after 6 months (p = 0.04). To our knowledge, the effect of plaster corset has not been evaluated in acute LBP. However, plaster corset has been used as a conservative treatment of spinal tuberculosis [14,15]. Although there is limited evidence of efficiency of lumbar supports for treatment of low back pain [10], these results confirm Calnel et al. work that showed the beneficial effect of lumbar belt in subacute back pain [16]. The results were significantly less for the CG. Valle-Jones et al. analyzed the benefits of wearing a back support in the treatment of acute non specific LBP, at 10–12 days. After 21 days, all the patients were ameliorated for pain intensity, limitation activity level, and this

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Plaster corset</th>
<th>Control</th>
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<tbody>
<tr>
<td>Number</td>
<td>33</td>
<td>34</td>
</tr>
<tr>
<td>Mean age/range (years)</td>
<td>39.03 ± 12.1 [21–61]</td>
<td>38.02 ± 13.7 [20–63]</td>
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<tr>
<td>Sex-ratio (M/F)</td>
<td>25/39 (0.64)</td>
<td>27/38 (0.71)</td>
</tr>
<tr>
<td>Mean VAS</td>
<td>86.7 ± 21.3</td>
<td>88.3 ± 20.2</td>
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Figure 2 A photo of a male patient with low back pain wearing plaster corset (from the front and back).

Figure 3 Evolution of pain intensity (VAS) in patients with acute low back pain wearing a plaster corset [n = 33] (blue line) or the control group [n = 34] (red line) over the period of the study (6 months).

Figure 4 Evolution of EIFEL Scale in patients with acute low back pain wearing a plaster corset [n = 33] (blue line) or the control group [n = 34] (red line) over the period of the study (6 months).
amelioration was significantly greater for the wearing group than CG. For the wearing group the analgesic consumption was significantly lower [17]. Against this, Zarghooni et al. in their review found that orthoses are not recommended for non-specific LBP. They should, therefore, be used only after individual consideration of the indications in each case [18].

The use of belts, corsets, or orthoses is frequently reported as an alternative therapeutic associated in LBP but without strong evidence. The benefits can be explained by some mechanical effects in regard with all the components of LBP: limitation of the back mobility and more specifically the limitation of the flexion in the subjects daily activities [7]. In our country, the high cost of the belts gives the physician the opportunity to use plaster corsets which cost less. Moreover, the plaster corset gives more stability than the belts which can be remove by the patients. However the benefit of wearing a plaster corset does not last beyond six months as shown in the present study. Further studies on a larger number of patients are needed to check this assertion.

In the study of Calmels and coworkers, the global profit on medical consumption constitute an important argument, because of the economic impact and the potential decrease of iatrogenic effects of some antalgic or anti-inflammatory drugs used to treat LBP. Therefore belts, corsets or orthoses cannot substitute medical drugs in any way. It must be a complementary treatment in association with medical drugs [16]. In regards with different treatments proposed for LBP, it is also interesting to underline that plaster corset does not induce secondary or iatrogenic effects and has no contraindication. Some patients may indicate skin irritation which was not seen in our study.

5. Conclusion

This study reports significant improvement of the functional status and reduction in medication consumption on using a plaster corset as a complementary treatment for acute low back pain. The plaster corset does not cost and can be used for excellent complementary treatment in acute back pain in less developed countries.

Conflicts of interest

None.

References