

Use of Chest Orthosis Can Significantly Shorten the Hospitalisation of Rib Fracture Patients

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Summary

In an earlier investigation has been shown, that isolate immo-bilisation of the rib fracture region with Chrisofix Chest Orthosis[®](1,2) significantly reduces the pain and improves the respiratory functions in the same time (3). We investigated in two independent clinical studies and also with metaanalysis of these both (including 72 pats.), whether the use of this medical device can have any influence on the duration and consequently on the costs of the hospitalisation of rib fracture patients. A significant difference ($p < 0.05$) was registered in both studies as to the duration of hospitalisation. According to the metaanalysis the Chrisofix Chest Orthosis[®]-treated patients spend in average 2.2 days less in the hospital, than the controls ($p = 0.0004$). Considering the price of Chrisofix Chest Orthosis[®], the use of medical device is highly cost saving.

Introduction

Rib fractures are common problems in trauma centres and effects high number of hospitalisation days (4). In the USA, 10% of patients admitted to a trauma centres had rib fractures (5). In England 82% of hospital consultant episodes required hospital admission for blunt chest trauma-induced fracture of rib, sternum or thoracic spine and required about 0,15% of hospital bed days in 2002-2003 (6,7). These patients spent 10.8 days in average in the hospital. To reduce the expenses the simplest way would be the shortening of the duration of hospitalisation.

Rib fracture patents with few fractured ribs without complications do not

generate any difficult therapeutic problems (5,6,8). In the therapy of patients with rib fracture, the pain reduction is the most crucial task. Oral administration of painkillers is not always enough, epidural analgesia is cost exhausting and difficult, the effect of nerve blockade is transitory and the procedure is time-consuming. There is a place for a complementary way of therapy. Thorax bandage is not relay accepted, because of possible reduction in the vital capacity. Chrisofix Chest Orthosis® in our trials significantly reduced the pain and in the same time increased the vital capacity (3). Because the simple use and the low expense of this medical devise, we decided to investigate the effect of the application of this orthosis on the duration of the hospitalisation.

Patients and Methods

Two from each other independent studies, i.e., a randomised and a placebo-(similar sized abdominal sponge)-controlled retrospective ones (involving 30 and 42 isolated rib fracture patients with 2-7 fractured ribs, respectively) were separately and also with meta-analysis evaluated. The randomised study included 16 controls and 14 “Chrisofix-splinted” patients, while the retrospective one 16 and 26 cases, respectively. For statistical analysis t-, Wilcoxon-Mann-Whitney-U-, and Cox-Mantel-tests were used.

We applied Chrisofix Chest Orthosis on the day of trauma (Fig.1) at the admission. Patients with polytrauma, alcoholism, or any severe interfering were not included into the study. Painkiller (usually NSAID), per os administered expectorant (acetylcystein), and physiotherapy (“breathing in a bag”) belonged to the treatment strategy in both groups. X-ray was performed at least on the day of admission, two or three days later and just before the



Fig. 1. Chrisofix Chest Orthosis on the chest.

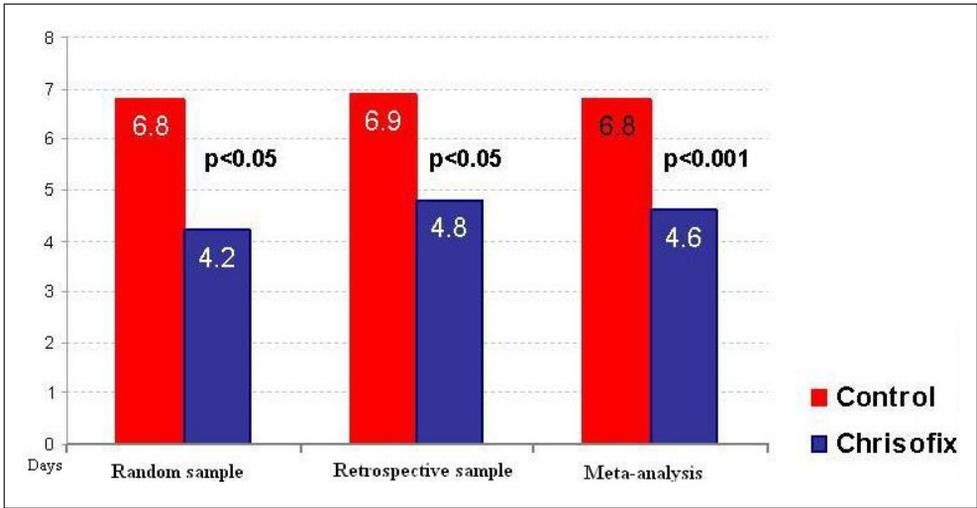


Fig. 2. Duration of hospitalization in the in the two study populations.

dismissing. Patients without complications were dismissed if the fracture caused pain had been effectively reduced and had not caused any remarkable respiratory troubles.

Results

The two study populations did not show any significant difference as to the age, sex and number of the fractured ribs. Neither was any significant difference in these parameters between the two groups involved into the meta-analysis (mean age: 57.3 vs. 58.2; fractured ribs: 2.9 vs. 3.0). On the contrary, significant difference ($p < 0.05$) was registered in both studies as to the duration of hospitalization (6.75 vs. 4.21 and 6.9 vs. 4.8 days, respectively). According to the meta-analysis the Chrisofix Chest Orthosis-treated patients spend in average 2.2 days less in the hospital, than the controls ($p = 0.0004$). Fig. 2 illustrates these observations. It has to be mentioned, that in two patients we observed dislocated fractures. In both cases, we were able to demonstrate a definitive reduction in the grade of the dislocation during the breathing.

Conclusions

The main patho-physiological consequence of rib fracture is respiration-connected pain with concomitant developing of superficial breathing as a consequence. Several investigations showed that bandaging devices generally restrict the tidal volume and thus rather promote, than prevent the developing of atelectasis or other late pulmonary complications (9). On the contrary, Chrisofix Chest Orthosis^â increased the vital capacity (3).

Principles and priorities for treatment after severe blunt chest trauma is well documented in literature (10,11,12,13.), however there is no generally accepted criteria for the hospitalization and/or dismissing of rib fracture patients. The rules are different from country to country. More than two fractured ribs are indications for hospitalization in any age (9).

Considering the costs of hospital treatment in this indication (based on DRG-related calculation e.g. in Germany or Austria around 2000 • per case), the use of chest orthosis (sparing effect 2.2 days in average in our study) provides an important new approach even in economical point of view.

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