



Nonoperative management of pectus carinatum with orthotic bracing

SPANISH FULL TEXT

SUMMARY

Introduction: *Pectus carinatum* (PC) or "pigeon chest" is a deformity of the thoracic cage, consisting of an anterior protrusion at the costo-sternal level characterised by excessive growth of the costal cartilage. Its prevalence is approximately one per every 1500 live births, and in most cases correction of PC is performed for aesthetic reasons, since only on rare occasions is it associated with physical symptoms. Traditionally, open surgery has been the treatment of choice, though in the last decade interest in non-invasive treatments using chest orthoses (braces) has been on the increase because, compared to surgery, orthotic treatment eliminates the risks posed by anaesthesia and surgery, thus reducing the complication rate and costs. These braces can be either conventional (system fitted with two valves, which enable pressure to be exerted on the protrusion) or dynamic (conventional system fitted with an electronic device that enables the pressure to be monitored and adjusted).

Objective: To assess the safety and effectiveness of non-invasive treatment of PC using conventional and dynamic compression brace systems on children and adolescents.

Material and methods: We conducted a systematic review of the literature, with a search in January 2015 that covered: systematic reviews databases, such as Health Technology Assessment (HTA), Database of Abstracts of Reviews of Effectiveness (DARE), Economic Evaluation Database of the National Health Service (NHS EED) and the Cochrane Library Plus; and general medical databases, such as Medline, Embase and the ISI Web of Science. The studies retrieved were selected in accordance with a set of pre-defined criteria and reviewed by two independent reviewers.

Results: Of the total of 529 papers retrieved, 15 studies fulfilled the inclusion criteria. No randomised control trials was identified, and all the studies corresponded to case series rated as having low-quality evidence. A total of 420 cases were evaluated by the conventional compression system versus 290 by dynamic systems.

The effectiveness of the treatment was measured by reference to the reduction in the protrusion and patient satisfaction. Outcomes were good for both treatments, with a significant



lessening of the protrusion, a reduction in antero-posterior chest width, improvement in the sternal angle, and high self-rated scale scores. Conventional treatment failed in 18%-43% of patients who failed to comply with the therapy versus 2%-4% of those who completed the treatment. In the case of the dynamic system, an 11% failure rate was reported. Non-adherence was 10%-43% for conventional orthoses versus 3%-14% for the dynamic system.

Adverse effects were mild with both systems, with a predominance of cutaneous lesions of a temporary nature. In addition, some recurrences occurred, which were treated successfully, but no overcorrections were reported. Most of the patients reported pain and difficulties in sleeping. The main cause of non-adherence was incompatibility with social life (62.5%). The severest cases, which were either associated with other diseases or failed to respond to the treatment, were referred for evaluation and surgical intervention.

There was a considerable difference in cost between the two systems, with the price of the conventional orthosis ranging from €300-€700 (brace) versus €8500 in the case of the dynamic system (€4500 brace + €4000 electronic device).

Conclusions: In most cases, treatment of PC is of a aesthetic in nature, and patients and/or family relatives must be appropriately informed of existing therapeutic options and the risk/benefit balance, particularly in surgical alternative. Orthosis-based treatment is not invasive but is a long-term and requires the brace to be used practically 24 hours a day.

While the conventional and dynamic orthoses display similar designs, the dynamic system features an electronic device that is fitted to the prosthesis and enables the pressure to be monitored.

Both systems display a similar effectiveness, not only achieving optimal correction of the protrusion in the majority of cases, but also improving the quality of life and self-esteem of those patients who comply with the treatment.

The key factors of success in non-invasive treatment are the patient's adherence to therapy, age, degree of thoracic malleability and type of deformity.

The adverse effects, which are similar with both systems, are mild in nature, with cutaneous lesions predominating. Pressure monitoring does not seem to prevent the complications arising from the conventional compression system.

The cost of the dynamic compression system (brace plus electronic pressure-measurement device) is approximately 12 times higher than that of the conventional system.