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Osteoporosis-related kyphosis and impairments in pulmonary function: a systematic review.

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Abstract

We conducted a systematic review to examine the relationship between osteoporotic vertebral fractures, kyphosis, and pulmonary function. Findings suggest modest but predictable declines in vital capacity related to the degree of kyphosis. However, there were only four studies, and all had significant methodologic limitations. Further high-quality research is needed.

INTRODUCTION: Our objective was to systematically review the extent to which osteoporosis-related vertebral fractures and kyphosis affect pulmonary function.

MATERIALS AND METHODS: We used a literature search from 1966 to 2006 (using Medline, EMBASE, and hand searches of references) for studies examining pulmonary function in patients without known lung disease who had vertebral fractures or kyphosis secondary to osteoporosis. Two reviewers independently abstracted data. Heterogeneity precluded formal meta-analysis.

RESULTS: Initial searches yielded 453 articles. After applying eligibility criteria, only four case-control studies of limited quality (e.g., only one study was blinded) remained. Since 1966, only 109 patients (6 men) have been studied. All four studies reported reductions in vital capacity (VC), with values ranging from 68% to 94% of predicted values. This was quantified as a 9% reduction in predicted VC per vertebral fracture in one study. The degree of kyphosis clinically (one study) or radiographically (three studies) correlated with declines in VC; impairments were most notable at kyphotic angles >55 degrees. Statistically significant differences in percent predicted VC were obtained only when arm span or recalled height, rather than measured height, was used (two studies).

CONCLUSIONS: Despite conventional teaching, the evidence relating osteoporotic vertebral fractures or kyphosis to pulmonary function is limited. On the basis of available studies, declines in VC secondary to kyphosis seem modest and directly related to the number of vertebral fractures or degree of kyphosis. Future studies need longitudinal follow-up of larger numbers of men and women, appropriate proxies for height, standardized measures for pulmonary function and kyphosis, and efforts to blind outcomes ascertainment.

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