

- British Thoracic Society and Society of Cardiothoracic Surgeons of Great Britain and Ireland Working Party. *Thorax* 2001;56:89–108.
- [22] Varela G, Ballesteros E, Jiménez M, Novoa N, Aranda J. Cost-effectiveness analysis of prophylactic respiratory physiotherapy in pulmonary lobectomy. *Eur J Cardiothorac Surg* 2006;29:216–20.
- [23] Issa MM, Healy DM, Maghur HA, Luke DA. Prophylactic minitracheotomy in lung resections. *J Thorac Cardiovasc Surg* 1991;101:895–900.
- [24] Bonde P, Papachristos I, McCraith A, Kelly B, Wilson B, McGuigan J, McManus K. Sputum retention after lung operation: prospective randomised trial shows superiority of prophylactic minitracheostomy in high risk patients. *Ann Thorac Surg* 2002;74:196–203.
- [25] O'Donohue W. Prevention and treatment of postoperative atelectasis. Can it and will it be adequately studied? *Chest* 1985;87:1–2.

## Editorial comment

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The article by Reeve et al. [1] published in this issue of the *European Journal of Cardio-thoracic Surgery* has the merit of being the first published randomised clinical trial on the effectiveness of physiotherapy manoeuvres to prevent pulmonary complications after lung resection. The authors have carefully designed and conducted an intention-to-treat study to evaluate the effectiveness of a physiotherapy policy in their settings, rather than the actual effectiveness of physiotherapy in the cases that eventually received the treatment.

For years, perioperative physiotherapy has been considered as one of the most effective measures to improve quality of care and provide optimal results to patients with thoracic surgical diseases [2]. However, in a recently published clinical practice guideline [3] on fitness for radical therapy in lung cancer patients developed by the European Respiratory Society (ERS) and the European Society of Thoracic Surgeons (ESTS), no recommendations on perioperative physiotherapy were stated owing to the lack of sound evidences in the literature.

The article by Reeve et al. [1] reports the preliminary results of a randomised clinical trial designed 2 years earlier [4] and concludes that postoperative pulmonary complications did not decrease in the experimental arm (patients treated with physiotherapy). This conclusion would be in accordance with systematic reviews of the literature related to abdominal and cardiac surgery where the effectiveness of routine perioperative physiotherapy has not been demonstrated [5,6]. Thus, according to current best evidences (one randomised control trial and two systematic reviews of the literature), it could be concluded that implementing perioperative physiotherapy programmes for patients undergoing major thoracic and abdominal procedures is not cost-effective, except for a small subset of cases with specific high-risk criteria of developing pulmonary complications [7,8].

In the study design previously published by the same team [4], the rate of pulmonary complications after major thoracic surgery was checked in the literature and, according to an estimated rate of 20%, a sample size of 184 cases was calculated. Unfortunately for the investigation, but fortunately for the patients, the actual prevalence of complica-

tions at the interim analysis was as low as 2.9% in the control arm. Thus, the investigators decided to stop patient's accrual due to the impossibility of demonstrating any advantages of the treatment and attributed the low rate of pulmonary complications to the effectiveness of the standardised clinical care pathway designed in the centre where the cases were treated, rendering additional physiotherapy ineffective. This finding – although not demonstrated by the data presented in the study by Reeve et al. [1] – is not new, and some years ago, the first evidence on the effectiveness of standardised patient care to decrease the prevalence of adverse outcomes and hospital costs in general thoracic surgery was published [9]. We also know that a greater number of hours of care by registered nurses per day are associated with better outcomes, including low rate of nosocomial pneumonia, for hospitalised patients [10].

To my understanding, the conclusions in the article published in this issue of the *EJCTS* do not contradict the widespread belief among thoracic surgeons that perioperative physiotherapy improves the outcomes after lung resection. Perhaps we should better define what kind of interventions are the exclusive responsibilities of the physiotherapy team and what kind of physical postoperative care should be performed by the nursing staff because of comparable results and lower costs. While in some countries or centres with abundant professionals, patients are better helped to early ambulation, deep breath and cough manoeuvres by registered nurses, in others, these interventions can better fit under the responsibility of physiotherapists.

The article by Reeve et al. [1] has to be well understood and would never be used by hospital administrators as an 'evidence-based' justification to save the money spent in routine perioperative respiratory care which is absolutely necessary for thoracic patients.

## References

- [1] Reeve JC, Nicol K, Stiller K, McPherson KM, Birch P, Gordon IR, Denehy L. Does physiotherapy reduce the incidence of postoperative pulmonary complications following pulmonary resection via open thoracotomy? A preliminary randomised single-blind clinical trial. *Eur J Cardiothorac Surg* 2010;37:1158–66.

- [2] Klepetko W, Aberg THJ, Lerut A, Grodzki T, Velly JF, Walker WS, Ahren C, Arsovski A, Bellenis I, Bequiri S, Berrisford RG, Branscheid D, Bibicic J, Csekeő A, Drescik I, Dussek J, Erzen J, Furmanik F, Godinho MT, Goldstraw P, Gotti G, Halezeroglu S, Hamzik J, Harustiak S, Hasse J, Hartl P, Hostrup P, Horvat T, Ilic N, Jeyasingham K, Kappetein AP, Kecskes L, Laisaar T, Lampl L, Levasseur P, Maggi G, Magnanelli G, Massard G, Moghissi K, Molnar T, Noirhomme PH, Orłowski T, Pafko P, Petricevic A, Pujol JL, van Raemdonck D, Ramos G, Ris HB, Salo J, van Schil P, Schmid RA, Thorpe A, Toomes H, Varela A, Varela G, Venuta F, sa Vieira VM, Weder W, Wihlm JM, Zannini P, Marta GM. Structure of general thoracic surgery in Europe: by The EACTS/ESTS Working Group on Structures in Thoracic Surgery. *Eur J Cardiothorac Surg* 2001;20:663–8.
- [3] Brunelli A, Charloux A, Bolliger CT, Rocco G, Sculier JP, Varela G, Licker M, Ferguson MK, Faivre-Finn C, Huber RM, Clini EM, Win T, De Ruyscher D, Goldman L, European Respiratory Society and European Society of Thoracic Surgeons joint task force on fitness for radical therapy. ERS/ESTS clinical guidelines on fitness for radical therapy in lung cancer patients (surgery and chemo-radiotherapy). *Eur Respir J* 2009;34:17–41.
- [4] Reeve JC, Nicol K, Stiller K, McPherson KM, Denehy L. Does physiotherapy reduce the incidence of postoperative complications in patients following pulmonary resection via thoracotomy? A protocol for a randomised controlled trial. *J Cardiothorac Surg* 2008;3:48.
- [5] Pasquina P, Tramèr MR, Granier JM, Walder B. Respiratory physiotherapy to prevent pulmonary complications after abdominal surgery: a systematic review. *Chest* 2006;130:1887–99.
- [6] Pasquina P, Tramèr MR, Walder B. Prophylactic respiratory physiotherapy after cardiac surgery: systematic review. *Br Med J* 2003;327:1379.
- [7] Hulzebos EH, Helders PJ, Favié NJ, De Bie RA, Brutel de la Riviere A, Van Meeteren NL. Preoperative intensive inspiratory muscle training to prevent postoperative pulmonary complications in high-risk patients undergoing CABG surgery: a randomized clinical trial. *J Am Med Assoc* 2006;296:1851–7.
- [8] Mackay MR, Ellis E, Johnston C. Randomised clinical trial of physiotherapy after open abdominal surgery in high risk patients. *Aust J Physiother* 2005;51:151–9.
- [9] Wright CD, Wain JC, Grillo HC, Moncure AC, Macaluso SM, Mathisen DJ. Pulmonary lobectomy patient care pathway: a model to control cost and maintain quality. *Ann Thorac Surg* 1997;64:299–302.
- [10] Needleman J, Buerhaus P, Mattke S, Stewart M, Zelevinsky K. Nurse-staffing levels and the quality of care in hospitals. *N Engl J Med* 2002;346:1715–22.

Gonzalo Varela\*

Service of Thoracic Surgery, Salamanca University Hospital,  
37007 Salamanca, Spain

\*Corresponding author. Tel.: +34 923 291 383;

fax: +34 923 291 383

E-mail address: gvs@usal.es

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