

What is already known on this topic

Prophylactic respiratory physiotherapy after cardiac surgery is widely used

It is thought to reduce the risk of pulmonary complications such as pneumonia or atelectasis

What this study adds

Evidence is lacking on benefit from any method of prophylactic respiratory physiotherapy after cardiac surgery

It is likely that there are adverse effects and costs only

adequately reported and data analysed according to intention to treat. Over two thirds of the trials attempted to blind the observers.

Practical management of physiotherapy was inconsistent. For example, the reported duration of daily continuous positive airway pressure varied by a factor of 10. Inconsistency suggests that there is uncertainty about each method.

The average incidence of pneumonia was 0-20%. Two reasons may explain this variability. Firstly, there were no uniform definitions of pneumonia; one study used established criteria only. Secondly, most trials were of limited size. Only two studies included groups of more than 50 patients.

The longest observation period was six days; this may be too short to identify all respiratory complications. Nosocomial pneumonia, for instance, occurs on average eight days after cardiac surgery.¹²

In large randomised controlled trials, cointerventions are usually balanced between the groups. Sixteen of the 18 trials, however, had less than 50 patients in each group, thus cointerventions may have affected the efficacy of physiotherapy. Method and intensity of postoperative analgesia may have an impact on pulmonary function.¹³ Early mobilisation may also have an effect on outcome. Only three trials adequately controlled for concomitant analgesia or mobilisation.

Because there was no evidence of any benefit from respiratory physiotherapy, we were unable to determine the cost incurred to generate one patient who would profit from an intervention compared with doing nothing. If there is no benefit, there are only costs, and these are not negligible in this context.

We thank Daniel Haake (medical libraries, Centre Medical Universitaire, Geneva University) for his help in searching electronic databases, and Kathy Stiller, Jean Crowe, and Pascal Matte who provided additional information.

Contributors: See bmj.com

Funding: MRT is a beneficiary of a PROSPER grant from the Swiss National Science Foundation (No 3233-051939.97/2).

Competing interests: None declared.

Ethical approval: None required.

- 1 Lawrence VA, Hilsenbeck SG, Mulrow CD, Dhanda R, Sapp J, Page CP. Incidence and hospital stay for cardiac and pulmonary complications after abdominal surgery. *J Gen Intern Med* 1995;10:671-8.
- 2 Jain U, Rao TL, Kumar P, Kleinman BS, Belusko RJ, Kanuri DP, et al. Radiographic pulmonary abnormalities after different types of cardiac surgery. *J Cardiothorac Vasc Anesth* 1991;5:592-5.

- 3 Carrel TP, Eisinger E, Vogt M, Turina MI. Pneumonia after cardiac surgery is predictable by tracheal aspirates but cannot be prevented by prolonged antibiotic prophylaxis. *Ann Thorac Surg* 2001;72:143-8.
- 4 Mangano DT. Perioperative cardiac morbidity. *Anesthesiology* 1990;72:153-84.
- 5 Taylor GJ, Mikell FL, Moses HW, Dove JT, Katholi RE, Malik SA, et al. Determinants of hospital charges for coronary artery bypass surgery: the economic consequences of postoperative complications. *Am J Cardiol* 1990;65:309-13.
- 6 Thornlow DK. Is chest physiotherapy necessary after cardiac surgery? *Crit Care Nurse* 1995;47:39-46.
- 7 Denehy L, Berney S. The use of positive pressure devices by physiotherapists. *Eur Respir J* 2001;17:821-9.
- 8 Overend TJ, Anderson CM, Lucy SD, Bhatia C, Jonsson BI, Timmermans C. The effect of incentive spirometry on postoperative pulmonary complications: a systematic review. *Chest* 2001;120:971-8.
- 9 Boldt J, Thaler E, Lehmann A, Papsdorf M, Isgro F. Pain management in cardiac surgery patients: comparison between standard therapy and patient-controlled analgesia regimen. *J Cardiothorac Vasc Anesth* 1998;12:654-8.
- 10 Thomas JA, McIntosh JM. Are incentive spirometry, intermittent positive pressure breathing, and deep breathing exercises effective in the prevention of postoperative pulmonary complications after upper abdominal surgery? A systematic overview and meta-analysis. *Phys Ther* 1994;74:3-10.
- 11 Temple R, Ellenberg SS. Placebo-controlled trials and active-control trials in the evaluation of new treatments. Part 1: ethical and scientific issues. *Ann Intern Med* 2000;133:455-63.
- 12 Leal-Naval SR, Marquez-Vacaro JA, Garcia-Curiel A, Camacho-Larana P, Rincon-Ferrari MD, Ordonez-Fernandez A, et al. Nosocomial pneumonia in patients undergoing heart surgery. *Crit Care Med* 2000;28:935-40.
- 13 Hedderich R, Ness TJ. Analgesia for trauma and burns. *Crit Care Clin* 1999;15:167-84.

(Accepted 16 October 2003)

Corrections and clarifications

Mortality in young offenders: retrospective cohort study

We failed to spot an error in table 1 of this paper by Carolyn Coffey and colleagues (*BMJ* 2003;326:1064-6). The total shown for person years of observation for the Victoria population (2 812 387) is in fact for females only. The correct total for males and females should be 6 133 674, giving a crude mortality of 3051 per 6 133 674 (0.5 per 1000). This affects the crude mortality given in the results and discussion but does not affect the standardised mortality ratios from which the paper's conclusions were drawn.

Minerva

Despite popular myth, Minerva is neither a goddess nor terribly wise, she says. She confesses to making two errors in the text that accompanied the picture on 22 November (p 1236). Firstly, the newborn in question was a 5 day old baby, not a 5 year old child. Secondly, she should have said that the problem had been detected by the baby's mother, not the community midwife.

Pre-existing risk factor profiles in users and non-users of hormone replacement therapy: prospective cohort study in Gothenburg, Sweden

The authors of this paper, Kerstin Rödström and colleagues, have reported some errors in their article (*BMJ* 1999;319:890-3). In two places the paper referred to "multivariate" modelling when the authors intended to say "age adjusted." These instances occur in the second sentence of the results section of the abstract and in the heading of the final column of table 2. In a third place—the "multivariate analysis" section of the results—the final sentence should have said that central obesity (measured as waist to hip ratio and waist circumference) "and the body mass index were no longer significant in the multivariate model" [not "seemed slightly more predictive than body mass index, whereas the reverse had previously been the case in the age adjusted model"].