



Clinical Update

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Does Lung Volume Reduction Surgery Work? Initial Results of the National Emphysema Treatment Trial

In 1997, the National Emphysema Treatment Trial (NETT) was set up to rigorously study lung volume reduction surgery (LVRS) and determine if surgical intervention improved patient outcomes when compared with traditional medical therapy.¹

LVRS was initially proposed to address key physiological changes resulting from emphysematous changes, namely decrease in elastic recoil of the lung tissue, decreased maximum expiratory airflow, hyperinflation, and air trapping. Its goal is to reduce the volume of lung tissue in the chest cavity through selective lung excision, allowing more room for lung expansion during normal breathing. Although patients with severe emphysema often reported improvements postoperatively such as decrease in dyspnea or increases in exercise tolerance and quality of life indicators, no systematic study had been done to directly compare surgical excision with medical treatment.

The NETT Trial

The May 22, 2003 issue of the *New England Journal of Medicine* contains reports on the National Emphysema Treatment Trial (NETT), a multicenter, randomized controlled clinical trial, which was set up to compare LVRS and medical treatment of severe emphysema. Between January 1998 and July 2002, 1,218 patients with severe emphysema were assigned randomly to either a surgical (608) or medical (610) treatment pathway². Emphysema was diagnosed by medical imaging and pulmonary function testing showing severe airflow obstruction with hyperinflation. Patients with co-morbidities were excluded¹.

Results: Primary Analysis

Total mortality from any cause was calculated from date of randomization and for a mean follow-up of 29.2 months per patient. Twenty-six percent of members in the surgery group died – the same as in the medical treatment group. Exercise capacity improved in 15 percent of surgical patients compared with 3 percent of patients treated medically.

During the first year of the study, the mean hospital days, days of ambulatory care, plus nursing home admissions were, not surprisingly, higher for the LVRS group than for the medical group. During the second year, however, the mean hospital days and emergency room visits were significantly lower for the surgical group. The third year of the study showed no significant differences between the medical and surgical groups' use of resources³.

Costs showed the same trend – higher in the first year and lower in the second year for the surgical patients, with no significant difference between

the two groups in year three. The surgical group showed an increase in the number of quality-adjusted life years for 12 to 24 months after surgery. Given costs and benefits over three years of follow-up, LVRS is costly relative to medical therapy. The procedure may become more cost-effective if results can be maintained for longer than three years – data not yet available.

Secondary Analysis Provides Interesting Wrinkles

Secondary analysis of study data showed patient subgroups could be identified: those that were at higher risk for surgery, and those that were more likely to benefit from LVRS. The secondary analysis found⁴:

- Mortality was lower in surgical patients who had disease localized to upper lobes and low exercise tolerance preoperatively – 20 percent at 36 months of follow-up compared with 40 percent in those treated medically.
- Patients had higher mortality postoperatively when emphysema was more diffuse and when they had a high exercise capacity; furthermore, there was no reduction in morbidity compared with study patients treated medically.

What's the Answer?

The results of this study provide a wealth of information about actual results of surgical vs. medical intervention. However, as physicians debating the study outcome in this issue are quick to point out, it's just too soon to tell. The key question is: Can surgical benefits be sustained over a longer term, for example, ten years? Improvements in cost-effectiveness and increases in quality-adjusted life years sustained over this time could in fact verify that the surgical path is the best – at least for the patient subgroups for whom LVRS has been shown to provide the best outcomes.

Right now, at the three-year point for all patients in the study who had LVRS, the cost was \$190,000 per quality-adjusted life year gained (QALY). If only costs for the one-quarter of patients identified as most likely to benefit from surgery are considered, cost drops to \$98,000 per QALY gained. Compare these values to dialysis or CABG where cost is \$60,000 or less per QALY gained. However, if benefits can be sustained for ten years postoperatively, cost drops to \$53,000 per QALY. Those benefits remain to be seen.

In the future, look for LVRS to be reserved for fewer patients who are most likely to benefit from surgery. Increasing use of microsurgical techniques that allow surgery to be done thoracoscopically without median sternotomy (in the study group, 70% had median sternotomy) will speed recovery. The use of smaller, portable chest drains postoperatively will allow patients to be mobile sooner, further enhancing recovery. The thoughtful combination of patient selection and state-of-the-art technology will make LVRS an important part of COPD treatment in years to come.

See sources on back page.

Check Your Knowledge...

Q. What single factor is associated with reducing the length of stay in hospitalized surgical patients?

Answer on other side

Clinical Update is an educational newsletter provided by Atrium Medical Corporation and is edited by Patricia Carroll, RN,BC, CEN, RRT, MS.

In The Literature

Aging and Shift Work: Keys to the Nursing Shortage

An article in a recent issue of *Nursing Economic\$* examines the ongoing nursing shortage from a unique perspective: how to manage round-the-clock needs with an aging workforce.

According to author Elizabeth Ellen Cooper, hospitals need to work to retain experienced nurses while recruiting and training younger nurses. In addition, employers need to find ways to offset the negative impacts of night shift work, including providing sleeping areas, more flexible scheduling, job sharing, and more ergonomic working environments. She asserts that retaining even two nurses at a facility (replacement cost, \$60,000 per nurse) would more than offset the cost incurred for these improvements but concludes that more research is needed to explore these crucial issues for nurses and nursing practice.

Source: Cooper EE. Pieces of the shortage puzzle: aging and shift work. *Nursing Economic\$* 2003;21(2):75-79.

Family Presence: Benefit, Inconvenience, or Harm?

Should family members be present when their loved one is being given CPR or undergoing another invasive procedure? An article in the current issue of the *American Journal of Critical Care* reports the results of a survey of critical care and emergency room nurses. The 30-item survey was mailed randomly to 1,500 members of the American Association of Critical-Care Nurses and 1,500 members of the Emergency Nurses Association. The survey consisted of demographic questions as well as queries about the respondent's preferences, practices, and hospital policies related to family presence during CPR and invasive procedures.

Results showed that only 5% of respondents worked in units that had written family presence policies. Despite the lack of any formal policy, family presence was supported during CPR by 45% of nurses and during invasive procedures by 51%. Forty percent of those surveyed had escorted a family member to the patient's bedside. About 25% reported barring family members during these procedures.

Since only 5% of units had written policies, it is clear that nurses working in all hospital areas need to develop clear policies and procedures about family presence. Perhaps a consultation with our colleagues in the delivery room, who faced this issue many years ago, would be helpful. The study authors call for more research into this important area and encourage units to explore and develop written policies and guidelines that meet the needs of nurses, patients, and families.

Source: MacLean SL, Guzzetta CE, White C, Fontaine D, Eichhorn DJ, Meyers TA, and Desy P. Family presence during cardiopulmonary resuscitation and invasive procedures: practices of critical care and emergency nurses. *American Journal of Critical Care* 2003;12(3):246-257.

Strategies for Decreasing Medication Administration Errors

Medication administration errors (MAE) are a major concern for health care institutions, nurses, and patients. An article in the current issue of *MedSurg Nursing* discusses the potential for applying airline safety practices to medication administration. The author suggests that the health care industry follow the lead of the airline industry in five areas:

1. Establish a safety culture
2. No conversation during medication administration (just as there's no conversation during the most critical parts of flight-takeoff and landing)
3. Use teamwork (check and cross-check)
4. Establish clear lines of authority to limit interruptions (medication administrators should wear a visible symbol of their role, plus a large print name tag that indicates job title -- RN, LPN, or Medication Tech -- just as flight crews wear distinctive uniforms)
5. Use a checklist (standard medication protocol for medication administration, just as airlines use a standard takeoff and landing checklist)

The author suggests further research to replicate these ideas in multiple settings and nursing models, as well as identifying the most effective symbols to designate medication administration and ways to decrease distraction during medication administration.

This is not the first time nurse researchers have looked to airline pilots -- you may recall that The Dreyfus Model of Skill Acquisition, which formed the basis for Patricia Benner's Novice to Expert matrix was initially developed to study airplane pilots' performance. Creative application of models designed for other professions provide a rich opportunity to enhance nursing practice.

Source: Pape, TM. Applying airline safety practices to medication administration. *MED-SURG Nursing* 2003; 12(2):77-93.

On the World Wide Web...



You can explore a number of web sites to learn more about the National Emphysema Treatment Trial, as well as general information about emphysema. Here are some of the best sites.

<http://www.emphysemastudy.org>

This site provides information about emphysema, the NETT, a glossary of medical terms, information about study enrollment and sites (however, enrollment is now closed). There's also a news link to recent press releases about the NETT and an easy-to-use "contact us" link. You can find more news releases on <http://www.nhlbi.nih.gov/new/press/03-05-20.htm>.

<http://clinicaltrials.gov/show/NCT00000606>

This site, a service of the National Institutes of Health, links patients with information about current medical research. This section of the site focuses on the NETT. A useful feature is a list of links at the bottom of the page, which provide direct access to journal articles about the NETT.

<http://www.nhlbi.nih.gov/health/prof/lung/nett/lvrsweb.htm>

This site also describes the NETT study in detail and gives specific information about emphysema and LVRS.

Sources:

1. National Emphysema Treatment Trial Research Group. Rationale and design of the National Emphysema Treatment Trial: a prospective randomized trial of lung volume reduction surgery. *Chest* 1999;116:1750-1761.
2. National Emphysema Treatment Trial Research Group. A randomized trial comparing lung-volume-reduction surgery with medical therapy for severe emphysema. *NEJM* 2003;348:2059-2073.
3. National Emphysema Treatment Trial Research Group. Cost effectiveness of lung-volume-reduction surgery for patients with severe emphysema. *NEJM*; 2003;348:2092-2102.
4. Ware JH. The national emphysema treatment trial - how strong is the evidence? *NEJM*; 2003;348:2055-2056.

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Check Your Knowledge...

A. The earlier patients get out of bed and walk, the sooner they go home.