primarily non-discretionary and it had the least variaion, whereas hysterectomy for menstrual hemorrhage and sequelae, which is primarily discretionary, showed the most variation in its rates. These findings further support our conclusion that greater variation is associated with procedures (and indications) that are primarily discretionary. Rates by indications could be determined for other primarily discretionary procedures such as prostatectomy, cholecystectomy and, if outpatient data were available, hemorrhoidectomy and varicose-vein surgery.

The editorial points out the problem of the unavailability of outpatient surgery data, a concern that we share and that we discussed in our paper. We explained that "to test the new index" we selected "operations expected to show increased variation because of the absence of outpatient surgery from our data file." Our conclusions are the same with or without the 10 procedures that are sometimes performed on an outpatient basis, and these procedures could easily be ignored in the analysis, because each of the 39 procedures was analysed independently. If those 10 procedures were eliminated from the analysis, hysterectomy and cesarean section would rank first and second in variation instead of fourth and sixth. We suggested further in-depth studies for three primarily discretionary procedures (prostatectomy, hysterectomy and cholecystectomy) that were done on an inpatient basis (where the data were complete), not for procedures for which the rates were confounded by unknown numbers of outpatient operations.

The strength of our paper is not in *how many* discretionary procedures are in the top half of the rankings, as the editorial implies, but in the fact that the primarily discretionary procedures rank higher in variability than the intermediate procedures, which rank higher in variability than the primarily non-discretionary procedures.

We agree with the editorial that, "studies using important outcomes as end points . . ." are necessary to develop appropriate practice guidelines and that "it is the health care providers who need to become involved in developing the evidence-based standards of practice . . . ." We are pleased that the editorial acknowledges that our paper has "identified several procedures for which the indications need to be examined and alternative treatments need to be compared in future clinical studies." Like Tandan and Langer we also look forward to the day when outpatient surgical data are available, so that all-inclusive counts and rates can be calculated for all operations. Meanwhile, we are pleased that our analysis may light the way for subsequent studies of the causes of variation and the development of appropriate guidelines.

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## References

1. Gentleman JF, Parsons GF, Walsh MN, Vayda E. High and low surgical procedure rates in census divisions across Canada [published erratum appears in *Health Rep* 1995;7:64]. *Health Rep* 1994;6:403-40.
2. Hall RE, Cohen MM. Variations in hysterectomy rates in Ontario: Does the indication matter? *Can Med Assoc J* 1994;151:1713-9.
3. Vayda E, Gentleman JF, Walsh MN, Parsons GF. Hysterectomy rates by diagnosis: variation among Canadian census divisions. *J Soc Obstet Gynecol* 1996;18:315-25.



## Alternative management for post-thoracotomy pain syndrome

Post-thoracotomy pain syndrome has been, and I anticipate will be, a continuing major problem for thoracic surgeons. Standard treatment by rest, analgesia, physiotherapy and nerve-root injection often provides little relief. Recently, I had two patients with severe post-thoracotomy pain syndrome who I treated in this way, but with little success. Both were unable to return to work and required ongoing treatment with narcotic drugs. As I monitored their progress it became obvious that a scoliosis had developed concave to the operated side associated with a great deal of spasm in the paraspinal muscles. Because there have been many reports recently in the chiropractic literature of chest pain relieved by manipulation of the costovertebral joints, I approached a doctor of chiropractic about these two patients. He elected to treat the patients both by direct joint manipulation and by attempting to open up the posterior facets by flexing the patients over a rolling drum. The results were dramatic: both patients no longer required narcotic drugs to relieve their pain. One, who had been incapacitated for 2 years, was completely relieved of pain and had only slight numbness in the distribution of the involved nerve root and was able to return to work. The other

had pain relief estimated to be more than 80% and no longer required major analgesics.

In most patients, post-thoracotomy pain will eventually resolve, and in both of my patients, who had protracted pain, the condition may have been about to improve spontaneously. Certainly the results have very little scientific significance. The magnitude of the problems that both of these patients faced, however, seemed so monumental and the relief that they obtained from the chiropractor's treatments was so dramatic that I believe it is worth communicating with readers of the journal this approach as an alternative to be considered in patients with serious post-thoracotomy pain syndrome. Perhaps with a wider patient base and experience this may prove to be a beneficial method of treating these patients whose condition is so difficult, if not impossible, to manage by the current standard treatment.

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## Monitoring patients in the intensive care unit after carotid endarterectomy

We are worried that Dr. Passerini's suggestion that postoperative intensive care unit (ICU) monitoring of patients who have undergone carotid endarterectomy (CE) is unnecessary (*Can J Surg* 1996;39:99-104) will be adopted as a cost-saving measure in some centres without further scrutiny.

Based on her Table IV (page 103), she stated that the "absence of events in the RR [recovery room] had a negative predictive value of 97%," implying that monitoring in the recovery room acts as a satisfactory screening test for postoperative complications. However, the data have been artificially forced into a two × two table format, since it is impossible to classify a patient who suffers a recovery-room complication as having no overall complication; this cell can be nothing other than zero. It is more proper to state that 97% (104 of 107) of those without complications in the recovery room continued to be free of major problems during their hospitalization. A more pessimistic view of the same data is that if the author's recommendations had been in effect during the study period, 38% (three of eight) of all major complications developed beyond the recovery-room period, potentially on the surgical ward. Also, the study patients spent an average of 3.5 hours in the recovery room, a period of time that may differ significantly from that in other hospitals — our endarterectomy patients remain in the recovery room a mean of 63 minutes before routine transfer to the ICU.

It is difficult to accept the author's strong conclusion that routine postoperative ICU care is unwarranted, since this study was an observational case series, lacking a control group for comparison. The routine ICU care that in fact occurred during this study may well have averted additional major complications. Clearly, whether or not ICU care prevents the development of, or progression to, significant complications will only be answered by a prospective controlled trial with randomization of care to either the ICU or general ward.

In Edmonton, hemodynamic instability is a common phenomenon after CE, developing in 62% of patients postoperatively.[1] Previous cohort studies have linked postoperative fluctuations in blood pressure with major complications,[2-4] and our experience is that severe postoperative systolic hypertension (greater than 220 mm Hg) is significantly associated with stroke and death. Although we believe that hemodynamic problems are best recognized and treated in an ICU setting, an acceptable compromise may be the use of intermediate care units with readily available arterial line monitoring and intravenous vasoactive agents.[5]

In these times of fiscal restraint, there are calls from all sides to restrict the use of expensive resources such as the ICU. However, since the question of whether ICU care actually prevents complications has not yet been answered, should not the surgeon's argument be to err on the side of patient safety? Until we become more skilled in predicting which patients are at most risk, where we decide to care for our patients after CE will depend on surgeon preference and availability of ICU resources. We must ensure that our decision continues to be founded on medical grounds rater than financial concerns.

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## References

1. Wong JH, Findlay JM. Perioperative hemodynamic instability after carotid endarterectomy. *Can J Neurol Sci* 1996;23:S888.
2. Bove EL, Fry WJ, Gross WS, Stanley JC. Hypotension and hypertension as consequences of baroreceptor dysfunction following carotid endarterectomy. *Surgery* 1979;85:633-7.