Anecdote or science?

A. Dale Vellet, MB, BCh ; Donald Lee, MB, BCh

Editorial

Éditorial

Dr. Vellet is Editor of the *Canadian Association of Radiologists Journal* and Associate Professor with the Department of Diagnostic Imaging, University of Calgary, Calgary, Alta.; and Dr. Lee is Associate Professor with the Departments of Diagnostic Radiology and Clinical Neurological Sciences, University of Western Ontario, London, Ont.

Can Med Assoc J 1998;158:63-4

See related articles pages 29 and 61

A fundamental aspect of medical therapy is the role of physician judgment in decision-making. Although many factors are involved, this process should ideally be based on the most comprehensive, objective data available. A major component of decision-making in the management of mechanical neck and back problems is the information obtained by diagnostic imaging.

Elsewhere in this issue (page 29), Dr. John N. Lavis and colleagues compare the rates of medical and surgical hospital treatments for a broad cross-section of mechanical neck and lower back disease in adults in presumably similar jurisdictions in Ontario and the US between 1982 and 1992. Their article demonstrates 3 major trends in the medical and surgical management of back diseases: a significant decrease in conservative in-hospital (medical) therapy in both jurisdictions, although to a greater extent in the US; an increase in the rate of in-hospital surgery (fusion and nonfusion) in both jurisdictions, again to a greater extent in the US; and a divergence between Ontario and the US in the rate of fusion surgery in elderly patients (this rate increased in both jurisdictions, but the increase was disproportionately higher in the US than in Ontario).

The authors speculate that the differences they observed may relate to incentives, the mix of physicians and the supply of medical technology, and they recommend that further work is needed to confirm these findings.

The rate of back surgery in the US is significantly higher than elsewhere in the world.[1] However, the trend of increasing surgery for back disease is not occurring in isolation. The annual rate of total knee arthroplasty in the US is increasing annually by 18.5%,[2] and between 1987 and 1992 there was an increase of between 125% and 175% in the rate of coronary artery bypass surgery in North America.[3] In part, the increasing rates of back surgery, knee arthroplasty and coronary artery bypass surgery reflect the fact that major surgery no longer presents substantial risk to elderly patients and is therefore performed more readily. This trend does not, however, explain the divergence between Ontario and the US in the frequency of spinal fusion surgery in elderly patients.

An interesting observation is that the percentage increases in the rates of surgical fusion for Ontario and the US are similar (see Table 3, page 33), although with an apparent age differential: relative to the baseline year of 1982, the percentage increases in the US rate of surgical fusion among patients 20 to 64 years of age for 1987 (148.7%) and 1992 (237.7%) are essentially equivalent to the percentage increases in the Ontario rate for patients 65 years of age and older (135.0% and 247.5% respectively). Without more detailed information on age and surgical site stratification, it is not possible to draw any conclusions from this observation. However, the similarities in these figures raises the questions of whether the apparent difference in the rates of spinal fusion between Ontario and the US might be "artificial" and to what extent the difference in rates and the age differential are influenced by the discrepancy in access to CT and MRI.

The frequency of surgery for spinal stenosis is increasing.[4] The report categorizes the surgical procedures according to whether or not fusion was performed, but not according to anatomic region, indication for spinal fusion or type of surgical procedure. This is important because the lack of benefit of spinal fusion in lumbar disk disease and spinal stenosis has been extensively documented. However, in the cervical spine, anterior diskectomy and fusion is well recognized and highly effective in treating herniated disk disease. Most cervical spine fusion is performed in elderly patients, and we believe that this, rather than an increase in the frequency of lumbar spinal fusion, accounts, at least in part, for the increasing

rate of fusion surgery in the elderly. It is to be expected that as the population ages, a successful therapy such as cervical fusion will be performed more frequently.

The authors were unable to obtain data on important explanatory variables such as age distribution within the different surgical categories, socioeconomic status of the patients, characteristics of the US jurisdiction under consideration (in particular physician distribution and characteristics) and comparisons with other discretionary and non-discretionary surgical procedures. In an analysis of this kind, such information is pertinent. For example, the potentially higher proportion of poorer citizens — those without medical coverage — in a given US jurisdiction means that the cost of expensive imaging (especially technology such as CT and MRI) may have affected discretionary decision-making and led to unwitting bias by the authors in the sample under consideration.

There are recognizable differences — structural, administrative, philosophical, psychological and cultural — between the US and Canadian health care systems. Notwithstanding these differences and their potential amplification by the aging of the population in both countries, the reported divergence between Ontario and the US in the rate of spinal fusion in the elderly population is unexpected.

The authors speculate that differences in diagnostic imaging technology and in numbers of specialist surgeons (specifically neurosurgeons and orthopedic surgeons) may in part account for the differences in rates of spinal fusion. This point is critical, given that the glaring differences between Ontario and the US presented throughout this retrospective analysis represent the restrictive distribution (on a per capita basis) of specialist surgeons, the restriction of physician and patient access to these surgeons and, especially, the restriction of the diagnostic imaging technologies (CT and MRI) required for adequate patient selection for specific therapies. The magnitude of the discrepancy in technology is apparent in the per capita distribution of MRI units in the 2 countries: 8.2 units per million people in the US and 1.3 units per million people in Canada. As of 1992, there were, on a per capita basis, approximately 3 times the number of orthopedic surgeons and neurosurgeons in the US as in Canada, and these specialists were supported by approximately 3.6 times the number of CT units and 6.3 times the number of MRI units as in Canada.

This discrepancy is further amplified by the restriction in access to and use of MRI in various jurisdictions in Canada, especially central Canada. However, on the basis of number of physicians per capita and assuming that discretionary care is the reason for the increase in surgery, there should be 2 to 4 times the number of surgical procedures in the US as in Canada for all age groups; this was not the case. Any difference in the absolute numbers of procedures in all age groups should reflect the differences in the number of specialist surgeons and in imaging technology between the 2 countries.

Lavis and colleagues could not describe the nature or duration of alternative therapies before surgical intervention nor the outcomes in the different categories. The analysis did not make corrections for different surgeons or different techniques. These factors are relevant because the study involved an increasingly health-aware population. Furthermore, the effect of improvements in anesthetic and surgical techniques realized during the period of the study have not been factored into the analysis.

The authors admit that a postoperative outcome analysis covering quality of life is lacking. In this regard, Oswestry disability scores improved after surgery over a 6-year period in a study from Finland.[5] In another study, 75% of patients who underwent surgery for degenerative spinal stenosis were satisfied with the results.[6] On this basis, surgery seems to be effective.

CT and especially MRI have had a major impact on the diagnosis and management of an ever-increasing number of neurological and non-neurological diseases. Unfortunately, Canada still has a significant deficiency of MRI technology compared with other industrialized nations. Perhaps the most important question posed by this study but left unanswered is the extent to which the per capita distribution of CT and MRI contributed to the divergent incidence of back surgery, particularly in the elderly.

To objectively evaluate differences in "discretionary" physician management of mechanical neck and back problems, in particular the incidence of spinal fusion, it is important to prospectively compare discretionary care in the context of equivalent, non-restrictive resource environments. Any comparison between the Canadian and US health care systems in which diagnostic imaging technology such as CT or MRI may have a major role in "discretionary" patient management is subject to error.

References

1. Anderson GM, Grumbach K, Luft HS, Roos LL, Mustard C, Brook R. Use of coronary artery bypass surgery in the United States and Canada. Influence of age and income. *JAMA* 1993;269:1661-6.
2. Ciol MA, Deyo RA, Howell E, Kreif S. An assessment of surgery for spinal stenosis: time trends, geographic variance, complications and reoperations. *J Am Geriatr Soc* 1996;44:285-90.
3. Cherkin DC, Deyo RA, Loeser JD, Bush T, Waddell G. An international comparison of back surgery rates. *Spine* 1994;19:1201-6.
4. Katz BP, Freund DA, Heck RA, Dittus RS, Paul JE, Wright J, et al. Demographic variation in the rate of knee replacement: a multi-year analysis. *Health Serv Res* 1996;31:125-40.
5. Herno A, Airakainen A, Saari T. Long-term results of surgical treatment of lumbar spinal stenosis. *Spine* 1993;18:1471-4.
6. Katz JN, Lipson SJ, Chang LC, Levine SA, Fossel AH, Liang MH. Seven to 10 year outcome of decompressive surgery for degenerative lumbar spinal stenosis. *Spine* 1996;21:92-8.

Reprint requests to: *Dr. Dale Vellet, Department of Diagnostic Imaging, Foothills Hospital, 1403–29 St. NW, Calgary AB T2N 2T9; fax 403 283-5386*