The Economics of Thrombolysis

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Stroke leads to significant long-term disability with important ongoing human and economic costs. Although the clinical and economic benefits of thrombolysis have been demonstrated in previous analyses,1 efficacious large volume stroke care requires systematic organization and commitment on the part of healthcare payers. Canada benefits from a universal single-payer system which faces increasing cost pressures attributable to an ageing population and increasing costs of healthcare technology. The Organization for Economic Cooperation and Development (OECD) estimates that healthcare spending could double as a proportion of GDP in this country by 2050.2 The Canadian Institutes of Health Information note that Canadian jurisdictions spent 38.7% of all expenditures on health care in 2005 to 2006.3 Development and maintenance of stroke care systems will require well executed economic analyses to influence policy makers.

In this regard, stroke is an ideal condition to treat from an economic perspective because its incidence is strongly age-linked and any intervention that reduces disability is likely to substantially reduce long-term costs. However, any treatment that reduces mortality but leaves disability may increase total costs attributable to the high cost of long-term nursing care of brain-injured patients.

Stroke thrombolysis has not been shown to reduce mortality. In the pivotal National Institute of Neurological Disorders and Stroke tissue plasminogen activator (NINDS tPA) Stroke Trial, a nonsignificant 4% reduction in mortality was observed, but this was not confirmed in the pooled analysis of randomized controlled trials. However, thrombolysis does reduce morbidity. Previous cost-effectiveness analyses have suggested large cost-savings per patient treated even with a relatively short 1-year timeline.

In the current issue of Stroke,4 Yip and Demaerschalk use a simple conservative cost-utility model and estimate the potential cost-savings at a Canadian national level from the expanded use of thrombolysis. The calculations are simplified and easy to follow. Using currently available estimates, the cost savings could increase from half a million to $7.5 million annually if 20% of ischemic stroke patients were thrombolysed. If a larger annual cost savings per patient was considered, the result could be $50 million annually. In the United States, with a population 10-fold larger, the estimated savings could be as high as $500 million annually.

There are some limitations inherent to this analysis. The assumption of a payer perspective sacrifices the ability to compare healthcare benefits to other interventions. When expressed in quality-adjusted life-years, cross disciplinary comparisons can be made to other currently funded treatments. Furthermore, direct health expenditures do not include indirect costs and productivity loss expected for a condition with a long survival such as stroke. In general this form of analysis underestimates, potentially by a significant amount, the expected economic benefit to society. As an example, individuals undergoing thrombolysis would also be exposed to secondary prevention interventions with additional benefit attributable to reductions in the rate of subsequent vascular events. The method used to estimate current costs is problematic, and further costing studies will be needed to increase its precision. We would encourage further development of the analysis to include other costs and a second order probabilistic sensitivity analysis which would help establish the conditions under which the intervention is expected to be cost saving.

Furthermore, the use of administrative data to define stroke occurrence in Canada has to be done carefully. Administrative data are particularly useful in Canada because it is collected on a population-wide basis for all hospital admissions and collated at the Canadian Institutes for Health Information. The operational definitions of stroke using these data were not ideal in the current study5 but certainly provide a reasonable estimate of stroke rates in the country.

Nevertheless, the exercise shown here serves to provide some hard numbers, which can be taken to hospital administrators, policy makers and legislators. The fact is that stroke is treatable, and the treatment of stroke results in large downstream cost savings. A small investment upfront in better public education and acute stroke management can pay big dividends in the long run. Stroke clinicians have a significant role to play in influencing policy with respect to stroke care. Credibility with policy makers is significantly enhanced if funding proposals are accompanied by economic analyses. We encourage readers to use these results to lobby for improved stroke care.

Disclosures

Both authors have received honoraria from Hoffmann-La Roche Canada Ltd for educational symposia in the last 5 years. Total for both was <$10 000. Dr Hill has received a gift-in-kind of tPA for a local investigator driven study. The retail cost of the drug was
>$10,000. Hoffmann-La Roche is the whole owner of Genentech and distributes tPA for Stroke in Canada.

References
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