Appropriateness: The Next Frontier in the Quest for Better Access to CT and MRI

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The Issue

Medical imaging, such as computed tomography (CT) and magnetic resonance imaging (MRI), is now an essential part of modern healthcare. The tests provide non-invasive diagnosis for a wide range of conditions, and their use has undoubtedly improved health outcomes for many individuals. However, in many developed countries, marked increases in imaging use are now straining healthcare expenditures and threatening health system sustainability. For example, in Ontario, between 1993 and 2003, the number of CT scans increased by 400% and the number of MRI scans increased by 700% (Tu et al. 2005). Despite these massive increases in capacity, Canadians have remained concerned about unreasonable wait times for CT and MRI (Priest 2009, February 23). In response, governments have committed a considerable amount of resources to address the access problem.

In Ontario, some progress has been made for CT. Since the launch of the provincial wait times strategy in 2004, waits for CT have been reduced from 81 to 36 days (although they still remain above the provincially set target of 28 days). However, the same cannot be said for MRI. Despite a doubling in MRI volumes between 2002 and 2006, wait times for MRI remain at 107 days – well above the 28-day target. When seeing these patterns, one obvious question is whether, in some cases, these tests are being over-prescribed.

Three recently published studies by the Institute for Clinical Evaluative Sciences (ICES) have shed some light on the question of appropriateness of diagnostic imaging in Ontario. In this brief report, we highlight the findings and implications of these studies.

Provincial Audit of CT and MRI Use

Key Findings

This provincial audit of scan requisitions and reports examined the reasons for ordering and results of 11,824 outpatient CT scans and 11,867 outpatient MRI scans performed on or after January 1, 2005, from a representative, randomly selected sample of 29 Ontario hospitals (You et al. 2008). The key findings from the study are as follows:

- Headache was the most frequent indication for CT scans of the brain: less than 2% of these scans found treatable abnormalities that could explain the headache.
- Back pain was the most common indication for MRI scans of the spine: 90% of these scans were abnormal, but the clinical importance of the abnormalities was unclear.
- Over half of MRI scans of the extremities were for knee pain or suspected cartilage tear: 80% of these scans were abnormal, but the clinical importance of the abnormalities was unclear.
- Cancer-related indications accounted for over 50% of CT scans of the abdomen/pelvis and chest.
- Family physicians – not just specialists – frequently order CT and MRI scans.

Implications

For the first time, this study provides information about why CT and MRI scans are being ordered and how often these scans find abnormalities that are likely to influence patient management. These detailed clinical data, which are not captured in Ontario Health Insurance Plan (OHIP) claims data, provide greater insights into the marked increases in CT and MRI volumes in Ontario and suggest that, in some cases, scans are being ordered when they are not really necessary. CT and MRI scans are a crucial part of the care for many patients, and they are waiting too long to undergo their tests. One way of reducing wait times is to not order scans for patients who are unlikely to benefit from them. If inappropriate use can be reduced, then access to CT and MRI scans can be improved for those more likely to benefit from their use.

Physicians Say Access to CT and MRI Is Better, But No One Said Care Is Better

In a subsequent study, a series of interviews were conducted between November 2006 and April 2007 with 19 well-respected Ontario physicians from diverse practice settings – academic medical oncology, academic orthopedic surgery, academic spine surgery, a northern Ontario family practice, a southern Ontario

urban family practice and radiology – and academic clinicians who frequently order CT/MRI scans of the brain. The purpose of the interviews was to elicit the physicians' attitudes about the findings from the Ontario CT and MRI audit. It is important to note that findings from this study should be viewed as preliminary, given the small number of physicians who were interviewed (You et al. 2009).

Key Findings

From the interviews emerged a picture of a fragmented, poorly coordinated healthcare system, with different groups of physicians blaming each other for inappropriate CT and MRI use. Although some physicians said that access to CT and MRI was improved, none felt that care had improved as a result. Specialists and radiologists identified family physicians as the source of the most inappropriate ordering. Spine surgeons, in particular, were frustrated at the number of patients they see unnecessarily because of results on MRI scans they believe should not have been ordered in the first place. Family physicians, however, were frustrated by the fact that many surgeons will not see a new referral unless the patient has first had an MRI. Physicians also described a number of non-clinical reasons for ordering CT and MRI scans, including defensive ordering because of fear of malpractice litigation and patient demand.

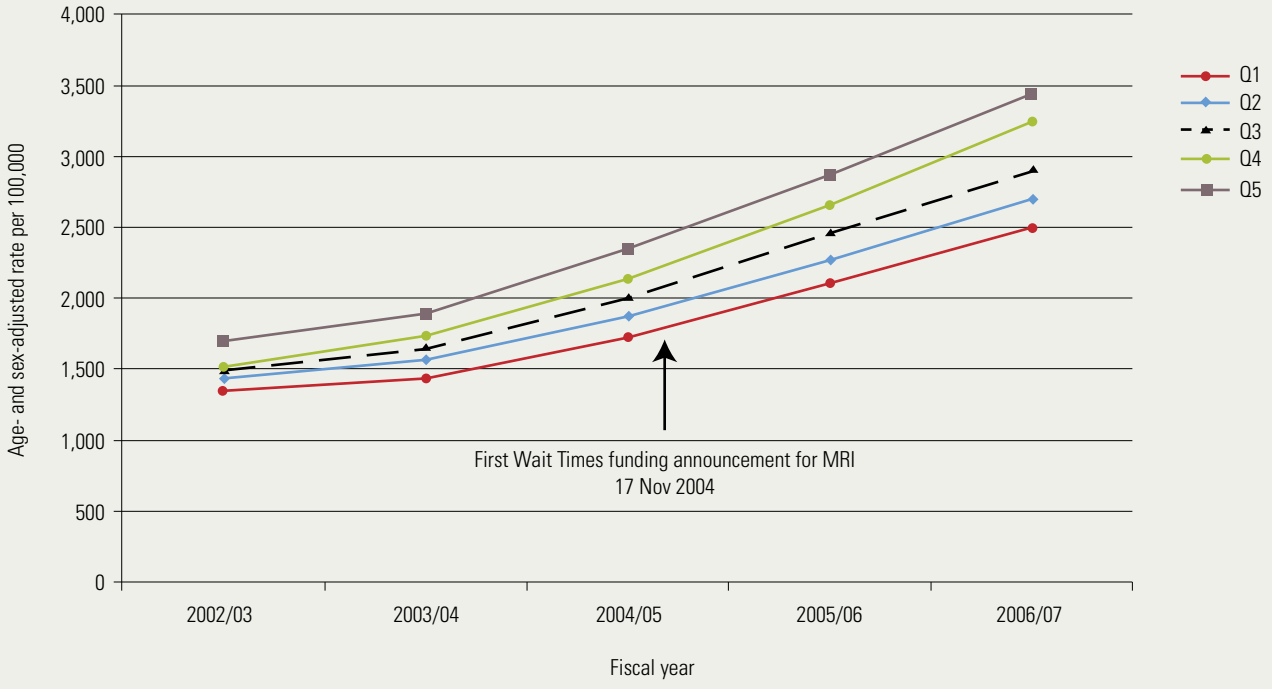
Implications

These findings suggest that increases in CT and MRI capacity may not be leading to better care for patients. The study also suggests that in order to develop effective solutions to optimize the use of CT and MRI, we must not only improve the capacity to perform these tests but also improve the structures and processes within the healthcare system, foster more effective communication between physician groups and understand the factors that influence physicians and patients to request CT and MRI scans.

Access to MRI: The Growing Gap between Rich and Poor

The third study was a population-based analysis of all OHIP claims for outpatient MRI scans performed between April 1, 2002 and March 31, 2007. Neighbourhood income at the level of the census dissemination area (the smallest geographical areas for which census data are made available by Statistics Canada) was used as a proxy measure of the personal income of patients

Figure 1. MRI use in Ontario by neighbourhood income, 2002–2003 to 2006–2007



Rates of outpatient MRI use within each neighbourhood income quintile are adjusted for age and sex by direct standardization to Ontario's 2001 population. Q1–Q5 denote neighbourhood income quintiles, with Q1 representing the lowest-income neighbourhoods and Q5 indicating the highest-income neighbourhoods. MRI = magnetic resonance imaging; neighbourhood = Statistics Canada census dissemination area.

receiving MRI scans. MRI scanning rates, expressed as the number of MRI scans per 100,000 population, were adjusted for age and sex since these factors might have an important impact on the frequency of MRI scanning.

Decision-makers should be aware that efforts to increase capacity may have the unintended consequence of exacerbating disparities in access according to socioeconomic status.

Key Findings

The age- and sex-adjusted population rates of MRI scanning doubled from 1,511 per 100,000 to 2,976 per 100,000 between fiscal years 2002–2003 and 2006–2007, respectively. Although rates of MRI use rose for all income groups, increases were greatest among the wealthiest 20% of the population, so the gap in access between rich and poor widened over the five-year period (Figure 1). By 2006–2007, Ontarians living in the richest neighbourhoods were 38% more likely to receive an MRI scan than were those living in the poorest neighbourhoods (You et al. 2009).

Implications

These findings have several possible explanations. One is that lower-income individuals are less able to navigate the healthcare system and gain access to MRI. Another explanation is that a greater number of inappropriate scans are being performed among wealthier patients. However, this was a descriptive study and was not specifically designed to determine the causes of the increasing disparity in MRI use. More research involving surveys or interviews with patients and physicians is needed to understand the underlying reasons for the study findings. Regardless, the findings underscore that, even in jurisdictions with universal health insurance, decision-makers should be aware that efforts to increase capacity may have the unintended consequence of exacerbating disparities in access according to socioeconomic status. The study emphasizes the need for simultaneous initiatives that aim to target new services according to need and that strive to improve the appropriateness of health services use.

Final Thoughts

Efforts to improve access to CT and MRI by increasing capacity alone are unlikely to be successful. Increasing the appropriateness of CT and MRI use will be essential if we are to successfully provide timely access to *high-quality* care. Steps to achieve more appropriate CT and MRI use include the following:

1. Committing resources to the ongoing, computerized collection of data (e.g., indications and results of CT and MRI scanning) that would allow real-time assessment of the appropriateness of current patterns of use.
2. Implementing knowledge translation strategies that put practice guidelines into the hands of clinicians when they need them (e.g., computerized order entry for diagnostic imaging tests with evidence-based decision support). Several commercial vendors have developed such software; however, the impact of these systems has been highly variable, and careful planning of the implementation and subsequent evaluation of their benefits will be critical.
3. Understanding the root causes of physician and patient behaviours. In particular, delineating the non-clinical factors, health system structures and processes, and incentives that influence decisions to use medical imaging tests will be crucial to the successful development of effective strategies to improve the appropriateness of CT and MRI ordering. HQ

Acknowledgements

The above three studies were funded by the Ontario Wait Times Strategy and ICES, which receives core operating funds from the Ontario Ministry of Health and Long-Term Care (MOHLTC). Dr. You is supported by an Ontario MOHLTC Career Scientist Award.

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