OHTAC Recommendation

Constraint-Induced Movement Therapy for Rehabilitation of Arm Dysfunction After Stroke in Adults.

Presented to the Ontario Health Technology Advisory Committee in May 27, 2011

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OHTAC Ontario Health Technology Advisory Committee

Issue Background

A stroke is a sudden loss of brain function caused by the interruption of blood flow to the brain (ischemic stroke) or the rupture of blood vessels in the brain (hemorrhagic stroke). Stroke is the leading cause of adult neurological disability in Canada with 1% of the population living with its effects, which may include difficulty with or the inability to move, see, remember, speak, reason, read and/or write. Up to 85% of persons who experience a complete stroke may have arm dysfunction, which will interfere with their ability to live independently. Rehabilitation interventions are the cornerstones of care and recovery for persons after stroke.

Burden of Illness

An estimated 5-10% of persons with arm dysfunction after stroke will be eligible candidates for CIMT.

Constraint-Induced Movement Therapy

Constraint-Induced Movement Therapy (CIMT) is a behavioural approach to stroke rehabilitation for persons with arm dysfunction. The major components of CIMT include: i) intense repetitive task oriented training of the impaired limb; ii) immobilization of the unimpaired arm; and, iii) shaping. Persons may train the affected arm for several hours a day for up to 10-15 consecutive days. Restraining the unaffected arm for up to 90% of waking hours and shaping involves a progressive increase in the difficulty of the training tasks as performance improves and providing immediate encouraging feedback when small gains are achieved.

OHTAC Findings

Summary of Findings

Clinical Findings

For persons beginning CIMT one month or greater after experiencing a stroke, there was a significant difference in the arm motor function measured with the Action Research Arm Test in favour of CIMT compared with usual care delivered with the same intensity and duration. Likewise, there were significant differences found in outcome measures including the arm motor impairment test and perceived motor function Amount of Use and Quality of Use scales. There was a nonsignificant effect found with both the Functional Independence Measure score and the quality of life Stroke Impact Scale outcome measure. The quality of evidence was moderate for the Action Research Arm Test and low for all other outcome measures except quality of life, which was very low [Table 1].

Table 1: Summary of Results*

Outcome Measure	Number of Studies (n)	Mean Difference in Change scores CIMT vs. Usual Care [95% C.I.]	Results	GRADE Quality of Evidence
Action Research Arm Test	4 (43)	13.6 [8.7, 18.6]	Significant	Moderate
Arm Motor Impairment Test	8 (169)	6.5 [2.3, 10.7]	Significant	Low
Functional Independence Measure Score	4 (128)	3.6 [-0.22, 7.4]	Nonsignificant	Low
Perceived Arm Motor Function (Amount of Use) Scale	8 (241)	1.1 [0.60, 1.7]	Significant	Low
Perceived Arm Motor Function (Quality of Use) Scale	8 (241)	0.97 [0.7, 1.3]	Significant	Low
Stroke Impact Scale	2 (66)	3.9 [-5.6, 13.5]	Nonsignificant	Very Low

*C.I. Confidence Interval; n, Sample Size

Economic Analysis

Budget Impact

The costs of providing CIMT for inpatient stroke rehabilitation of arm dysfunction depends on the duration and intensity of the program; as the costs are in addition to current rehabilitation care in the Province of Ontario. For a 2-week (10-day) CIMT program with a treatment intensity of 2.0 hours/day, the total cost (i.e. current care combined with CIMT) would be approximately $0.59 million for about 349 CIMT-eligible stroke patients. The most expensive CIMT program would last for 3-weeks (15 days) with a treatment intensity of 3.5 hours/day and be provided to about 698 CIMT-eligible stroke patients, and the total cost would be approximately $1.22 million.

Decision Determinants

OHTAC has developed a decision-making framework that consists of 7 guiding principles for decision making and a decision-making tool, called the Decision Determinants (DD) tool. For more information on the Decision-Making Framework and the meaning of the symbols below, please refer to the Decision Determinants Guidance Document or visit: www.health.gov.on.ca/english/providers/program/ohtac/decision_frame.html

Criteria	Sub-Criteria	Evidence
Overall Clinical Benefit	Effectiveness	▪ 24% change in total score on the arm motor function scale after CIMT compared to usual care (Moderate quality of evidence) ▪ Significant effect of CIMT compared with usual care (OT, PT) measured with arm motor impairment (10% improvement), perceived motor function amount of use and quality of use (1% improvement of total score) (Low quality of evidence) ▪ Nonsignificant results on quality of life scores (Stroke Impact Scale) and ADL function (FIM score)
	Safety	▪ In rodent models immediate casting of the unaffected forelimb is reported to cause lesion enlargement ▪ No reported safety issues in studies starting ≥ 1 month after stroke
	Burden of Illness	▪ Estimated 15,000 persons admitted to hospital for stroke in the Province of Ontario in 2007/2008 ▪ 40% of persons having stroke will go to inpatient rehab, and 10% of this population will be eligible CIMT candidates ~ 600 persons
	Need	▪ CIMT not readily available in the Province of Ontario ▪ Eligible persons receive standard rehabilitation, approximately 30 minutes/day upper limb rehabilitation in inpatient rehabilitation settings ▪ Problem with getting right person to right setting for rehabilitation ▪ The rehabilitation needs and services provided to 70% of persons in Ontario having stroke and who do not go to inpatient rehabilitation are unknown
Consistency with *Expected* Societal & Ethical Values	Societal Values	▪ One survey supports that CIMT requires motivated patient and therapist ▪ The same survey supports a patient preference for lower intensity treatment over longer duration
	Ethical Values	▪ Unknown
Value for Money	Economic Evaluations	▪ Value for money is high given low cost of the program for the size of the effect gained

Criteria	Sub-Criteria	Evidence
Feasibility of Adoption into Health Systems	Economic Feasibility	▪ Budget impact is $0.59 million (low intensity CIMT) to $1.22 million (high intensity CIMT) annual cost
	Organizational Feasibility	▪ Expert suggests difficult to implement based on current available OT resources in the Province of Ontario

OHTAC Recommendation:

OHTAC makes the following recommendations after considering these findings:

- CIMT shows short-term effectiveness on arm function and should be considered in the stroke rehabilitation regimen beginning no earlier than 1 month after the onset of stroke.
- Contextualization of these findings in terms of the management of stroke rehabilitation in Ontario is required.
- OHTAC supports the 2010 ICES Ontario Stroke Evaluation Report recommendations regarding access and tracking of outpatient stroke rehabilitation care in the province.