

# Benchmarking local practice in view of introduction of thrombolysis for stroke in Malta

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## Abstract

**Objectives:** The aim of the study was to benchmark the quality of local stroke care in view of introduction of thrombolysis.

**Methods:** Stroke patients admitted to Mater Dei Hospital over 6 weeks in 2008 were recruited. A questionnaire based on the 2006 Royal College of Physicians (RCP) National Sentinel Stroke Audit phase II (Clinical Audit) was used. Results were compared to the 2008 RCP National Sentinel Stroke Audit phase II (Clinical Audit) report.

**Results:** 42 confirmed strokes were admitted. All patients underwent CT scanning within 24 hours. 97% received aspirin within 48 hours. 26.2% spent >50% of their stay in the neurology ward. 81% were discharged alive. At 24 hours from admission, 54.7% were not screened for swallowing. 47.6% were not assessed by an occupational therapist. 81% were assessed by physiotherapy at 72 hours of admission. None of the patients had documented goals set by a multi-disciplinary team. If thrombolysis were available, 16.7% would have been eligible. The commonest contraindications were late presentation (52.4%) and age >80 years (35.7%).

**Conclusion:** Local results compared well to the RCP 2008 results in initiation of aspirin, imaging, and nutrition. However, we noted need for improvement in the assessment of swallowing, mood and cognitive function as well as involvement of a multidisciplinary team. Since then, adherence to international guidelines has improved by the introduction of thrombolysis, a dedicated multidisciplinary service and the use of local guidelines for stroke.

## Introduction

### Background

Stroke is a leading cause of death and disability worldwide and constitutes a considerable burden for patients, their carers and the community. With newer technology to assess cerebrovascular events, improved techniques to treat events acutely and intense rehabilitation by a dedicated team, stroke also has the potential of becoming a more successfully managed medical emergency.

### Aims of the audit

The Royal College of Physicians of London (RCP London) first published stroke guidelines in 2000<sup>1</sup>, with

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the aim of improving the quality of care delivered for everyone who suffers a stroke. Since then, more recent guidelines have been published in 2012<sup>2</sup> (4<sup>th</sup> edition). We have thus used the Royal College of Physicians' guidelines to benchmark the quality of local practice.

## Methodology

### *Patient Population*

All patients admitted to Mater Dei Hospital with a primary diagnosis of stroke, over a six-week period between 1<sup>st</sup> of June 2008 and 15<sup>th</sup> of July 2008, were recruited prospectively. Patients with a diagnosis of Transient Ischemic Attack (TIA) as well as patients who were discharged with a diagnosis other than stroke were excluded from the audit. In-patient strokes were excluded due to the absence of an effective mechanism to identify these patients.

### *Questionnaire Design*

A standard questionnaire sheet was designed for data collection. This questionnaire was based on the National Sentinel Stroke Audit 2006<sup>3</sup> and the RCP London National Clinical Guidelines of Stroke 2004.<sup>4</sup> Similar to what was carried out in 2004 RCP questionnaire, those patients that were deemed for palliative care or did not have a deficit requiring rehabilitation were considered as not requiring assessment. The Neuromedical ward at Mater Dei Hospital was considered the closest equivalent to a Stroke Unit.

### *Data Collection*

Ethical approval was obtained from the University of Malta Research Ethics Committee. Data was collected in a prospective manner recording documentation of inpatient assessment, results and management. Sources of data collection included access to patient files, access to nursing notes, PACS (Picture Archiving and Communications System), iSOFT (Healthcare Software) and PAS (Patient Administration System). Data was collected only if recorded in any of the available documentation and recording methods.

### *Data analysis*

Data was compared to the outcomes of the Royal College of Physicians National Sentinel Audit of 2008<sup>2</sup>. Data analysis focused mainly on the nine key indicators identified by the Royal College of Physicians. (Table1)

## Results

### *Recruitment*

Over six-weeks a total of 63 patients were admitted to Mater Dei Hospital with a diagnosis of stroke. 20 patients were excluded as the final diagnosis was not that of stroke, while 1 patient was excluded because medical notes were not available. Figure 1 demonstrates

the recruitment stage of the audit.

### *Demographics*

Of the eligible 42 patients, 21 were male (50%). Ages ranged between 37 and 93, with a median age of 76 years and an average age of 75.7 years (Figure 2).

### *Time of presentation, inpatient stay and discharge outcome*

47.6 % ( $n=20$ ) presented within 3 hours of initial symptoms, 38.1% ( $n=16$ ) presented between 3-24 hours, whilst 6 patients (14.3%) presented over 24 hours after initial symptomatology. 26.2% ( $n=11$ ) spent more than 50% of their stay in the Neuromedical Ward at Mater Dei Hospital. 9.5% ( $n=4$ ) required ITU admission.

81% ( $n=34$ ) were discharged alive from Mater Dei Hospital, while the remaining 8 patients (19%) died during in hospital stay. Of the surviving patients, 44.1% were discharged home, 26.5% ( $n=9$ ) were discharged to a rehabilitation unit, while 7 patients (20.6%) were transferred to a long-term care/care of the elderly facility (Figures 1 and 3)

The average length of stay (LOS) from admission until live discharge was 9 days (range 1-30 days), while the average LOS from admission until inpatient death was 5 days (range 1-9 days). The average LOS for patients discharged home was 5.5 days (range 1-20 days), for patients discharged to a rehabilitation unit 11 days (range 5-30 days), while for patients discharged to a long-term care facility was 17.8 days (range 7 – 30 days).

### *Brain imaging*

All patients presenting with a presumed stroke underwent CT scanning of the brain, and all scans were done within 24 hours of presentation, with 62% of scans being performed within 3 hours of presentation. 10 patients had features of an acute ischaemic infarct (23.8%), 10 patients had features of old ischaemic changes, while only 2 patients (4.8%) had sustained a haemorrhagic event. Brain scan for the remaining 20 patients (47.6%) was reported to contain no significant abnormalities. Of these 20 patients, 5 underwent a second scan, which in all instances confirmed an acute infarct.

### *Comorbidities and Secondary Prevention*

The large majority of patients (85.7%) had at least one previously diagnosed co-morbidity, the commonest being hypertension (73.2% of patients), previous CVA/TIA (43.9%), diabetes mellitus (39%) or evidence of vascular disease (MI/angina in 39%) (Figure 4). Concomitant past cerebrovascular events and diabetes was present in 38.1% of the cohort, this being an exclusion criterion for thrombolysis at the time. 33.3% underwent Carotid Doppler scanning with 3 patients

having evidence of significant carotid stenosis. 9.76% were found to be in atrial fibrillation. Serum lipids were checked in 36.6%, while an echocardiogram was requested for 23.8%, with the majority of patients (53.7%) having no documented reason for not undergoing secondary prevention assessments. Of note, 29.4% of patients were discharged with prescription for lipid-lowering agent. 76.5% of patients were prescribed anti-hypertensive agent/s at discharge.

#### Medical Management and Assessments

94% of patients with no contraindication received aspirin within 48 hours of presentation. Nutrition was started within 72 hours for 90.5% ( $n=38$ ), with 61.9% receiving oral feeding, 21.4% receiving nasogastric/PEG feeding, and only 7.1% remaining dependent on intravenous supplements at 72 hours. 6 patients (14.3%) required urethral catheterisation, with the main indication being assessment of fluid balance, and less commonly for retention or to prevent skin trauma. No documentation of weight was found in any of the 42 patients. Of the eligible 34 patients (81%), excluding patients too unwell, cognitive assessment was documented for only 1 patient, while none of the patients underwent mood assessment. 11.9% of patients required social worker involvement.

#### Rehabilitation

At 24 hours from admission, 69% ( $n=28$ ) had not been screened for impaired swallowing, while at 72 hours 61% ( $n=26$ ) of patients had not been screened. Speech and language assessment was carried out in 33% ( $n=14$ ) within 7 days, but in 38.1% ( $n=16$ ) this was deemed not to be required. 22% ( $n=7$ ) of patients had visual field assessment within 24 hours and of the remaining patients in 26% ( $n=11$ ) this was deemed not to be required. 23.8% ( $n=10$ ) were assessed by an occupational therapist within the first week of admission, of the remaining 76.2% in 28.5% ( $n=12$ ) it was deemed not to be required. 76.9% ( $n=27$ ) had been assessed by a physiotherapist within 72 hours of admission and of the remaining patients in 15.38% ( $n=7$ ) it was deemed not to be required. None of the patients had a documented plan for rehabilitation goals agreed by a multi-disciplinary team. None of the patients had documentation of advice being given regarding lifestyle modifications including smoking cessation, diet and exercise.

#### Thrombolysis

If thrombolysis were available, 7 patients (16.7%) would have been eligible for thrombolysis at time of admission. This percentage is similar to that obtained in the Royal College of Physicians' Sentinel Audit of 2008 (15%).<sup>5</sup> The commonest contraindications to thrombolysis were: presentation after 3 hours of onset of

symptoms (52.4% of all admissions), age >80 years (35.7%), blood pressure above 185/110 (26.2%) and significant stroke severity (19%).

#### Benchmark

Table 1 displays the outcomes of the 9 key indicators in management of stroke patients (as highlighted by the RCP), compared to the UK National Sentinel Stroke Audit phase II 2008.

**Table 1:** The nine key indicators of stroke care identified by the Royal College of Physicians, with outcomes at Mater Dei Hospital compared to RCP 2008.

The nine key indicators of stroke care	Mater Dei (%)	UK (%)
1. Patients treated for 90% of stay in stroke unit	26	58
2. Screen for swallowing disorders within first 24 hours of admission	31	72
3. Brain scan within 24 hours of stroke	100	59
4. Commenced aspirin by 48hours after stroke	97	85
5. Physiotherapy assessment within 72hours of admission	77	84
6. Assessment by an Occupational Therapist within 4 working days of admission	23	66
7. Weighed at least once during admission	0	72
8. Mood assessed by discharge	0	65
9. Rehabilitation goals agreed by the multi-disciplinary team	0	86

#### Discussion

The Audit highlighted lacunae in stroke management. There are 9 key indicators of good stroke care according to the RCP.<sup>2</sup> In order to qualify stroke care at Mater Dei Hospital, we benchmarked our results against the results of the RCP UK National Sentinel Stroke Audit phase II 2008.<sup>2</sup>

The first key indicator of good stroke care is spending 90% of hospital stay in a stroke unit. Randomized trials have shown that stroke unit care prevents 1 death and 1 institutionalisation for every 33 and 20 patients treated, respectively.<sup>6</sup> According to the Stroke Unit Trialists' Collaboration, the basic characteristics of a stroke unit should be: (1) a dedicated unit, (2) staff with a special interest in stroke or in rehabilitation including physician(s), nurse(s), assistant nurse(s), physiotherapists(s), occupational therapist(s), social worker(s), speech therapist, dietician and a

psychologist, (3) multidisciplinary team care with regular meetings at least weekly, (4) procedures for diagnostic evaluation, acute monitoring, and acute treatment, (5) early mobilisation, and a very strong focus on rehabilitation, (6) early setting of rehabilitation plans involving carers (7) early assessment and planning of discharge needs. At the time, the Neuromedical ward catered for characteristics 1, 2, 5. The dedicated neurology ward catered for 26% of patients.

The second key indicator of stroke care is screening for swallowing disorders within 24 hours. 36.1% of our patients compared with 72% in the UK fulfilled this criterion. Reasons for this discrepancy include lack of documentation, time constraints and possibly lack of adequate staffing levels. To address this, the 50ml swallowing assessment was incorporated into the admission protocol, providing clear criteria for referral to the speech language pathologists for formal assessment.

Imaging of the brain is a vital part of the initial assessment of stroke patients. All our patients underwent a CT scan within the first 24 hours. With the advent of thrombolysis the role of urgent scanning has become increasingly important. The advantage of having a centralised acute general hospital is evident when one considers that in the UK 59% of patients have a CT within 24 hours. MDH has a 24 hour CT service which enables patients to be worked up within the time-frame for thrombolysis. Whilst MRI is now being used in certain centres in acute stroke management, it has its own limitations, including cost, limited availability and patient contraindication such as inability to stay still in such a claustrophobic environment. In the latest AHA guidelines of 2013, “non-contrast enhanced CT definitely excludes parenchymal haemorrhage and can assess other exclusion criteria”.<sup>7</sup>

There is a 13% relative risk reduction with aspirin vs placebo for a recurrent stroke after an ischaemic event.<sup>8</sup> 97.1% of patients in our cohort vs 85% in the RCP stroke audit, were started on aspirin within 48 hours.

The fifth key indicator is physiotherapy assessment within the first 72 hours. Locally, 77.2% of patients underwent this assessment. 23% of patients at Mater Dei Hospital vs 66% in the UK were referred for occupational therapy assessment (sixth key indicator) within 4 working days. Possible reasons for these low rates include patients being deemed too fit or too ill, without adequate documentation; or failure to document referral to physiotherapist services.

Referral to physiotherapy, occupational therapy, social worker and speech language pathologist services were given prominence in the new local guidelines. Besides assessments being carried out by the aforementioned professionals, formal multidisciplinary meetings have been proven to improve outcomes (ninth

indicator). None of the patients in our cohort had multidisciplinary team rehabilitation goals documented in the medical notes. UK patients had goals set by a multidisciplinary team in 86% of cases.

Where stroke unit admission is not possible (e.g. lack of bed space availability), a ‘Stroke/TIA Nurse Specialist’ can provide an essential outreach service and liaise with the key members of the multidisciplinary team. In addition, a specialist nurse would provide the much essential and often lacking educational aspect, both for patient and relatives.

Regular weighing of patients provides an indirect measure of nutrition.<sup>9</sup> None of the patients in our cohort were weighed contrasting significantly with the UK. This has been addressed in the guidelines.

Mood assessment plays a vital role in outcomes. Whilst in the UK 68% of patients had a formal mood assessment, none of the patients in our cohort did. The GHQ-12/ PHQ-9 mood scoring systems were included in the guidelines to standardise mood assessment. This provides clear cut-off points for referral to a psychiatrist.

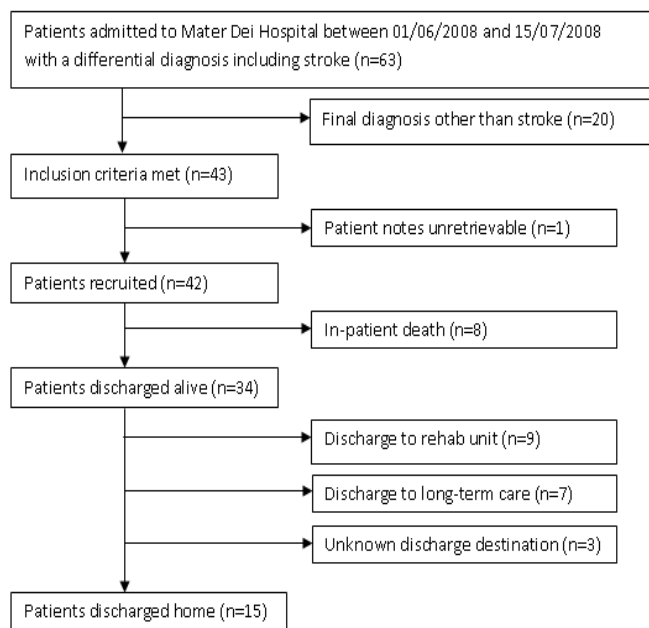
Secondary prevention of stroke is an important part of acute stroke care. In the majority of cases essential investigations including echocardiography, carotid dopplers and serum lipids, were not carried out or booked during the in-patient stay. A flaw of our study is that we only looked at investigations documented during the in-patient period. Failure of documentation may have been an issue or the investigations might have been booked during follow up visits.

Lifestyle modification including smoking cessation, diet and exercise are keystones of secondary prevention. In none of the patients’ notes did we find documentation of these important parts of the consultation. Failure to document discussions regarding these lifestyle changes again might be an important contributing factor. The guidelines address all these issues.

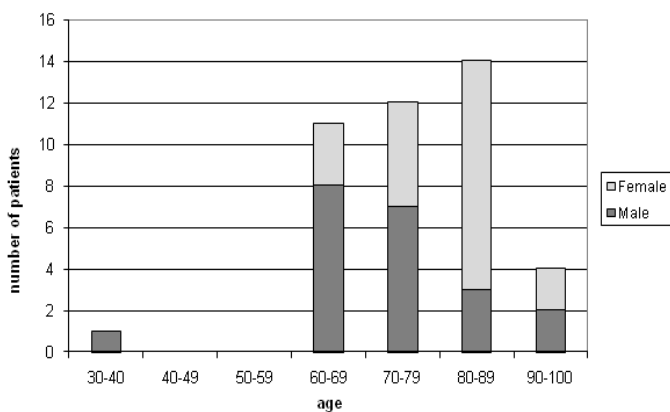
The main limitations of our audit were poor documentation of investigations and referrals causing underestimation. Our audit contained 42 patients. The small number of patients audited means that certain categories only contained a few patients, with the possibility of skewing the results. The short duration did not allow us to get data on seasonal variability; however the aim was to benchmark the quality of care independent of this variable.

Based on the results of the audit, stroke guidelines have been formulated and are currently being used at Mater Dei Hospital. Reaudit and closure of the audit loop were planned after the guidelines were implemented. These were carried out in 2012, and results are due to be published soon.<sup>10</sup>

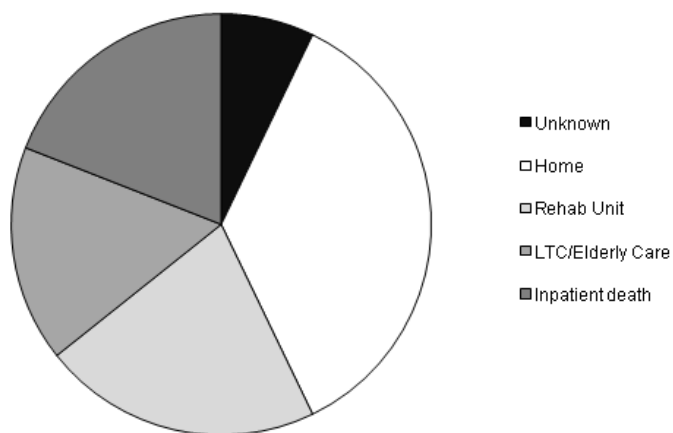
**Figure 1: Recruitment and outcome of enrolled patients.**



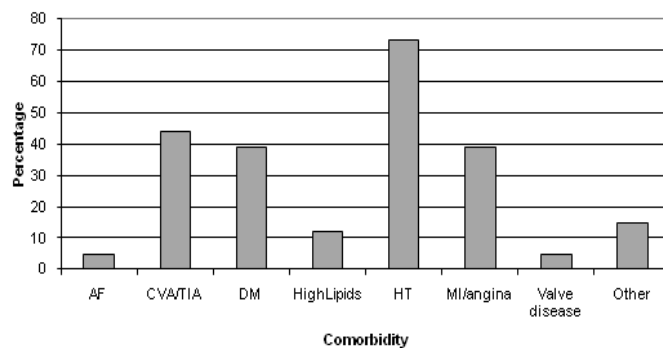
**Figure 2: Demographics: Age and Gender distribution.**



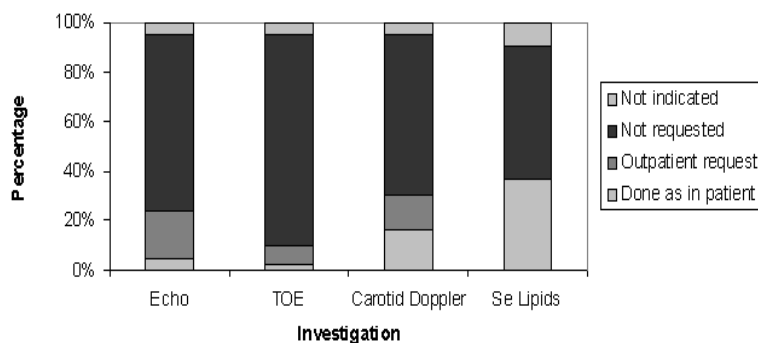
**Figure 3: Discharge Destination**



**Figure 4: Comorbidities at Presentation.**



**Figure 5: Secondary Prevention.**



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