ABSTRACT

Rationale: Urinary incontinence (UI) is a common consequence of stroke and the most significant indicator of poor outcome, yet continence management in many acute settings remains suboptimal.

Objective: To examine local post stroke continence management practice within the context of the National Stroke Foundation guideline recommendations and to develop a solution that will improve post stroke continence care.

Context: Three stroke rehabilitation units within Hunter New England Local Health District in regional NSW, Australia.

Participants: Nursing staff working with stroke patients.

Interventions: We carried out an audit to characterise current continence management practice, then developed a urinary continence assessment and management tool and an online modular continence learning package to support staff in their care of stroke patients with continence difficulties.

Findings: Audit results showed a substantial evidence/practice gap across the three rehabilitation sites, including:

- a lack of continence assessments and individual management plans;
- a failure to recognise and document the specific urinary incontinence type;
- a tendency to adopt compensatory strategies rather than treat the underlying problem; and,
- a lack of multidisciplinary involvement in continence care.

Conclusion: Our findings confirm the need for better post stroke continence management within this cohort and justify the need for a change in practice. It is envisaged that our standardised continence management protocol and web-based education program will support this practice change and improve continence levels and quality of life for patients experiencing urinary incontinence following stroke.

Key Words: Audit, Australia, Continence, Evidence-based, Rehabilitation, Stroke, Urinary incontinence.

INTRODUCTION

Each year 60,000 Australians suffer stroke (National Stroke Foundation, 2010). As a result of stroke, many people experience impairment or disability of normal functioning, one of the most common being urinary incontinence (UI). UI is a common consequence of stroke (Barer, 1989), and is reported to be present in 40-60% of stroke survivors (Petterson & Wyller, 2006). The impact of urinary incontinence (UI) for patients and their carers is substantial with UI being the most significant indicator of poor outcomes, the greatest indicator of disability (Hankey et al., 2000), and a powerful predictor of admission to institutional care (Patel et al., 2001). Rates of depression are twice as common in stroke survivors who are incontinent (Brittain, 1998). UI specifically has been identified as a major factor influencing the functional recovery of patients experiencing stroke (Barer, 1989).

URINARY INCONTINENCE AND STROKE

The process of bladder control is highly complex and is dependent upon the integrity of the micturition neural pathways (central and peripheral nervous systems associated with micturition), as well as the urinary bladder and urinary sphincters. Urinary incontinence (involuntary leakage of urine) occurs when the integrity of any part of this system fails, for example a weakened pelvic floor may result in stress urinary incontinence, while damage to the micturition neural pathways may result in urgency/urge incontinence or neurogenic urinary incontinence (see Table 1).

Evidence from the literature highlights the multi-faceted nature of UI following stroke. Damage to the neuro-micturition pathways (Gelber et al., 1993), decreased mental ability or cognition (Gelber et al., 1993; Castleden et al., 1985), immobility and dependency (Getliffe et al., 1997; Borrie et al., 1986), and language problems have all been considered as possible contributing factors or causes of Post Stroke Urinary Incontinence. Larger cerebrovascular lesions, those involving the parietal regions, frontal lobe or basal ganglia, and the presence of extensive white matter changes are also thought to be associated with higher rates of urinary incontinence (Petterson et al., 2008).

The most common types of UI following stroke are urgency/urge incontinence, urinary retention, and functional incontinence. Urgency/urge incontinence is usually associated with detrusor (bladder muscle) overactivity with or without sphincter dysfunction. Incidence varies from 37% to 62% of patients with incontinence following stroke (Kovindha et al., 2009; Rustam, & Rehman, 2007; Burney et al., 1996). Detrusor overactivity is characterised by involuntary contractions during the bladder filling phase. Patients usually experience urgency, frequency, nocturia and urinary incontinence (Huang, 2008). Patients sustaining a stroke in the frontoparietal cortex or the internal capsule are even more susceptible to development of detrusor overactivity (Burney et al., 1996). A formal diagnosis of detrusor overactivity requires urodynamic evaluation.

Urinary retention is also common following stroke, particularly within the first 72 hours post ictus. Reports of incidence, however, vary significantly (21%-47%) according to the definition used for urinary retention, the time interval between stroke and assessment of urinary retention, and the study methods employed (Kong & Young, 2000; Gelber et al., 1993; Burney et al., 1996). Although the exact mechanism is unknown, urinary retention may be caused by detrusor overactivity or underactivity or detrusor-sphincter dyssynergia (Meng et al., 2010; Sakakibara et al., 1996), and may be exacerbated by bladder outlet obstruction or anticholinergic medication.

Functional incontinence is associated with normal bladder function and arises because of a patient’s inability to physically and cognitively negotiate their environment and void appropriately, or manage the complexities of the toileting task once he or she does get to the toilet (see Table 1). It is important to note that UI following stroke may not necessarily be associated with the neurologic insult and that non-stroke causes, such as prostate hypertrophy and organ prolapse or pelvic floor weakness should not be overlooked.
**Table 1. Types of Urinary Incontinence**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urgency/urge incontinence</strong></td>
<td>Urgency is the sudden compelling desire to pass urine which is difficult to defer. Urge incontinence is involuntary leakage accompanied by or immediately preceded by urgency. It is often associated with detrusor overactivity but can be due to other forms of urothovesical dysfunction.</td>
</tr>
<tr>
<td><strong>Acute urinary retention</strong></td>
<td>Acute retention of urine is defined as a painful, palpable or percussable bladder, when the patient is unable to pass any urine. Although acute retention is usually thought of as painful, in certain circumstances (for instance in some cases of stroke) pain may not be a presenting feature. It may be associated with detrusor overactivity or underactivity.</td>
</tr>
<tr>
<td><strong>Functional incontinence</strong></td>
<td>Associated with normal bladder function. Incontinence due to impairment of physical or cognitive functioning. An inability of a usually continent person to reach the toilet in time to avoid the unintentional loss of urine.</td>
</tr>
<tr>
<td><strong>Chronic urinary retention or voiding symptoms associated with obstruction or underactive detrusor</strong></td>
<td>Chronic retention of urine is defined as a non-painful bladder, which remains palpable or percussable after the patient has passed urine. Such patients may be incontinent. The International Continence Society no longer recommends the term “overflow incontinence”.</td>
</tr>
<tr>
<td><strong>Neurogenic urinary incontinence</strong></td>
<td>Loss of urine due to detrusor hyperreflexia and/or involuntary urethral relaxation in the absence of the desire to void. The bladder empties without warning. The person is unaware that the bladder is emptying. Reflex incontinence is usually associated with spinal injury or cortex stroke.</td>
</tr>
<tr>
<td><strong>Mixed incontinence</strong></td>
<td>Leakage associated with urgency and also with exertion, effort, sneezing or coughing.</td>
</tr>
<tr>
<td><strong>Nocturia</strong></td>
<td>The individual has to wake at night one or more times to void. Nocturia may be a symptom of reduced functional bladder capacity, detrusor overactivity, nocturnal polyuria or urogenital aging. Nocturia is not a UI type but it may exacerbate UI.</td>
</tr>
<tr>
<td><strong>Stress incontinence</strong></td>
<td>Involuntary leakage on effort or exertion, or on sneezing or coughing. Usually caused by pelvic floor weakness or damage, sphincter incompetence.</td>
</tr>
</tbody>
</table>

Adapted from Abrams et al. (2010).

= Most common post-stroke UI types

**Current Management of Post Stroke Urinary Incontinence (PSUI)**

In 2011, Jordan and colleagues reported that urinary continence management in Australian acute stroke units remained less than optimal, with many reporting practices incongruent with National Stroke Foundation (NSF) guideline recommendations, even where level II evidence exists (Jordan et al., 2011; Jordan & Cadilhac, 2010). Evidence/practice gaps still exist in stroke services throughout Australia with less than half of acute services utilising UI plans based on NSF guidelines (Jordan et al., 2011). Further, the NSF National Stroke Audit: Clinical Report Acute Services (2009), showed that contrary to guideline recommendations only a third of stroke survivors with incontinence had a documented continence plan, while a quarter had an indwelling urinary catheter inserted within one week of admission (National Stroke Foundation, 2009). Similar data were obtained across four audit cycles of the United Kingdom (UK) National Sentinel Audits of Stroke (1998-2004), where less than 60% of applicable patients had a plan to promote urinary continence and 30% of patients had an indwelling catheter inserted within the first week of admission. Thus, while improvements had occurred in other key areas of stroke management, such as access to stroke units, the management of urinary incontinence remained relatively problematic (Wilson et al., 2008).

**Barriers to Providing Evidence-based PSUI Management.**

Mayor (2005) reported a list of barriers to quality continence care, observed during the UK National Sentinel Audit, including an extensive failure to diagnose, a lack of policies on continence, limited staff training, a disproportionate use of indwelling catheters and pads, and a tendency not to treat the underlying problem.

Further barriers to quality continence care might include the complex nature of urinary incontinence and the lack of clear management guidelines and intervention recommendations. While a variety of therapeutic interventions such as timed voiding, pelvic floor exercises, hormonal therapy and pharmacotherapy have been used to manage urinary incontinence in the general population, supporting evidence for such interventions in the stroke population is limited (Thomas et al., 2008). However, a structured functional approach to assessment and management has been associated with an increased likelihood of continence on discharge. An examination of the effects of a comprehensive assessment and intervention strategy in the acute setting showed higher continence levels in the intervention group compared with a retrospective historical sample. This highlighted the need for further staff education and support, as well as the need for a continence advisor in both the acute and rehabilitation settings (Hanna et al., 2005). In a systematic review of the literature a multimodal approach using assessment procedures, problem-solving processes, guidelines and nurse education were found advantageous for promoting post stroke continence (Wilbert-Herr et al., 2006). A recent study in Switzerland showed that a structured assessment with planned processes and individually tailored interventions could improve continence levels in stroke patients admitted to a rehabilitation unit. In this cohort targeted continence levels were achieved in 67% of treated patients (Wilbert-Herr et al., 2010).

**The Project Aim**

We sought to develop a structured Stroke Continence Assessment and Management Program (SCAMP) that is evidence-based,
multifaceted in approach and designed to address identified barriers to implementation. We also sought to test the program’s transferability by piloting implementation across three local rehabilitation sites and to report pilot outcomes. Ethics approval was granted by the local Human Ethics Board.

What SCAMP Looks Like

The SCAMP program is based on the NSF guideline recommendations and reflects the following principles:

- early continence assessment, diagnosis and tailored management;
- screening for urinary retention;
- avoidance of indwelling urinary catheters where possible; and,
- staff education and professional development.

Local clinicians indentified five major obstacles to the uptake of the program:

- the complexity of post stroke Urinary Incontinence (PSUI);
- the gap in skill, knowledge and attitudes to PSUI;
- the absence of process to support it; and,
- lack of clarity regarding roles and responsibilities for PSUI management.

To address these barriers the scope of the project included the development of a Continence Assessment and Management Plan, a web-based continence learning package linked to professional development learning points, a pre and post implementation medical record audit, a communication plan which includes regular progress reports to clinicians, and engagement of key organisational stakeholders.

Continence Assessment and Management Plan

A continence assessment and management plan tool was developed to guide the clinician through relevant assessments and information gathering in order to determine any factors that may be contributing to UI, and to arrive at a UI diagnosis or UI type. Once the UI type is known, a management plan is built on the recommended strategies provided for that UI type. Provision is made for planning and documenting times and volumes associated with scheduled or timed toileting, post void residual volumes and intermittent catheterisations. A detailed guide for the routine screening and management of acute urinary retention is also included. All management tools integrate with current local documentation procedures.

Continence Learning Package

A web-based and stroke-specific continence management education package was developed, consisting of nine separate learning modules, each of ten minutes duration. Modules were based on current stroke management principles in line with NSF Clinical Guidelines for Stroke Management (2010), and in conjunction with current evidence supporting specific post stroke bladder dysfunction. Promotion and implementation of the education package was provided initially by the project team members in collaboration with the Manager, Education and Professional Development, Hunter Stroke Service and the Manager, Clinical Service Delivery Hunter Stroke Service.

Implementation Plan

To improve the likelihood of uptake and ongoing sustainability of the pilot and to inform possible future implementation of this program an implementation plan was established and includes a communication plan, sponsorship plan and implementation tips. Capacity building was also undertaken and all continence working party participants were trained in Accelerated Implementation Methodology (AIM).

SCAMP Development Process

Agreement was achieved from three sites to develop and contribute to the development of the program. A working party was established to achieve the aims of the project and a designated lead nurse from each site joined the working party. There was agreement that the project should be achieved in a six months time frame. SCAMP was launched during stroke week in September 2010.

Stakeholder and Communication Strategy

To ensure support and progress of the program, key groups and stakeholders were identified and engaged, including an executive sponsor; members of the Clinical Stroke Stream (CSS), Nurse Managers, Clinical Nurse Consultants and Specialists, Nurse Educators, Continence Management Nurses, the Manager Professional Education and Development Hunter Stroke Service, Consumer Representatives and Rehabilitation Medical Officers. The SCAMP was coordinated by the Clinical Lead of the CSS and managed at each site by the local Stroke Care Coordinator or Clinical Nurse Consultant/Rehabilitation.

Staff Interviews

Pre project, qualitative interviews were undertaken to better understand current continence practices, nurses’ skills, knowledge and attitudes to PSUI management and to seek advice regarding practice recommendations.

Implementation

Designated lead nurses at each of the three rehabilitation sites provided staff with an overview of the SCAMP and provided training and assistance in the use of the SCAMP assessment and management tools. Nurses, and in some instances, allied health staff completed the online continence education modules and provided feedback. Monthly meetings were held to help monitor and evaluate the progress of the project and to support lead nurses with any issues they may have experienced such as staff uptake of the tools and the education program. Regular progress reports were supplied to each site in the form of graphs depicting changes and improvements in care processes and management strategies as a result of the program. Feedback from staff was encouraged, particularly in relation to tool design and content.

EVALUATION

This publication reports the pre-implementation audit used to determine current continence management practice across the three pilot sites. A retrospective audit of the records of consecutive patients discharged from September 2009 with a stroke diagnosis from each of the three sites (20 consecutive patient records per site total 60 records), was undertaken to determine baseline continence management practices and concordance with NSF recommendations. Results showed that 33/60 (55%) stroke patients admitted to a rehabilitation facility experienced urinary
incontinence. No patients in this cohort had a formal continence assessment completed. Of the patients who were incontinent of urine 10/33 (30%) had a documented continence diagnosis or type. Less than half, 16/33 (48%) had a documented continence plan of some description (see Table 2). Continence management strategies varied according to site, for example, the percentage of patients undergoing a post void residual volume (PVRV) bladder ultrasound was 30% in hospitals one and three, and 55% in hospital two. Indwelling catheters had been used in 9/33 (27%) of incontinent patients. There was no documented evidence in any of the 60 medical records reviewed, of multidisciplinary continence goal setting, or review of medications that might interfere with bladder or bowel control.

<table>
<thead>
<tr>
<th></th>
<th>Hosp 1 n (%)</th>
<th>Hosp 2 n (%)</th>
<th>Hosp 3 n (%)</th>
<th>Overall n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continence assessment form</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Continence diagnosis</td>
<td>1(17)</td>
<td>5(36)</td>
<td>4(31)</td>
<td>10(30)</td>
</tr>
<tr>
<td>Management plan</td>
<td>2(33)</td>
<td>8(57)</td>
<td>6(46)</td>
<td>16(48)</td>
</tr>
<tr>
<td>Adequate hydration</td>
<td>5 (83)</td>
<td>14 (100)</td>
<td>13 (100)</td>
<td>32 (97)</td>
</tr>
<tr>
<td>Manage constipation</td>
<td>5(83)</td>
<td>14 (100)</td>
<td>11 (85)</td>
<td>30 (91)</td>
</tr>
<tr>
<td>Post Void Residual Volume</td>
<td>6(100)</td>
<td>11 (78)</td>
<td>6 (46)</td>
<td>23 (70)</td>
</tr>
<tr>
<td>Environment modification</td>
<td>2 (33)</td>
<td>10 (71)</td>
<td>1 (8)</td>
<td>13 (39)</td>
</tr>
<tr>
<td>Time and Volume charting</td>
<td>6 (100)</td>
<td>5 (36)</td>
<td>5 (38)</td>
<td>16 (48)</td>
</tr>
<tr>
<td>Medication check</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Multi-Disciplinary Team</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Physiotherapist input</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pelvic floor exercises</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Containment aids</td>
<td>5 (83)</td>
<td>12 (86)</td>
<td>10 (77)</td>
<td>27 (82)</td>
</tr>
<tr>
<td>Indwelling catheter</td>
<td>1 (17)</td>
<td>5 (36)</td>
<td>3 (23)</td>
<td>9 (27)</td>
</tr>
<tr>
<td>Intermittent catherisation</td>
<td>1 (17)</td>
<td>1 (7)</td>
<td>2 (10)</td>
<td>4 (12)</td>
</tr>
</tbody>
</table>

### Table 2. Continence Management Strategies for Incontinent Patients

The effectiveness of the program will be measured and reported at the completion of the pilot and will include data collected during process along with an analysis of pre and post implementation qualitative data.

**DISCUSSION**

Our review of current practice across three rehabilitation sites confirmed that the management of PSUI was suboptimal in this cohort. No standardised method for assessing continence in stroke patients admitted for rehabilitation across the three sites was evident in the medical records audited. Although there was evidence of informal continence assessment processes such as urinalysis, post void residual volume bladder scans or determination of pre stroke continence status, assessments were ad hoc and potentially unhelpful. In patients with the greatest need for continence assessment and management, that is, incontinent patients, less than one in three had been given a UI diagnosis, further limiting the ability of staff to manage UI effectively (Jordan et al., 2011). Furthermore, less than half of all incontinent patients had any semblance of a continence management plan. Management strategies for UI varied across sites, further highlighting the lack of standardisation and the need for an evidence-based SCAMP.

**Changing Practice**

Changing practice is often difficult, particularly in a complex health care delivery system (Grol & Grimshaw, 2003). While this project is not complete we have found that despite efforts to support practice change such as management engagement and support, staff education, regular meetings, progress reports and feedback implementing the SCAMP is not simple. While many nurses welcomed the structure and formality of the SCAMP … it makes you think about why we do what we do for a patient and when: it’s good to have a protocol to follow (Registered Nurse with eight years’ experience), others were concerned about the extra paper work, duplication of documentation and competing priorities. Others felt that it wasn’t their job to be assessing and diagnosing incontinence, and that this should be left up to the Continence Clinical Nurse Consultant (CNC). Some nurses were not comfortable with the responsibility of making a UI diagnosis. One nurse voiced her fear of litigation if she got it wrong. However, failure to recognise that understanding the distinct aetiology of the patients’ UI condition will prevent the initiation of targeted and more effective management interventions.

**Next Steps**

Pilot project feedback and evaluation of the program are required to inform and refine current tools, making them more palatable to clinicians. Formalisation of the implementation plan is underway and is planned to be published as a manual. A clinical practice guideline will be developed to improve process. Ongoing educational support will be sought from the Hunter New England Continence Nurse Annual Education Forums, local site clinicians such as Clinical Nurse Consultants and Clinical Nurse Specialists working in stroke rehabilitation. National interest in the concept of standardised continence management protocols that are supported by web-based education programs has been expressed. Furthermore, there is an opportunity for a State-wide roll out supported by the Education and Pathways Subcommittee, Agency for Clinical Innovation, Stroke Services.

**CONCLUSION**

Our findings confirm the need for better post stroke continence management within this cohort and justify the need for a change in practice. It is envisaged that our standardised continence management protocol and web-based education program will support this practice change and improve continence levels and quality of life for patients experiencing urinary incontinence following stroke.

**Acknowledgements**

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