**INTRODUCTION**

Multiple Sclerosis (MS) is an autoimmune inflammatory brain and spinal cord disease (Hickey, 2014). It is characterised by unpredictable prognosis, influenced by the area(s) of demyelination within the central nervous system (CNS). Cited as the most distressing symptom (Fowler et al, 2009), bladder symptoms affect up to 75% of people with MS (De Ridder et al, 2013), often involving significant physical and psycho-social implications (Rushworth, 2009).

This poster explores the underlying pathophysiology influencing neurogenic bladder dysfunction in MS, to facilitate diagnostic reasoning and optimise clinical decision-making within community nursing in the context of National Institute for Clinical Excellence (NICE) guidance. Differential diagnosis is considered, identifying ‘red flags’ warranting comprehensive evaluation. Key recommendations for diagnostic reasoning specifically within the community setting are made.

**PATHOPHYSIOLOGY IN MS**

Normal micturition comprises of two phases (Chapple, 2014) (Figure 1A) that is storing (Figure 1A) and voiding (Figure 1B). In normal micturition, the detrusor muscle (bladder) is relaxed when empty.

- As the bladder fills, pressure is placed upon the internal sphincter.
- Alpha fibres transmit messages to the spinal cord via the pelvic (sacral level 2-4) and hypogastic nerves (T12-L2) (Figure 1A) via afferent (sensory) nerves of the peripheral nervous system (PNS).
- Sensory excitability in the pelvic nerve alongside sympathetic (autonomic) activity of the hypogastic nerve inhibits detrusor contraction instigating voiding by external sphincter contraction.
- The pontine storage centre (PSC) inhibits this reflex if it is an inappropriate environment to void.

Activation to void occurs through external sphincter relaxation via a CNS response (Figure 1B) with the bladder reaching a specific threshold.

In intact CNS, messages are relayed via Alpha fibre cell bodies to the PSC and pontine micturition centre (PWC), where voiding signals are initiated.

If inappropriate, a spinobulobal reflex stimulates parasympathetic outflows to the bladder at T2-4, initiating contraction.

Finally, the somatic nervous system enables voluntary control of micturition via activation of the pudendal nerve (S2-4).

As disability increases in MS, so does risk of urinary problems; people with MS are likely to be under the care of an urolgist where additional studies are likely to be undertaken. There is a dearth of recent evidence evaluating the reliability of urodynamics in relation to the neurogenic bladder.

**DIAGNOSTIC REASONING**

Accurate diagnostic reasoning must be underpinned from an understanding of abnormal pathophysiology in urological function. Based upon NICE guidelines [reviewed by NICE (2014a), Fowler et al’s (2009) work (Figure 3) was used to promoting consensus diagnostic reasoning for neurogenic bladder assessment. Critical review of identified diagnostic interventions is evaluated in Table 2. Red flags are considered in Table 3.

**PATHOLOGY**

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**THERAPEUTIC CONSIDERATIONS**

- First line treatments: adequate fluid, reduced caffeine (Fowler et al, 2009).
- Physiotherapy: pelvic floor exercises / Neuromuscular stimulation inhibit detrusor muscle (Fowler et al, 2009).
- Clean Interstitial Self Catheterisation (CISC) (impaired voiding).
- Antimuscarinic medications are often combined with CISC (caution in patients with MS cognitive dysfunction).
- Rai et al’s (2012) describe combinations of treatments as best option.
- Often unlicensed, severe symptoms may benefit from other therapeutic or surgical options.

**KEY RECOMMENDATIONS**

- Fowler et al’s (2009) work is pivotal to the detection of neurogenic bladder symptoms and easily transferable to the community.
- Resources enabling initial diagnostic reasoning within the community (e.g. bladder scanners) are accessible.
- The necessity for the validity of diagnostic reasoning in neurogenic bladder assessment, specifically bladder scanning /urodynamics is identified.
- Annual review for people with MS by an appropriate specialist (NICE 2014a) should include a review of urological, bowel and sexual symptoms (NICE, 2012).  Open, prompt communication between primary and secondary care for timely referral in suspected differential diagnosis.
- Establishing a MS community database to measure outcome (e.g. reduced hospital admission/improved patient outcomes).

**CONCLUSION**

The complexity of understanding pathophysiology of the neurogenic bladder (MS), critiquing current diagnostic reasoning and its transferability to the community has been explored. It is suggested the degree of neurogenic dysfunction correlates with disability in MS (De Ridder, 2013). Diagnostic reasoning must be underpinned by clinical history / optimise clinical outcome, ensuring principles of beneficence (Beauchamp and Childress, 2013) are upheld in therapeutic intervention. As MS progresses, likelihood of neurogenic bladder symptoms increases. With emergency admissions for MS costing the NHS £43 million in 2013/2014 (National Health Interview Survey, 2015), it is imperative innovative, but cost-effective, diagnostic reasoning occurs in a timely and accessible location for optimal outcome.

**REFERENCES**