POLICY STATEMENT
Neurogenic bladder is an unfortunate condition that affects a large number of women with a neurologic disease. Neurogenic bladder is marked by a wide variety of urinary symptoms, including frequency, incontinence, uncomfortable bladder spasms and inability to empty the bladder. Based on data from congenital neurologic disorders, neurogenic bladder may also result in detrusor sphincter dyssynergia (DSD), a lack of coordination of voiding mechanisms that places the patient at risk for ureteral reflux and damage to the urinary system that may become irreversible. If lower urinary tract symptoms are not addressed in these vulnerable patients, they face worsening quality of life and morbidity. Women with this condition are often referred for care by Urogynecology specialists, and it is important to aid these patients in the management of symptoms that worsen quality of life and lead to morbidity and mortality. Therefore, the purpose of this policy is to standardize those aspects of neurogenic bladder management for women presenting with this diagnosis and requiring particular expertise from the Urogynecology specialist.

PURPOSE:
To describe management for the majority of women presenting with neurogenic bladder as relevant to the practice of a female pelvic medicine specialist, including clinical evaluation, treatment, and, where necessary, consultation or coordination with other sub-specialists.

APPLICABILITY
This policy applies to women who present with a neurogenic bladder condition, either with a pre-existing diagnosis or symptoms suggestive of this condition in a woman with neurologic disease.

EVIDENCE
Clinically, neurogenic bladder is defined as isolated or combined lower urinary tract symptoms that are partially or wholly attributed to a neurologic injury or illness. This disorder has been associated with a wide array of disorders including, but not limited to, Parkinson’s disease, multiple sclerosis, peripheral neuropathy in diseases such as diabetes, traumatic brain or spinal cord injury, meningomyelocele, cerebral palsy, and brain malignancies. It has been estimated that the majority of women with common neurologic disorders (such as multiple sclerosis and spinal cord injury) have at least one lower urinary tract complaint and these patients face not only their symptoms, but the risks of chronic catheterization, compromised hygiene from incontinence, upper renal tract damage, and urinary tract infections. In particular, patients with detrusor sphincter dyssynergia (DSD) and high pressures in the bladder with voiding (≥ 40 cm H2O) face particular risk of upper renal damage, which is a leading cause of mortality in spinal injury patients. Improved evaluation has improved the accuracy of diagnosis and treatment outcomes for these patients. It is vital to establish the correct pathophysiology and offer treatment options that (a) minimize complications and (b) offer the greatest improvements in quality of life. This is also a patient population where the potential risks of
aggressive treatments, such as the risks of catheter use or surgery, needs to be considered carefully.\textsuperscript{8,12,13} Unfortunately, few treatments in this patient population are supported by randomized, controlled trials (Level I evidence), so most treatment options still rely on expert opinion or case series experience.

**PROcedures**

1. Workup:
   a. Full medical history with emphasis on the presence of neurologic disease and the course and past or current treatment of any known neurologic disease.\textsuperscript{2,8,9} (Level III)
   b. Physical examination, with emphasis on sensation/reflexes relevant to the sacral nerve roots.\textsuperscript{2,8,9} (Level III)
   c. Measurement of post-void residual urine volume.\textsuperscript{2,7-10} (Level III)
   d. Urinalysis and midstream urine culture and sensitivity should be performed with the first presentation of symptoms in order to rule out urinary tract infection (UTI) as source or contributor to the symptoms.\textsuperscript{8,9} (Level III)
   e. Patients with elevated post-void residual, abnormal neurologic exam, or symptoms highly suggestive of neurogenic bladder should have urodynamics testing performed, including the components of CMG, pressure-flow study, and EMG.\textsuperscript{2,7-10} (Level III)
   f. If the patient is able to complete a bladder diary, this should be done where possible.\textsuperscript{8,9} (Level III)

2. If the patient has a spinal cord injury or lesion above the T6 level, special consideration should be given to the possibility of autonomic hyperreflexia occurring as a possible side effect of urodynamics or catheterization and appropriate measures for its treatment should be considered.\textsuperscript{7,8} (Level III)
   a. Autonomic hyperreflexia is the sudden and exaggerated autonomic response to stimuli involving vasoconstriction, hypertension, flushing, diaphoresis, and reflex bradycardia. Hypertension and the bradycardia are potentially life-threatening.
   b. Management of autonomic hyperreflexia: Immediate cessation bladder filling and bladder drainage as well as pharmacologic management (nifedipine, morphine, nitro-paste), and admission if necessary to an ICU.\textsuperscript{8}

3. Women with urinary incontinence and neurogenic bladder should be managed as follows:
   a. Clinical evaluation to establish the correct diagnosis for incontinence (including UDS and, if possible, bladder diary as above), as accurate diagnosis contributes to better outcomes in these patients.\textsuperscript{2,7-9,11} (Level III).
   b. Treatment options as appropriate for type of incontinence recognized by history and testing. This could include the following:
      i. Counseling on dietary, toileting, lifestyle, and fluid management, as there is little potential harm to these therapies and little cost.\textsuperscript{8} (Level III)
      ii. Physical therapy as possible within the parameters of the neurologic illness.\textsuperscript{8} (Level III)
      iii. Anti-muscarinic or beta adrenergic agonist therapy for overactive bladder (OAB) or urgency urinary incontinence in patients with adequate emptying or using other means to adequately drain the bladder, as it has been found to be well tolerated and improve urodynamic parameters in neurogenic bladder populations.\textsuperscript{14-17} (Level I)
      iv. Botulinum toxin injection should be offered to appropriate candidates with OAB or detrusor instability associated with neurogenic bladder who have failed, have contraindications to, or do not prefer medical therapy, as this can substantially improve symptoms and quality of life in these patients.\textsuperscript{18-21} (Level I)
      v. Sacral nerve stimulation can be offered to patients who have neurogenic bladder related central nervous system disease (e.g. spinal cord injury), but patients with
peripheral nerve disease (e.g. diabetic uropathy) or obstructed voiding may be
ineligible based on their unique condition.\textsuperscript{8,22,23} (Level II-3)

vi. Posterior nerve stimulation can be offered to patients for whom detrusor overactivity
is an issue, particularly to multiple sclerosis patients.\textsuperscript{8,24} (Level II-3)

vii. Treatment of pelvic organ prolapse or stress urinary incontinence (where
appropriate) if these are worsening quality of life or inhibiting lower urinary tract
function. (Level III)

c. Counseling on optimization of functional status to allow for regular and safe toileting
(including discussion of options such as bedside commodes, safe and prompt transport to
and from restrooms, handles and supports in home and/or office restrooms, avoidance of
medications that compromise mental status or functional abilities).\textsuperscript{2,8,10,11} (Level III)

d. Counseling on optimization of neurologic disease status and coordination with the care
provider (PCP, neurologist, etc.) who manages their neurologic illness to ensure patient is
receiving adequate medical therapy (where appropriate) for the neurologic illness and
avoiding future complications as possible.\textsuperscript{3,8} (Level III)

e. If the patient's incontinence cannot be adequately managed by usual treatment options and
optimization of disease and functional status, they should be offered consultation with
Urology for the possibility of urinary diversion or other surgical measures that could improve
quality of life.\textsuperscript{2,8} (Level II-3)

4. Women with urodynamics testing consistent with high pressure voiding (maximum Pdet > 40 cm
H2O)\textsuperscript{7,8} should be managed as follows:

a. Radiological screening for vesico-ureteral reflux (such as VCUG) and serum creatinine
should be performed to rule out possibility of vesico-ureteral reflux and establish baseline
renal functioning, with referral to appropriate subspecialist if abnormal findings.\textsuperscript{2,7,9,11} (Level
III) Unfortunately, no evidence exists regarding any benefit to continued surveillance with
this testing if the initial evaluation is negative, or on the recommended frequency of
repeating the testing in the future,\textsuperscript{11} so we do not recommend repeating the test if these
initial evaluations are normal and the patient does not present with new or changing
symptoms. (Level III)

b. Patient should be evaluated to see if they are a candidate for anti-cholinergic therapy to
avoid detrusor overactivity, and start an available medication if possible and willing (see
above).

c. If detrusor overactivity and high pressure voiding cannot be controlled with anti-muscarinic
therapy or the patient has contraindications or intolerance to these medications, patient
should be evaluated to see if they are a candidate for intravesicular botulinum
toxin injection and offered this treatment option if they are a candidate, as this treatment
may improve outcomes. (see above)

5. Women who have incomplete bladder emptying and are not already receiving treatment that allows
adequate bladder emptying should be taught intermittent self-catheterization (ISC) if possible, or
have a caretaker learn to perform ISC, as this is associated with lower morbidity than indwelling
catheters.\textsuperscript{7,25-27} (Level III)

a. If ISC is possible, patient should receive necessary supplies for self-catheterization for 1-2
months and keep a diary of spontaneous voids and catheter volumes for at least 3 days of
that period.

b. If ISC has just initiated, patient should follow up after performing ISC for 1-2 months to
review symptoms and bladder diaries as well as screen for any complications of ISC.

c. If the patient is adequately emptying bladder and has no complications of ISC at 1-2 months
after initiating, they can follow up in the future for any new or changing symptoms.

d. If ISC is not feasible, the patient should be referred for evaluation by Urology for counseling
on indwelling catheterization methods with the lowest morbidity and greatest patient
acceptability, such as suprapubic catheter placement, which may have lower morbidity but equivalent patient acceptability to other indwelling catheters.28,29 (Level II-2)

6. Women with recurrent UTIs associated with neurogenic bladder and incomplete emptying should have measures taken as above to ensure:
   a. Adequate emptying of the bladder to the extent possible (see above).
   b. Management according to the recurrent UTI standard operating procedures.
   c. A high index of suspicion is kept to ensure that patients are adequately diagnosed and treated for UTIs, as signs and symptoms typical in patients without neurologic disorders do not have the same predictive for diagnosis in patients with neurologic defects.8,30,31 (Level III-3)

7. Women with pelvic organ prolapse (POP) or stress urinary incontinence (SUI) co-existent with neurogenic bladder, where bothersome symptoms may be improved by treatment of the POP or SUI, should be offered treatment options for prolapse treatment, with special consideration to:
   a. Possible increased perioperative morbidity due to the patient’s specific neurologic condition and be counseled on these specific risks if they desire a surgical procedure for POP or SUI (Level III)
   b. Possible limitations to non-surgical therapies due to neurologic limitations (such as inability to remove a pessary at home or inability to control muscles employed in relevant physical therapy).2,8 (Level III)

REFERENCES


I: Evidence obtained from at least one properly randomized controlled trial
II-1: Evidence from well-designed controlled trials without randomization
II-2: Evidence from well-designed cohort (prospective or retrospective) or case-control studies, preferably from more than one center or research group.
II-3: Evidence obtained from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of treatment with penicillin in the 1940's) could also be included in this category.
III: Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.
A: There is good evidence to recommend the clinical preventive action
B: There is fair evidence to recommend the clinical preventive action
C: The existing evidence is conflicting and does not allow to make a recommendation for or against use of the clinical preventive action; however, other factors may influence decision-making
D: There is fair evidence to recommend against the clinical preventive action
E: There is good evidence to recommend against the clinical preventive action
L: There is insufficient evidence (in quantity or quality) to make a recommendation; however, other factors may influence decision making.
APPROVAL

Prepared by: Yuko Komesu, MD

Approved by: ______________________

Approval: ______________________  11/5/10

Chair, Department of Obstetrics and Gynecology

Date

<table>
<thead>
<tr>
<th>SOP # / Version #</th>
<th>Effective Date</th>
<th>Supersedes</th>
<th>Review Date</th>
<th>Summary of Change(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>