WILLIAM S. WILKE, MD, EDITOR

FREDERICK FROST, MD
Dr. Frost is the principal investigator in the Northeast Ohio Regional Spinal Cord Injury System, an assistant professor of rehabilitation at Case Western Reserve University, and chief of the Spinal Cord Injury Service at MetroHealth Medical Center in Cleveland; he manages the care of nearly 1,000 persons with spinal cord injury across the state of Ohio.

Pitfalls in managing routine medical problems of patients with spinal cord injury

Patients with spinal cord injury face a lifetime of medical complications. Physicians caring for such patients need to know how to apply management strategies uniquely appropriate in these patients, and what pitfalls to avoid, specifically:

- Failure to appreciate the complexities of managing neurogenic bladder disorders.
- Overuse of antibiotics in treating urinary tract colonization and pressure sores.
- Failure to recognize autonomic dysreflexia, a cause of malignant hypertension that often can be treated without drugs.

Bacteriuria does not always require antibiotic treatment

URINARY TRACT COLONIZATION: TREAT THE PATIENT, NOT THE CULTURE

It is easy to over-react when a patient with a spinal cord injury is found to have a Foley catheter specimen that has positive findings on urinalysis and urine culture. If one is not accustomed to caring for such patients, it may be tempting to substitute a Texas catheter for the Foley catheter and start antibiotics. This approach would be wrong for two reasons: it may result in urinary retention (and consequent complications), and it may contribute to antibiotic resistance.

Although a Foley catheter can allow bacteria to enter the bladder, many patients with spinal cord injury need a Foley catheter to prevent urinary retention. The reason is that they have a dysfunctional voiding reflex: the urinary sphincter does not relax when the bladder contracts. Such patients can often pass urine without a catheter, but at very high voiding pressures. This results in high intravesical pressure and vesicoureteral reflux, a large amount of residual urine, and a high risk of bacterial colonization and urinary tract infection.

Intermittent catheterization may be impractical

In theory, intermittent catheterization is better than an indwelling catheter for preventing urinary retention, but this approach has practical limitations. Intermittent catheterization must be done religiously every 4 hours, or high pressure in the bladder may result. In addition, tetraplegic patients cannot catheterize themselves and must rely on a caregiver, who would need to be present at all times. Patients must

restrict their fluid intake to avoid rapid filling of the bladder and constantly adjust the catheterization schedule. The difficulty of living day-to-day with intermittent catheterization is best demonstrated by data from Stover et al showing that 30% of spinal cord-injured patients are discharged from the hospital with orders for intermittent catheterization, but that fewer than 5% are continuing by 5 years.

Avoid routine use of antibiotics

Antibiotics should not be used routinely to try to sterilize the urine in spinal cord-injured patients with positive urine cultures because this has not proved useful. Most patients have chronic bacteriuria, but this indicates colonization only, not systemic infection. In many instances, an indwelling catheter without antibiotics is a reasonable management course.

However, antibiotics may be beneficial in patients with indwelling catheters and positive urine cultures if:

- The catheter is leaking or clogged.
- The urine is foul-smelling and urinalysis shows positive nitrites and leukocytes (usually indicative of an overgrowth of bacteria and which may predict subsequent systemic infection).
- The patient is scheduled for surgery.
- Oganisms are in the urine that are often associated with calculi in spinal cord-injured patients, such as *Klebsiella*, *Serratia*, or *Proteus*.

PRESSURE SORES AND OSTEOMYELITIS: TAKE A LONG-TERM VIEW

A study by Fuhrer et al suggests that approximately one third of spinal cord-injured patients living in the community have pressure sores, and 25% of the sores extend to the depth of fat, muscle, or bone. Such patients are at risk of osteomyelitis.

Here again, physicians should curb their urge to prescribe systemic antibiotics, which are not absorbed well into dead bone tissue. Systemic antibiotics are indicated in patients with osteomyelitis due to pressure sores if:

- The patient has a definite plan for surgical repair within 3 to 6 weeks.
- Septicemia and fever are present.
- The sore can heal with conservative treatment. In such cases (eg, osteomyelitis in a toe or a small ulcer on the lateral malleolus), effective healing may be promoted by a 6-week course of intravenous antibiotics.

General concepts in treating pressure sores

Relieve the pressure. If sores are caused by pressure when sitting, patients should not sit at all until the sores have healed. Prevention may mean frequent changes in position to alleviate pressure. Special beds or mattresses can provide support over a broad area, but are not a substitute for turning or changing positions.

Clean it up. Several chemical, mechanical, and surgical means exist to clean pressure sores.

Avoid systemic antibiotics unless the patient experiences systemic illness with fever, an elevated white blood cell count, and positive blood cultures. Broad-spectrum antibiotics such as vancomycin or clindamycin should be saved until absolutely necessary, such as during surgical closure of the ulcer.

If a bone is visible, consult a surgeon about removing and culturing any infected bone. Surgical options may be limited for patients with multiple chronic ulcers and osteomyelitis. For some, surgical options may have been exhausted; such patients may have to live with chronic osteomyelitis and ulcers for years, managed by frequent dressing changes and local care. If surgical closure is planned, and the patient does not exhibit systemic illness, it is best to time the delivery of intravenous antibiotics to coincide with the anticipated surgery.

Take a long-term view of treatment. Spinal cord-injured patients are prone to a lifetime of pressure sore risk but should not be subjected to a lifetime of antibiotics.

Changing the catheter may relieve the hypertension

AUTONOMIC DYSREFLEXIA: NOT ESSENTIAL HYPERTENSION

Autonomic dysreflexia—exaggerated autonomic responses to stimuli that are innocuous in normal persons—occurs in patients with spinal cord transection above T-6. Paroxysmal hypertension is the hallmark feature, often reaching systolic pressures over 250 mm Hg. Tachycardia occurs in up to 40% of affected patients; other features are headache, sweating, feelings of doom, a blotchy rash, and goose pimples.

Management: Identify and remove the trigger

Overwhelmingly, the most common trigger is bladder irritation. Catheterization or unblocking a blocked catheter will relieve urinary

retention and bladder irritation, lowering the blood pressure and removing the need for admission to the intensive care unit for a nitroprusside infusion.

Other triggers include abdominal processes such as bowel impaction or acute abdomen, cutaneous afferent stimuli such as an ingrown toenail, and undiscovered fractures. A rectal examination may uncover bowel impaction, which cathartic agents can clear. Restrictive clothing should be removed.

Acute episodic hypertension may be treated effectively by making use of the spinal cord-injured patient's natural orthostasis (sitting the patient up and letting his or her legs dangle over the edge of the bed). Alternatively, transdermal nitroglycerin may break the hypertensive reflex; this agent can be removed when the blood pressure normalizes. Once the reflex is broken, for long-term antihypertensive drug treatment is seldom needed. ■

SUGGESTED READING

Bergstrom N, Bennett MA, Carlson CE, et al. Treatment of pressure ulcers. Clinical practice guideline, no. 15. Rockville, MD: US Department of Health and Human Services. Public Health Service, Agency for Health Care Policy and Research. AHCPR publication no. 95-0652, December 1994.

Colachis S. Autonomic hyperreflexia with spinal cord injury. J Am Paraplegia Soc 1992; 15:171–184.

Ditunno J, Formal C. Chronic spinal cord injury. N Engl J Med 1994; 330:550–556.

Fuhrer MJ, Garber SL, Rintala DH, Clearman R, Hart KA. Pressure ulcers in community-resident persons with spinal cord injury: prevalence and risk factors. Arch Phys Med Rehabil 1993; 74:1172–1177.

Levinson W, Ward G. Care of the spinal cord injured patient after the acute period. J Gen Intern Med 1989; 4:336–347.

Peterson J, Roth E. Fever, bacteriuria and pyuria in spinal cord injured patients with indwelling urethral catheters. Arch Phys Med Rehabil 1989; 70:839–842.

Stover SL, DeLisa JA, Whiteneck GG. Spinal cord injury. Clinical outcomes from the model systems. Gaithersburg, MD: Aspen Publishers, Inc., 1995.

Waldvogel F, Medoff G, Swartz M. Osteomyelitis: a review of clinical features, therapeutic considerations and unusual aspects. N Engl J Med 1970; 282:198–206.