Case in Point

Oxybutynin Treatment for Hyperhidrosis in Spinal Cord Injury Patients

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Two patients with spinal cord injuries presented with hyperhidrosis and were successfully treated with oxybutynin.

Hyperhidrosis (HH) is sweating beyond that which is required for thermoregulation.[1] Secondary HH, which is usually caused by an underlying medical condition or drug, may be seen in patients with spinal cord injury (SCI) and can negatively impact psychosocial well-being and quality of life (QOL) if not treated.[1]

Information on the current prevalence of HH is lacking. In 2004, one study projected the prevalence of HH in the U.S. to be 2.8%.[2] A previous study found that about 27% of the 154 patients with SCI reported experiencing HH that was annoying, with 28 (14.6%) of those reporting no contributing somatic causes.[3] Somatic causes of HH include autonomic dysreflexia, posttraumatic syringomyelia, or orthostatic hypotension.[4]

Autonomic dysreflexia is a syndrome that describes a dramatic increase in blood pressure (BP) in patients with spinal cord lesion at or above T6 and is characterized by exaggerated autonomic responses to stimuli that are innocuous to individuals without SCI.[5,6] Noxious stimuli that may trigger autonomic dysreflexia include bowel or bladder distension or obstruction, urinary infection, catheter insertion, suprapubic palpation, or skin irritation.[6] Syringomyelia, another somatic cause of HH, is a cystic lesion on the spinal cord that may develop secondary to congenital anomalies or SCI.[6-8]

The following case reports describe 2 patients with SCI with different diagnoses and presentations of HH. Both were treated with oxybutynin for HH.

CASE 1 PRESENTATION

Mr. J is a 49-year-old with C6-C7 SCI attributed to a motor vehicle accident 26 years before. He presented to the primary care clinic for a routine visit in a self-propelled wheelchair. His diagnosis included tetraplegia, muscle spasms, osteoporosis, chronic pain syndrome, benign prosthetic hypertrophy, neurogenic bladder, and neurogenic bowel. He was noted to have a bath towel around his neck to wipe sweat from his face and neck. He did not recall when this condition started; however, he reported a prior trial of diazepam 5 mg as needed in 2006 in the mornings and before transfers when sweating was usually worst. He continued to use diazepam because it helped with his muscle spasms but not with sweating. His other medications included oral baclofen, alendronate, ibuprofen, docusate sodium, tamsulosin, calcium/vitamin C supplement, and bisacodyl suppository.

The patient's surgical history was significant for anterior discectomy with C6-C7 fusion, sphincterotomy, transurethral resection of the prostate, and right urethral stent placement for hydronephrosis in 2004. His cystoscopy and renal sonogram were within normal limits. On physical examination, his vital signs were within normal limits. However, his long-sleeved shirt was wet on the front, and his neck, chest, and arms also were moist from excessive sweating. During his transfer to and from his wheelchair, he was noted to have chattering of his teeth. The remainder of the physical examination was negative for any other acute findings.

Mr. J was prescribed a 30-day trial of oxybutynin 5 mg 1 tablet by mouth per day for HH. During a 3-week follow-up telephone call, Mr. J reported that the oxybutynin was working well; the sweating on his chest had improved and had resolved

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on his face. Except for mild dryness of mouth, he was tolerating the medication well. There were no changes in his neurogenic bladder, which was managed with an external urinary device.

Six months later, Mr. J reported that oxybutynin continued to work well, and he no longer had to travel with a towel. He was able to go to a football game, social activities were more enjoyable, and he was not embarrassed because of excessive sweating.

CASE 2 PRESENTATION

Mr. B is a 48-year-old with T12 paraplegia secondary to a motor vehicle accident in 1994. He called the primary clinic for a visit because he was concerned about cold clammy hands for the past 6 to 7 months when he woke up in the morning and sometimes throughout the day. He was preparing to start his first semester in college. His diagnosis included neurogenic bowel and bladder and muscle spasms. There was no history of posttraumatic syringomyelia, and his medications included baclofen, dantrolene, diazepam, and multivitamins.

Mr. B took tolterodine 4 mg/d for several years, and for unknown reasons, about 6 years previously the prescription was changed to oxybutynin 15-mg extended release for his neurogenic bladder. He continued to have urinary leakage between the every 4-hour intermittent catherization, and oxybutynin was increased to 10-mg tablet twice per day.

About 7 months prior to this appointment, Mr. B independently stopped the oxybutynin as he felt that it was not making a difference in the management of his neurogenic bladder. It was noted that his cold clammy hands started about the same time that he discontinued the oxybutynin. He could not recall whether he had this symptom prior to initiation of any medication. It was mutually decided to restart the oxybutynin at a lower dose, this time not for his bladder but for the HH. He was ordered a 30-day trial of a 5-mg tablet once per day. About 3 weeks later, he sent a secure message to report oxybutynin's effectiveness and to request a refill.

DISCUSSION

Sweating is a physiological process that involves the active secretion of water by specialized sweat glands in the skin.[9-11] There are 2 types of sweat glands in the skin; apocrine and eccrine.[9] Collectively the 3 million eccrine sweat glands of the average person approximately equal the mass of a kidney and exceed the secretory rate of exocrine glands.[9] They function in evaporative cooling in response to thermal or physiologic stimuli and are widely distributed over the body, especially on the forehead, back, palms, and soles.[10]

Sympathetic cholinergic nerves are mainly responsible for sweat secretion by the release of acetylcholine to activate muscarinic receptors on the gland.[11] Postganglionic fibers from sympathetic nerve cells innervate sweat glands that release cholinergics.[6] Postganglionic cholinergic receptors that are activated by muscarinic drugs are termed *muscarinic receptors* and are readily accessible to antimuscarinic drugs.[6,12] Anticholinergic/antimuscarinic agents antagonize muscarinic receptors and suppress premature detrusor contractions to enhance bladder storage.[13] They include oxybutynin, tolterodine, trospium, solifenacin, darifenacin, and fesoterodine.[13] Oxybutynin was used in both cases because it is on VA formulary. It was effective in treating HH, although the etiology is unclear and the presentations were different.

One retrospective study that analyzed 20 patients who received oxybutynin for primary HH at uncommon sites, such as the back and groin, found that QOL improved in 85% of the subjects after 6 weeks.[14] Randomized placebo-controlled trials also have found oxybutynin effective for treatment of palmar and axillary HH and generalized HH.[15,16]

Syringomyelia was ruled out in both cases based on history and radiologic studies, specifically magnetic resonance imaging. Autonomic dysreflexia was ruled out as the HH was not an acute finding and BP was within normal limits. Orthostatic hypotension is a common finding in SCI, mainly in tetraplegic patients, and could be suspected in both cases. Sweating was usually worse in the mornings in both cases and during transfers, as noted in the first case.[17] However, chronic autoregulation allows for chronic adaption to tissue hypoperfusion over time.[16]

Hyperhidrosis or other disorders of eccrine sweating can occur for various reasons, including changes in the spinal sympathetic preganglionic, ganglionic, or postganglionic neurons; dysfunction of the thermoregulatory centers in the brain's central autonomic network; or changes in the muscarinic cholinergic synapse on sweat glands.[18]

CONCLUSION

Patients with SCI may have an acute or chronic presentation of HH. Removal of the inciting cause in the case of autonomic dysreflexia and/or the administration of a pharmaceutical agent is the usual treatment.

Regardless of the etiology of HH that persists, effective treatment should be a goal, especially in those

patients whose QOL is affected by this condition. The outcome of treatment with oxybutynin in these case reports is consistent with the findings of the limited retrospective study and randomized placebo-controlled studies that show oxybutynin is effective for treating bothersome HH.[14-16]

The results of these case reports are not generalizable to patients with SCI and HH, nor are the results of the limited retrospective study and randomized placebo-controlled studies, as their sample sizes were small.[14,16,17] However, information on the use of oxybutynin for the effective treatment of HH in the SCI population is promising. Research studies on the prevalence of HH and randomized placebo-controlled trials with a larger SCI population are considerations for future studies. ●

Author disclosures

The author reports no actual or potential conflicts of interest with regard to this article.

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REFERENCES

1. Strutton DR, Kowalski JW, Glaser DA, Stang PE. US prevalence of hyperhidrosis and impact on individuals with axillary hyperhidrosis: results from a national survey. *J Am Acad Dermatol*. 2004;51(2):241-248.
2. Walling HW. Clinical differentiation of primary from secondary hyperhidrosis. *J Am Acad Dermatol*. 2011;64(4):690-695.
3. Andersen LS, Biering-Sørensen F, Müller PG, Jensen IL, Aggerbeck B. The prevalence of hyperhidrosis in patients with spinal cord injuries and an evaluation of the effect of dextropropoxyphene hydrochloride in therapy. *Paraplegia*. 1992;(30):184-191.
4. Sato K, Kang WH, Saga K, Sato KT. Biology of sweat glands and their disorders. II. Disorders of sweat gland function. *J Am Acad Dermatol*. 1989;20(5, pt 1):713-726.
5. Kewalramani LS. Autonomic dysreflexia in traumatic myelopathy. *Am J Phys Med*. 1980;59(1):1-21.
6. Low PA, Engstrom JW. Disorders of the autonomic nervous system. In: Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J, eds. *Harrison's Principles of Internal Medicine*. 19th ed. New York, NY: McGraw-Hill; 2015.
7. Milhort TH. Classification of syringomyelia. *Neurosurg Focus*. 2000;8(3):E1.
8. National Institute of Neurological Disorders and Stroke. Syringomyelia fact sheet. https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Fact-Sheets/Syringomyelia-Fact-Sheet. Accessed February 13, 2017.
9. Meschner AL. *Junqueira's Basic Histology*. 14th ed. New York, NY: McGraw-Hill; 2016:371-392.
10. Mauro TM. Biology of eccrine and apocrine glands. In: Goldsmith LA, Katz SI, Gilchrest BA, Paller AS, Leffell DJ, Wolff K. eds. *Fitzpatrick's Dermatology in General Medicine*. 8th ed. New York, NY: McGraw-Hill; 2012.
11. Barrett KE, Barman SM, Boitano S, Brooks HL. *Ganong's Review of Medical Physiology*. 25th ed. New York, NY: McGraw-Hill; 2016:261-272.
12. Kellogg DL Jr. Thermoregulation. In: Goldsmith LA, Katz SI, Gilchrest BA, Paller AS, Leffell DJ, Wolff K, eds. *Fitzpatrick's Dermatology in General Medicine*. 8th ed. New York, NY: McGraw-Hill; 2012.
13. Rovner ES, Wyman J, Lam S. Urinary Incontinence. In: DiPiro JT, Talbert RL, Yee GC, Matzke GR, Wells BG, Posey L. eds. *Pharmacotherapy: A Pathophysiologic Approach*. 9th ed. New York, NY: McGraw-Hill; 2014:1377-1396.
14. Teivelis MP, Wolosker N, Krutman M, Kauffman P, Campos JR, Puech-Leão P. Treatment of uncommon sites of focal primary hyperhidrosis: experience with pharmacological therapy using oxybutynin. *Clinics (Sao Paulo)*. 2014;69(9):608-614.
15. Wolosker N, de Campos JR, Kauffman P, Puech-Leão P. A randomized-placebo-controlled trial of oxybutynin for the initial treatment of palmar and axillary hyperhidrosis. *J Vasc Surg*. 2012;55(6):1696-1700.
16. Schollhammer M, Brenaut E, Menard-Andivot N, et al. Oxybutynin as a treatment for generalized hyperhidrosis. *Br J Dermatol*. 2015;173(5):1163-1168.
17. Gonzalez F, Chang JY, Banovac K, Messina D, Martinez-Arizala A, Kelley RE. Autoregulation of cerebral blood flow in patients with orthostatic hypotension after spinal cord injury. *Paraplegia*. 1991;29(1):1-7.
18. Fealey RD, Hebert AA. Disorders of the eccrine sweat glands and sweating. In: Goldsmith LA, Katz SI, Gilchrest BA, Paller AS, Leffell DJ, Wolff K, eds. *Fitzpatrick's Dermatology in General Medicine*. New York, NY: McGraw-Hill; 2012:chap 84.