

# Botulinum Neurotoxin Treatment of Palmar and Plantar Hyperhidrosis



Tessa Weinberg<sup>a</sup>, Nowell Solish, MD, FRCPC<sup>b,\*</sup>,  
Christian Murray, MD, FRCPC<sup>b</sup>

## KEYWORDS

• Botulinum neurotoxin • Palmar plantar hyperhidrosis • Nerve blocks • Hypohidrosis

## KEY POINTS

- Palmar and plantar hyperhidrosis is relatively common and can have severe psychological and medical consequences for those afflicted.
- A multitude of treatments exist but are often inadequate especially for those with significant disease; in these cases BoNT, in its various formulations, provides a reliable method for reducing the symptoms and improving QOL.
- Although the actual administration is relatively straightforward pain management is a crucial component that requires a mastery of several techniques.
- Patients have a high degree of satisfaction with BoNT treatment and are motivated to come back for repeat treatments, usually every 6 months.

## INTRODUCTION AND OVERVIEW

Hyperhidrosis (HH) is an excessive sweating disorder that affects approximately 2.8% of the population in the United States,<sup>1</sup> likely with similar incidences in other countries.<sup>2</sup> It is commonly defined as sweating beyond what is expected for environmental conditions and thermoregulation with duration of more than 6 months.<sup>3</sup> Some have added specific diagnostic criteria, which are discussed later<sup>4</sup> and do apply to the palms and soles. A quantitative definition of HH as the production of more than 50 mg of sweat in one palm per minute has also been suggested for use in studies and when examining therapeutic intervention<sup>5</sup>; however, this fails to account for surface area. Clinically, sweating is considered excessive if it significantly interferes with daily life.

HH can be classified as primary or secondary and further as general or focal. Focal is further

subclassified by anatomic area. Eccrine glands cover most of the body and have a density of approximately 60/cm<sup>2</sup>, except on the palms and soles where their density is at approximately 600/cm<sup>2</sup>.<sup>6</sup> It is thus not surprising that patients experience HH in areas of high eccrine density, such as the soles (30%) and palms (24%).<sup>7</sup> It should be noted that in primary focal HH, neither the number, density, nor size of eccrine glands are abnormal; rather, there is overactivity of the postganglionic sympathetic cholinergic fibers (sudomotor) innervating them.<sup>8</sup> This explains the effectiveness of botulinum neurotoxin (BoNT).

In clinical practice significantly more patients present with axillary than palmar HH and more with palmar than plantar HH.<sup>9</sup> In many cases individuals suffer with more than one site involved. Most patients who present with palmar HH have had the condition since childhood or early

<sup>a</sup> School of Medicine, Royal College of Surgeons of Ireland, 123 Street Stephen's Green, Dublin 2, Ireland;

<sup>b</sup> Division of Dermatology, Women's College Hospital, University of Toronto, 76 Grenville Street, Room 5142, Toronto, Ontario M5S 1B2, Canada

\* Corresponding author. Division of Dermatology, Women's College Hospital, University of Toronto, 76 Grenville Street, Toronto, Ontario M5S 1B2, Canada.

E-mail address: n.solish@utoronto.ca

adolescence with no known cause and report “sweaty palms” that cause them social embarrassment. The effects later in life are physical and emotional. Physically, the wetness may be bothersome enough that patients go to great lengths to avoid shaking peoples hands and frequently hide their hands in their pockets. Plantar HH may cause patients to frequently change their socks and slip in their shoes. HH is a well-established risk factor for cutaneous infection and eczematous dermatitis. Psychologically HH causes anxiety, emotional distress, embarrassment, and a markedly diminished quality of life (QOL).<sup>3,4</sup> Interestingly, a study by Lear and colleagues<sup>7</sup> suggested that spontaneous regression might occur over time because there is a low prevalence of the disorder in the elderly population.

Multiple modalities are available for treatment of primary focal HH, including topical medications, such as aluminum chloride<sup>10</sup>; oral medications, such as clonidine<sup>3,11</sup>; physical treatments, such as iontophoresis<sup>3,11</sup>; injectable treatments, such as BoNT; and even surgical sympathectomy.<sup>2,12</sup>

In this article, the role of BoNT in the treatment of primary focal HH of the palms and soles is discussed.

## PATIENT EVALUATION

A careful clinical history and focused physical are imperative. The first fact to establish is whether the patient has primary or secondary HH. There are many causes of secondary HH that have been well documented previously<sup>13</sup> and include febrile illness (ie, chronic infections), endocrine disorders (thyroid dysfunction), medication use (ie, antidepressants), and cancer (ie, pheochromocytoma). Secondary is more likely if the sweating is associated with other constitutional symptoms and is generalized in nature. If secondary HH is suspected the work-up should at minimum include a complete blood count, fasting glucose level, and thyroid function tests. Any suspected offending medications should be discontinued and if necessary appropriately substituted. Further investigations should be guided by elements of the history and the examination.

The generally accepted diagnostic criteria for HH in general and palmar-plantar specifically is excessive sweating that lasts at least 6 months without any obvious cause and has at least two of the following features: impairs daily activities, a bilateral and relatively symmetric pattern of sweating occurring at least once per week, an age of onset younger than 25 years, cessation of focal sweating during sleep, or positive family history.<sup>4</sup> Bilaterality is not a diagnostic criteria and it

should be noted that palmar HH can present unilaterally in 6% of cases.<sup>4</sup>

It is important to quantify the impact of HH on the patient’s QOL.<sup>14</sup> This not only helps to decide on the need for and success of treatment but may also aide in obtaining insurance approval for treatment. The HH Disease Severity Scale (HDSS) is an easy tool for this (Table 1).

It is important to take a family history because there is evidence that primary HH is an autosomal-dominant trait with variable penetrance.<sup>15,16</sup>

## MANAGEMENT GOALS AND STRATEGY

The goal of management is to improve the quality of the patient’s life with acceptable risks. QOL studies have in general shown a significant improvement in the QOL after treatment of axillary,<sup>17</sup> for palmar and planter HH.<sup>18</sup>

Several methods have been used to measure the amount of palmar and plantar sweating before and after treatment. These include the evaporimeter,<sup>19</sup> persprint paper,<sup>20</sup> patient reports of the number of days of dryness,<sup>21</sup> digitized ninhydrine test,<sup>22</sup> gravimetry sweat production test,<sup>23</sup> the Minor iodine starch test,<sup>24</sup> and the HDSS. We clinically prefer the HDSS because it is easy and quick to administer and has been found<sup>25</sup> to be

**Table 1**  
Hyperhidrosis Disease Severity Scale

“How Would You Rate the Severity of Your Hyperhidrosis?”		
Patient Response	Score	Clinical Interpretation
1 My sweating is never noticeable and never interferes with my daily activities	1	Mild
2 My sweating is tolerable but sometimes interferes with my daily activities	2	Moderate
3 My sweating is barely tolerable and frequently interferes with my daily activities	3	Severe
4 My sweating is intolerable and always interferes with my daily activities	4	Very severe

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