Management of Compensatory Sweating After Sympathetic Surgery

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KEYWORDS

• Hyperhidrosis • Sweating • Sympathectomy • Sympathetic nervous system
• Cholinergic antagonists

KEY POINTS

- Compensatory hyperhidrosis consists of an increase in the severity of sweating much more than necessary to regulate body temperature in locations that were previously normal.
- Compensatory hyperhidrosis is the most common and feared side effect of thoracic sympathectomy, because patients with severe forms have their quality of life greatly impaired.
- It is currently postulated that the occurrence of compensatory hyperhidrosis is a reflex mechanism, mediated by the hypothalamus.
- The most well-known factors associated with compensatory hyperhidrosis are extension of manipulation of the sympathetic chain, level of sympathetic denervation, and body mass index.
- Therapeutic options include topical agents, botulinum toxin, systemic anticholinergics, clip removal, and sympathetic chain reconstruction.

INTRODUCTION

Sympathectomies have been performed for many decades for the treatment of hyperhidrosis (HH). Technical developments, like the advent of video-assisted operations in the 1990s, have brought safety and positive results to the procedure, leading to an overwhelming increase in the number of video-assisted thoracoscopic sympathectomies (VATS) in recent years.[1,2] In contrast, the postoperative phenomenon of compensatory HH (CH) has been observed more frequently, with an incidence ranging up to 98% in the literature.[3–10]

The wide variability in the incidence of CH may be attributable to heterogeneous patient populations, a variety of techniques of sympathetic denervation, or more important to a lack of objective methodology for defining CH. [11] CH was first described in 1935 by Adson and colleagues[12] and consists of an increase in the severity of sweating much more than necessary to regulate body temperature in locations that were previously normal.

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CH occurs mainly in the abdomen, back, chest, and thighs, but may also be manifested on the feet, although the latter is infrequent. Most patients present with a combination of 2 or more areas.[13,14] CH is generally symmetric and usually occurs within 1 to 5 days after sympathectomy. It becomes more uncomfortable on hot days, in hot environments, during physical exercise, and when experiencing emotional stress and anxiety. It may diminish over time or the patient may learn to live with it.[15,16] CH is the most common and most feared side effect of thoracic sympathectomy.

In most cases, CH is tolerable and does not reach the point of social embarrassment or occupational disability. However, CH can be severely debilitating for some patients, leading them to regret the procedure in severe cases.[17] Patients with severe CH have their quality of life (QOL) greatly impaired, needing several changes of clothes during the day, and on very hot days, patients may avoid leaving home. CH is the Achilles' heel of sympathectomy, as many as 11.2% of patients expressed either dissatisfaction or regret about undergoing the procedure as a result of the occurrence of this troublesome consequence.[18]

PATHOPHYSIOLOGY

The exact mechanism of the development of CH remains unknown. Shoenfeld and colleagues[19] suggested that the total amount of sweat produced did not vary after sympathectomy; however, the increase in perspiration in other parts of the body would represent a body's compensation for sympathetic denervation. Consequently, the term "CH" was adopted. Nevertheless, it is currently postulated that the occurrence of CH is a reflex mechanism, mediated by the hypothalamus after sympathetic surgery, and not a compensatory mechanism.[9,16,20]

Anatomically, the thermoregulatory sweat response is regulated by the hypothalamus, more precisely in the preoptic region. The sympathetic nerves originate in the intermediolateral horns of the spinal cord, between T1 and L2. Each sympathetic pathway is composed of preganglionic and postganglionic neurons. The nerve fibers to the sweat glands are postganglionic fibers. These fibers may go upward and downward in the sympathetic trunks before leaving and distributing to the sweat glands. Consequently, the distributions overlap and are not necessarily to the same part of the body from the same spinal segments.[21]

According to Chou and colleagues[22] changes in sweating patterns after sympathetic procedures may be attributable to a reflex response in the sweating center of the hypothalamus. Afferent negative feedback impulses initiated in the sweat glands stimulate sweating centers located in the hypothalamus, from where efferent positive feedback signals return to the target organs (eg, hands, soles, and armpits).

Sympathectomy at the T2 level causes a complete interruption of the negative feedback to the hypothalamus, contributing to the appearance of CH in peripheral areas owing to the magnified efferent signals originating from the hypothalamus, as well as the fact that the amplified sympathetic signals do not reach the sympathectomized areas. When performing sympathectomy at the T4 level, most of the afferent fibers are not damaged and the efferent stimuli are weaker; therefore, there are fewer cases of severe CH.

CLASSIFICATION

To date, no consensus has been established concerning the classification of CH.[22] Although some authors count only cases in which massive overperspiration occurs, others consider even a slight increase in perspiration as CH.[23] Some authors believe that the increase in sweating in hot environments or during physical exercise is CH, whereas others state that this sweating is only a thermoregulatory response, thus being named compensatory sweating, leaving the term "CH" for more severe cases.[24]

The classification proposed by Gossot and colleagues[25] described 3 different intensity levels of CH (slight/mild, moderate/disturbing, and severe/disabling). Slight or mild CH was considered present when patients reported minor changes in the location and severity of their sweating, such as visible sweating during hot weather and when exercising, but without expressing significant concern. Moderate or disturbing CH was considered present when patients reported visible and embarrassing sweating or occasionally disabling situations caused by sweating. Severe or disabling CH was considered present when patients reported interference in their social and professional activities, such as the need for successive changes of clothes caused by sweating at the same intensity as their previous main site of HH, but at other primary locations.

Dumont and colleagues[26] defined 4 intensity levels of CH (low, moderate, severe, and very severe). Yazbek and colleagues[9] graded the severity of CH as severe or nonsevere. CH was considered to be severe if it was visible, embarrassing, and required more than 1 change of clothes during the day.