

Skin Depigmentation: Could it Be a Complication Caused by Thoracic Sympathectomy?

Fernando L. Westphal, MD, PhD,

José R. M. de Campos, MD, PhD, Jonas Ribas, MD,
Luís C. de Lima, MD, PhD, José C. Lima Netto, MD,
Márcia S. da Silva, and Danielle C. Westphal

Divisions of Thoracic Surgery and Dermatology, Federal and State University of Amazonas Medical School, Manaus, Division of Thoracic Surgery, University of São Paulo Medical School, São Paulo, Brazil

Primary hyperhidrosis is an idiopathic disorder, and its definitive treatment is obtained through thoracic sympathectomy. However, this procedure is not exempt from complications and compensatory sweating is the main inconvenience described. In this article, 2 patients were submitted to video-assisted thoracoscopic sympathectomy, and after approximately 8 months they noticed depigmentation of the region corresponding to the blockade of sympathetic stimulus. This fact could be explained by the possible effect of the nervous system on the melanocytes of human skin. Thus, patients with primary hyperhidrosis, who are candidates for thoracic sympathectomy and have brown skin, must be made aware of this possible complication.

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PPrimary hyperhidrosis is an idiopathic disorder characterized by excessive sweating [1]. Its prevalence in the general population ranges from 0.3% to 4.5%, affecting mainly young adults [2, 3].

Today, there are several therapeutic alternatives; however, the surgical treatment by means of video-assisted thoracoscopic sympathectomy (VATS) presents good results and has the advantage of being definitive [1]. However, as in all surgical procedures, VATS is not exempt from complications, and the most significant is compensatory sweating [4].

Among the VATS complications, no reference regarding alterations in skin color was found in the literature. This study aims to describe the presence of dyschromia in two cases after VATS was performed.

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Address correspondence to Dr Westphal, Hospital Universitário Getúlio Vargas, 4, Apurina St, Praça 14, Manaus, 69010-130, Brazil; e-mail: f.l.westphal@uol.com.br.

Fig 1. Patient 1: Presence of intense dyschromia in the region corresponding to anhidrosis. (Left) Depigmentation in anterior upper region chest wall. (Right) Depigmentation in posterior upper region chest wall.



Case Reports

Patient 1

A 25-year-old man (JMM) with brown skin and palmar-plantar hyperhidrosis was submitted to bilateral VATS with the use of metal “clips” at the third thoracic ganglion (T3) and T4 levels. He evolved well, without postoperative complications and was discharged 24 hours after hospital admission. He returned to the service after 10 months, with total resolution of the initial symptoms, presenting a low-grade of compensatory sweating in the abdominal and dorsal regions, and alteration in skin color, after the route of the dermatomes corresponding to the sympathetic blockade in the entire circumference of the upper region of the trunk, thus forming a clear band with the sympathectomized region (Fig 1). He reports that dyschromia had begun 2 months prior to the return, and there had been worsening after sun exposure, which generated new embarrassment, because he avoids taking off his shirt in public places or in the presence of other people.

Patient 2

A 27-year-old man (ABC) with brown skin and craniofacial, palmar, and axillary hyperhidrosis was submitted to bilateral VATS by ablation at T2, T3, and T4 levels. He evolved without postoperative complications and was discharged 24 hours after his hospital admission. He returned on postoperative day 6 with remission of the initial symptoms; however, presenting intense compensatory hyperhidrosis in the abdomen, thigh, and dorsal region this time. After 8 months, he presented moderate alteration in skin color, in the same region as the other patient, presenting normal coloration on the area of the preserved sympathetic innervation (Fig 2).

Comment

Hyperhidrosis is a stigmatizing condition, both social and psychologically. In addition to discomfort and impairment in the quality of life, constant humidity can cause considerable morbidity when associated with skin maceration, bacterial infections, and fungal skin infections [1]. Even though surgical treatment shows high satisfaction levels, it is important to make the patient aware of the possible undesired side effects, which might affect the quality of life in the same way or even more than the initial disease [4].

In this article, from a total of 353 patients submitted to sympathectomy, 117 (33.1%) had brown skin, of whom



Fig 2. Patient 2: Presence of moderate dyschromia in the region corresponding to anhidrosis. (Left) Depigmentation in anterior upper region chest wall. (Right) Depigmentation in posterior upper region chest wall.

two presented localized dyschromia approximately 8 months after being submitted to VATS. Thus, the estimated frequency of this complication for this group of patients was 1.7%.

This fact could be explained by two hypotheses: (1) the already verified embryological relation between the nervous system and the melanocytes, because both originate from neural crest cells, and (2) the possible presence of direct contact between cutaneous nerve endings and epidermal melanocytes through a mechanism similar to nerve synapse through the release of neuropeptides [5].

The skin is innervated by sensory nerves and postganglionic sympathetic and parasympathetic fibers. Sensory nerves function not only as an afferent conduction system of the stimulus of the skin to the central nervous system, but also as an efferent system to stimulate the target tissue to secrete several types of neuropeptides through its branches. The fact that both melanocytes and Schwann cells derive from the neural crest makes it plausible that the behavior of melanocytes is regulated by neuropeptides, in that the most probable is the calcitonin gene-related peptide, a neuropeptide that is known to be present in intra-epidermal nerve endings responsible for regulating DNA synthesis and the proliferation of melanocytes. A study carried out in experimental animals showed the presence of direct contact, similar to nerve synapse, between cutaneous nerve endings and epidermal melanocytes. However, the study was not confirmed on human skin [5].

Studies that evaluate the presence of neuropeptides in human skin and their influence in some dermatoses corroborate the hypotheses mentioned [6]. Specific disorders in cutaneous pigmentation are strongly associated with nerve abnormalities or appear characteristically in the distribution pattern of the dermatome. In some cases of vitiligo, an acquired hypomelanosis, finding characteristics such as nerve degeneration in the affected site, distribution patterns of the disease following the line of the corresponding dermatomes, and alterations in the quantity of neuropeptides in the epidermal nerve fibers support the fact that in some patients neural factors are basically involved in the disease genesis [7]. In patients with Hansen disease, the lesion of cutaneous nerve branches is associated with areas of anesthesia and depigmentation, in addition to there being significant alterations

in local neuropeptides [5, 6]. Dermatological problems, such as psoriasis and vitiligo, are associated with alterations in cutaneous neuropeptides and with the patient's psychological state, presenting themselves more severely in anxiety states [6].

The association between sympathectomy and dyschromia was reported in 1980 by Samuel and colleagues [8]. In the case described, the female patient presented hyperpigmentation of the extensor surface of the right hand fingers after malignant infiltration of the cervical-thoracic sympathetic chain by Pancoast tumor.

Thus, the possible effect of the nervous system on the melanocytes of human skin makes it plausible that the blockade on the sympathetic nerve stimulus through VATS might cause alterations in the epithelial melanocyte system, especially in patients with large production of melanin.

In conclusion, patients with primary hyperhidrosis, who are candidates for VATS, and who have brown skin, must be informed and aware of this possible complication. More detailed studies of the binomial efferent fibers and melanocytes should clarify this type of alteration that has been verified in these cases.

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