

# Review of Reported Cases of Chromhidrosis

Hyunhee Park, DO,\* Brad Glick, DO, FAOCD\*\*

\*Dermatology Resident, 1st year, Wellington Regional Medical Center-Dermatology Residency Program/LECOMT, Wellington, FL

\*\*Program Director, Wellington Regional Medical Center-Dermatology Residency Program/LECOMT, Wellington, FL

## Abstract

*Chromhidrosis is an uncommon, idiopathic sweat-gland disorder that produces pigmented sweat. Etiology of this disorder is unknown, and the clinical presentation can vary in color of the sweat and body location involved. Histologically, chromhidrosis is notable for apocrine glands in the dermis and the presence of lipofuscin granules. There is still a controversy over the origin of chromhidrosis, whether apocrine or eccrine. There are also limited options to providing satisfactory treatment for patients suffering from this rare condition. In this review, some of the noteworthy previously documented case reports of chromhidrosis are described to illustrate the patient demographic, characteristics of the disorder in each patient reported, and treatment options explored.*

## Introduction

Chromhidrosis is a rare, idiopathic disorder of sweat glands, characterized by pigmented secretions from the malar cheeks, axilla, areolae, hands or other body areas. The incidence of chromhidrosis is not well-documented. Male-to-female prevalence ratio is unknown because there are too few reported cases to draw a statistically meaningful conclusion. Both the apocrine and eccrine glands can be involved in chromhidrosis. Previously reported colors of sweat include black, blue, yellow, green, red, and brown.<sup>1-6</sup> Although there are no known long-term sequelae associated with chromhidrosis, the condition can cause significant social and psychological distress. Treatment options for this entity are limited and still present a challenge. This article evaluates some of the previously reported cases of chromhidrosis, illustrating the demographic of the patient, body areas involved, color of the pigmented sweat, and whether the attempted treatment was successful (and if so, for what duration).

## Review of the literature by case report

A 28-year-old female with a five-year history of bluish discoloration on bilateral superior cheeks was presented by Alanen et al.<sup>5</sup> Manual expression resulted in black sweat. Her past medical history was unremarkable, and she denied taking any medications. A 3 mm punch biopsy revealed collections of ectopic apocrine glands within mid-reticular dermis as well as occasional apocrine glands with brown lipofuscin-laden cytoplasm. This case showed an apocrine chromhidrosis involving bilateral malar cheeks in which botulinum toxin type A injection was unsuccessful. It did not disclose the methodology of botulinum toxin type A used.

On the other hand, Matarasso presented a 32-year-old female with black chromhidrosis limited to her lateral cheeks that was successfully treated with botulinum toxin type A injection.<sup>7</sup> This was another healthy subject with no other

associated symptoms. Upon a challenge of moderate exercise (running in place), an area approximately 3.0 cm in diameter appeared with discrete pinpoint black beads just above the zygomatic arch bilaterally. Patient deferred biopsy, and trial treatment with botulinum toxin type A injection was initiated. Using a 1.0 cc tuberculin syringe, 15 units were injected into each side of the face (total of 30 units). Five injection sites were distributed at 1.0 cm intervals on each side. The patient reported there was a marked reduction in black sweat upon exertion at 48 hours. She reported a further reduction at seven days with no side effects or complications. At 14 days, the patient returned for follow-up examination, where a trace of isolated black beads of sweat reappeared in the same fashion but without pigmented sweat production. Matarasso reported these sustained results at four months post injection and indicated a substantial role of the eccrine gland in chromhidrosis.

Type A botulinum toxin is the most potent of seven subtypes: A, B, C (C alpha and C beta), D, E, F, and G. It is used as a chemodenervating agent that temporarily causes paralysis of select facial muscles, relaxing the superimposed rhytid.<sup>7</sup> The inhibition of acetylcholine, the neurotransmitter responsible for contracting the myoepithelium that surrounds eccrine glands, may account for the prevention of sweat release.<sup>8</sup> This rationale asserts that the successful response to botulinum toxin type A treatment is indicative of eccrine origin. On the contrary, there is some reported evidence that apocrine sweat glands respond to cholinergic stimulation to a lesser degree.<sup>9</sup> This implies that a successful response to botulinum toxin does not necessarily mean chromhidrosis is completely of eccrine origin.

Wu et al. described a 24-year-old female with black chromhidrosis involving her cheeks.<sup>10</sup> The patient's condition was aggravated by an increase in ambient temperature or stress level, and a black watery discharge could be expressed from her cheeks with pressure. Discharge appeared to arise

primarily from the follicles along malar eminence, consistent with apocrine chromhidrosis. Biopsy was deferred, and basic laboratory workup including complete blood count, platelet count, clotting profile, urinalysis, and homogenetic levels were within normal levels. After failing a three-month course of 20% aluminum chloride hexahydrate treatment, botulinum toxin type A trial therapy was started on the patient's right cheek. Ten units were injected intradermally to the visible chromhidrosis area in five-unit amounts approximately 1 cm apart. Less-prominent discoloration was noted at three-week follow-up with no side effects, and 10 more units of botulinum toxin type A were injected into the areas of the right cheek in a similar fashion. The patient reported significant reduction in sweating as well as substantial decrease in discoloration at two weeks post-injection. There was still beneficial response present at 19 weeks post-treatment. The article did not mention why the right cheek was chosen for the trial treatment or why bilateral treatment was not done.

Chromhidrosis has been reported in male patients. A 38-year-old man with a five-year history of dark blue secretions on bilateral malar cheeks was reported in an article by Chang et al.<sup>11</sup> Pinpoint pigmented specks were limited to his cheeks and would appear with exertion in a symmetric, diffuse pattern. His medical history was unremarkable, with no topical or oral medications. Urinary homogenetic acid levels and lumbar spinal X-rays were normal. A 3 mm punch biopsy revealed glandular structures exhibiting decapitation secretion, consistent with ectopic apocrine glands in the deep reticular dermis.<sup>11</sup> Also, bluish cytoplasmic granules were observed in the apocrine epithelium lining, leading to a diagnosis of facial apocrine chromhidrosis. The patient denied any active treatment at that time.

Malar cheeks are a frequently reported body site for chromhidrosis; however, other locations have been addressed in the literature. Polat et al. described a case of a 44-year-old woman with

a 10-month history of blue staining of clothing around the breasts and axillae.<sup>12</sup> Her medical history was insignificant, and she was not taking any medications. Physical examination revealed blue staining on the patient's bra with no other abnormal findings. Mycological and bacteriological cultures from the axillae and inframammary region grew no organisms.<sup>12</sup> The patient refused a biopsy, and this report does not mention whether treatment was attempted.

Although chromhidrosis seems most commonly limited to one area of the body, it is possible to involve more than one body area as reported by Perez Tato et al. in 2012.<sup>13</sup> They reported a case of 26-year-old woman with a three-year history of dark blue secretions on bilateral malar cheeks. On examination, a subtle blue sweating of her axillae was noted. In this case, a 4 mm punch biopsy was obtained from the axillary region, showing apocrine glands in the deep reticular dermis as well as bluish lipofuscin granules in the apocrine epithelium lining. This confirmed the diagnosis of apocrine chromhidrosis, and treatment with 20% aluminum chloride hexahydrate solution was initiated with poor tolerance due to irritation. Topical capsaicin cream was tried later, again with poor tolerance secondary to burning sensation. Subsequently, treatment with botulinum toxin type A was started with 10 units into each side of the face, 0.05 cc per injection site. Authors reported a reduction in sweating and a decrease in discoloration at one week after injection. Although without complete remission, improvement persisted at four months post treatment.

## Conclusion

Chromhidrosis is a rare, idiopathic sweat-gland disorder characterized by the excretion of pigmented sweat arising from either apocrine or eccrine glands. Clinically, it is sometimes difficult to distinguish between eccrine and apocrine origin. As mentioned previously, there remains some controversy as to whether the resolution of chromhidrosis with botulinum toxin injections is indicative of a purely eccrine nature, because there is some evidence reported that apocrine glands are also affected. In apocrine chromhidrosis, varying degrees of oxidized lipofuscin pigment granules within apocrine glands can cause black, blue, green, brown, red, and yellow sweat.<sup>14</sup> The presence of lipofuscin pigment granules within the apocrine cells confirms the diagnosis of apocrine chromhidrosis.<sup>2</sup> Eccrine chromhidrosis is the excretion of pigmented sweat from eccrine glands after the ingestion of dyes or drugs, and red, yellow, and blue excretions have been described in the literature.<sup>14</sup> Pseudochromhidrosis is the change of color of normal sweat on the skin by surface compounds, molecules, or chromogenic bacteria. Such chromogens include dyes, colored

chemicals, or microorganisms such as *Piedraia* or *Corynebacterium*.<sup>7,15,16</sup>

Three main off-label treatment options for chromhidrosis include topical capsaicin cream, 20% aluminum chloride hexahydrate solution, and botulinum toxin A. Satisfactory therapy for chromhidrosis remains challenging and is typically focused on ways to reduce secretions. It is worthwhile to explore new technologies such as micro-focused ultrasound to reduce sweat production as potential chromhidrosis treatment options.<sup>17</sup>

## References

1. Shelley WB, Hurley HJ. Localized chromhidrosis: a survey. *Arch Dermatol.* 1954;69:449-471.
2. Griffith JR. Isolated areolar apocrine chromhidrosis. *Pediatrics.* 2005;115:239-241.
3. Mali-Gerrits MM, van de Kerkhof PC, Mier PD, et al. Axillary apocrine chromhidrosis. *Arch Dermatol.* 1988;124:494-496.
4. Thami GP, Kanwar AJ. Red facial pseudochromhidrosis. *Br J Dermatol.* 2000;142:1219-1220.
5. Barankin B, Alanen K, Ting PT, et al. Bilateral facial apocrine chromhidrosis. *J Drugs Dermatol.* 2004;3:184-186.
6. Saff DM, Owens R, Kahn TA. Apocrine chromhidrosis involving the areolae in a 15-year-old amateur figure skater. *Pediatr Dermatol.* 1995;12:48-50.
7. Matarasso SL. Treatment of facial chromhidrosis with botulinum toxin type A. *J Am Acad Dermatol.* 2005;52:89-91.
8. Yuraitis M, Jacob Cl. Botulinum toxin for the treatment of facial flushing. *Dermatol Surg.* 2004;30:102-4.
9. Robertshaw D. Catecholamines and the control of sweat glands. In: Blaschko H, Sayers G, Smith AD, editors. *Handbook of physiology, endocrinology, VI.* Washington (DC): American Physiology Society; 1975. p. 591-603.
10. Wu JM, Mamelak AJ, Nussbaum R, McElgunn PS. Botulinum toxin A in the treatment of chromhidrosis. *Dermatol Surg.* 2005;31:963-965.
11. Chang YC, Anderson N, Soeprono F. Bilateral facial pigmentation. *Dermatology Online Journal.* 2007;13(3):16.
12. Polat M, Dikilitas M, Gozubuyukogullari A, Alli N. Clinical and Experimental Dermatology. 2009;34:e373-e374.
13. Perez Tato B, Zamora Martinez E, Sanchez Albisua B, et al. Facial and axillary apocrine chromhidrosis. *Dermatology Online Journal.* 2012;18(3):13.
14. Wyrick K, Cragun T, Russ B, Royer MC. Atypical chromhidrosis: a case report of orange sweat. *Cutis.* 2008;81:167-170.

15. Odom RB, James WD, Berger TG, editors. *Andrews' Diseases of the Skin: Clinical Dermatology.* 9<sup>th</sup> ed. New York, NY: WB Saunders Co; 2000.

16. Bologna JL, Jorizzo JL, Rapini RP, editors. *Dermatology.* London, England: Harcourt Health Sciences; 2003. P. 580.

17. Nestor MS, Park HP. Safety and efficacy of micro-focused ultrasound plus visualization for the treatment of axillary hyperhidrosis. *J Clin and Aesth Dermatol.* 2014;7(4):14-21.

**Correspondence:** Hyunhee Park, DO; hparkdo@gmail.com