Anatomía Digital

ISSN: **2697-3391**
Vol. 7 No. 3.1, pp. 23 – 45, agosto 2024

www.anatomiadigital.org

Berloque dermatitis: an esthetic problem in modern dermatology

Dermatitis de Berloque: un problema estético en la dermatología moderna

[1] Rita Elizabeth Velastegui Hernández https://orcid.org/0000-0001-9360-4265
Facultad de Ciencias de la Salud, Universidad Técnica de Ambato, Ambato, Ecuador.
rvelastegui1088@uta.edu.ec

[2] Ana Elizabeth Tagua Moyolema https://orcid.org/0009-0005-6313-0640
Facultad de Ciencias Médicas, Universidad Regional Autónoma de los Andes "UNIANDES", Ambato, Ecuador.
ma.anaetm81@uniandes.edu.ec

[3] Victoria Estefanía Toasa Zumbana https://orcid.org/0009-0002-3544-3648
Facultad de Ciencias de la Salud, Universidad Técnica de Ambato, Ambato, Ecuador.
vtoasa7048@uta.edu.ec

[4] Rommel Santiago Velastegui Hernández https://orcid.org/0000-0001-6653-7933
Universidad Técnica de Ambato, Ambato, Ecuador.
rs.velastegui@uta.edu.ec

Artículo de Investigación Científica y Tecnológica
Enviado: 16/04/2024
Revisado: 13/05/2024
Aceptado: 11/06/2024
Publicado:13/08/2024
DOI: **https://doi.org/10.33262/anatomiadigital.v7i3.1.3117**

Cítese: Velastegui Hernández, R. E., Tagua Moyolema, A. E., Toasa Zumbana, V. E., & Velastegui Hernández, R. S. (2024). Berloque dermatitis: an esthetic problem in modern dermatology. Anatomía Digital, 7(3.1), 23-45. https://doi.org/10.33262/anatomiadigital.v7i3.1.3117

ANATOMÍA DIGITAL, es una Revista Electrónica, Trimestral, que se publicará en soporte electrónico tiene como misión contribuir a la formación de profesionales competentes con visión humanística y crítica que sean capaces de exponer sus resultados investigativos y científicos en la misma medida que se promueva mediante su intervención cambios positivos en la sociedad. https://anatomiadigital.org
La revista es editada por la Editorial Ciencia Digital (Editorial de prestigio registrada en la Cámara Ecuatoriana de Libro con No de Afiliación 663) www.celibro.org.ec

ISSN: **2697-3391**
Vol. 7 No. 3.1, pp. 23 – 45, agosto 2024

www.anatomiadigital.org

Palabras claves:
Dermatitis, medicina, Berloque, hiperpigmentación, cosméticos

Resumen

Introducción. La dermatitis de Berloque es una afección cutánea caracterizada por la aparición de hiperpigmentación en áreas expuestas al sol, causada por la interacción de productos cosméticos que contienen furocumarinas con la radiación ultravioleta (UV). Esta condición, aunque no es peligrosa, tiene un impacto significativo en la estética y el bienestar emocional del paciente. La comprensión de su etiología, manifestaciones clínicas, diagnóstico y tratamiento es crucial para abordar tanto el aspecto físico como el psicológico de la enfermedad. **Objetivo.** El objetivo de este artículo es proporcionar una revisión exhaustiva de la dermatitis de Berloque, abordando su etiología, patogenia, manifestaciones clínicas, diagnóstico, tratamiento y prevención. Se busca ofrecer una perspectiva integral sobre cómo prevenir y manejar esta condición, así como entender su impacto estético y psicológico en los pacientes. **Metodología.** La investigación se basa en una revisión de literatura científica actualizada sobre la dermatitis de Berloque. Se realizó una búsqueda exhaustiva en bases de datos médicas y científicas para identificar estudios relevantes sobre la afección. El enfoque metodológico incluye la recopilación y análisis de datos sobre la etiología de la dermatitis, su patogenia, características clínicas, métodos de diagnóstico y opciones de tratamiento. Además, se consideraron aspectos de prevención y el impacto estético y psicológico de la enfermedad. La metodología se enfocó en una revisión crítica de estudios y artículos relevantes para proporcionar una visión completa de la condición. **Resultados.** La dermatitis de Berloque se manifiesta como hiperpigmentación en áreas expuestas al sol que han estado en contacto con productos cosméticos fotosensibilizantes. Las lesiones suelen ser marrones, bien delimitadas y tienen una distribución que sigue el patrón de aplicación de los productos. El diagnóstico se basa en la historia clínica, el examen físico y, en algunos casos, pruebas de laboratorio como el fotopatch test. El tratamiento incluye la prevención mediante la educación sobre el uso de productos cosméticos y protección solar, así como la aplicación de tratamientos tópicos despigmentantes y, en casos severos, tratamientos sistémicos. La intervención temprana es crucial para minimizar el impacto estético y

Anatomía Digital

ISSN: **2697-3391**
Vol. 7 No. 3.1, pp. 23 – 45, agosto 2024

www.anatomiadigital.org

psicológico de la enfermedad. **Conclusión.** La dermatitis de Berloque es una condición que requiere un enfoque multidisciplinario para su manejo eficaz. La prevención es clave, y los dermatólogos deben educar a los pacientes sobre los riesgos de productos fotosensibilizantes y la importancia de la protección solar. El tratamiento efectivo combina estrategias para mejorar la apariencia de la piel y abordar el impacto emocional de la afección. Un enfoque integral que incluya tanto el tratamiento físico como el apoyo psicológico puede mejorar significativamente la calidad de vida de los pacientes y ayudarles a afrontar los desafíos asociados con la dermatitis de Berloque. **Área de estudio general:** Medicina. **Área de estudio específica:** Dermatología. **Tipo de estudio:** Artículos originales

Keywords:
Dermatitis, medicine, Berloque, hyperpigmentation, cosmetics

Abstract

Introduction. Berloque dermatitis is a skin condition characterized by the appearance of hyperpigmentation in sun-exposed areas caused by the interaction of cosmetic products containing furocoumarins with ultraviolet (UV) radiation. This condition, although not dangerous, has a significant impact on the patient's aesthetic and emotional well-being. Understanding its aetiology, clinical manifestations, diagnosis and treatment is crucial to address both the physical and psychological aspects of the disease. **Objective.** The aim of this article is to provide a comprehensive review of Berloque dermatitis, addressing its aetiology, pathogenesis, clinical manifestations, diagnosis, treatment and prevention. It aims to provide a comprehensive perspective on how to prevent and manage this condition, as well as to understand its aesthetic and psychological impact on patients. **Methodology.** The research is based on an up-to-date scientific literature review on Berloque dermatitis. A comprehensive search of medical and scientific databases was conducted to identify relevant studies on the condition. The methodological approach includes the collection and analysis of data on the aetiology of the dermatitis, its pathogenesis, clinical features, diagnostic methods and treatment options. In addition, aspects of prevention and the aesthetic and psychological impact of the disease were considered. The methodology focused on a critical review of relevant studies

ISSN: **2697-3391**
Vol. 7 No. 3.1, pp. 23 – 45, agosto 2024

and articles to provide a comprehensive overview of the condition. **Results.** Berloque dermatitis manifests as hyperpigmentation on sun-exposed areas that have been in contact with photosensitizing cosmetic products. The lesions are usually brown, well demarcated and have a distribution that follows the application pattern of the products. Diagnosis is based on clinical history, physical examination and, in some cases, laboratory tests such as the photo patch test. Treatment includes prevention through education on the use of cosmetic products and sun protection, as well as the application of topical depigmenting treatments and, in severe cases, systemic treatments. Early intervention is crucial to minimize the aesthetic and psychological impact of the disease. **Conclusion.** Berloque dermatitis is a condition that requires a multidisciplinary approach for effective management. Prevention is key, and dermatologists should educate patients about the risks of photosensitizing products and the importance of sun protection. Effective treatment combines strategies to improve the appearance of the skin and address the emotional impact of the condition. A comprehensive approach that includes both physical treatment and psychological support can significantly improve patients' quality of life and help them cope with the challenges associated with Berloque dermatitis. **General area of study:** Medicine. **Specific area of study:** Dermatology. **Type of study:** Original articles.

Introduction

Berloque dermatitis is a dermatological condition that has attracted interest in the medical community due to its peculiar character and its significant impact on the aesthetics of those who suffer from it. This condition, also known as pigmentary photodermatitis, manifests itself through linear or droplet-like hyperpigmentation’s on the skin, resulting from the interaction between certain photosensitizing chemicals in cosmetics and exposure to ultraviolet light. The name comes from the French word "berloque", which refers to a small ornament or pendant, alluding to the characteristic appearance of the spots that resemble small beads or droplets. Although it is not a life-threatening condition, its relevance lies in the aesthetic and therefore psychological impact it has on patients, affecting their quality of life (1).

Berloque dermatitis was first described in the early 20th century, linked to the use of perfumes containing photosensitive substances such as furocoumarins. These substances, when in contact with sunlight, trigger a phototoxic reaction resulting in residual pigmentation (2). Over the years, the understanding of this condition has evolved, allowing not only perfumes but also other cosmetic products to be identified as possible triggers. In a context where physical appearance and personal aesthetics have acquired increasing social relevance, the study of Berloque dermatitis takes on an additional dimension, standing out not only as a dermatological problem, but also as a condition with profound aesthetic and emotional implications (3).

The pathophysiological mechanism underlying Berloque dermatitis involves a complex interaction between chemical agents and environmental factors. Furocoumarins, the main culprits of this condition, are compounds naturally present in certain plants and fruits, and their inclusion in cosmetic products is common due to their aromatic properties. These compounds can absorb ultraviolet light and generate reactive oxygen species, which in turn damage skin cells, triggering an inflammatory response followed by altered melanin production (1). The result is localized hyperpigmentation in the areas of skin that were in direct contact with the photosensitizing product and subsequently exposed to the sun. This pigmentation, which may initially appear mild, tends to persist and, in some cases, may become permanent, underlining the importance of early diagnosis and treatment (2).

The prevalence of Berloque dermatitis has been the subject of several studies, revealing that, although not extremely common, its incidence is underestimated. This is partly due to the benign nature of the condition, which often does not motivate patients to seek medical attention (3). However, the increasing use of cosmetic products and perfumes, coupled with frequent sun exposure, especially in tropical and subtropical regions, suggests that a significant number of people may be at risk of developing this condition. In addition, the current trend towards the use of natural or "organic" products containing plant extracts may inadvertently increase exposure to furocoumarins and other photosensitizing compounds, which could lead to an increase in cases of Berloque dermatitis in the future (4).

The diagnosis of Berloque dermatitis is mainly based on clinical history and physical examination. The typical presentation of linear or droplet-like hyperpigmentation’s on sun-exposed areas, together with a history of recent use of perfumes or cosmetics, is usually sufficient to suspect the condition (5). However, the differential diagnosis includes other forms of photosensitive dermatitis, such as phytophotodermatitis and polymorphous light eruption, as well as pigmentary disorders such as melasma, which can complicate the diagnostic process. In some cases, photo patch tests or skin biopsies may be necessary to confirm the diagnosis and rule out other conditions (1).

Treatment of Berloque dermatitis focuses on the prevention of new exposures to photosensitizing agents and mitigation of existing hyperpigmentation. Patient education is essential, as avoiding the use of cosmetic products containing furocoumarins and other photosensitizers is the most effective measure to prevent recurrences. In addition, regular use of broad-spectrum sunscreens is crucial to protect the skin from exposure to ultraviolet light, which can exacerbate pigmentation. For established hyperpigmentation, treatment options include topical depigmenting agents such as hydroquinone, kojic acid and retinol, as well as laser therapies, which can help lighten spots. However, these treatments may require several months of application and do not always guarantee complete removal of pigmentation, which can be frustrating for patients.

The aesthetic impact of Berloque dermatitis should not be underestimated, especially in a world where physical appearance plays an important role in self-esteem and social interaction. Dark patches on the skin, although benign, can be perceived as disfiguring, generating emotional distress and reducing the quality of life of those affected. This is particularly relevant in cultures where fair skin is associated with beauty and social status, which may intensify the negative perception of hyperpigmentation. In this context, Berloque dermatitis represents not only a dermatological challenge, but also an aesthetic problem that requires comprehensive care by healthcare professionals (5).

In modern dermatological practice, it is essential to approach Berloque dermatitis from a multidisciplinary perspective that includes both medical management and psychological support. Early intervention, regular follow-up and ongoing patient education are key components in reducing the cosmetic impact of the condition. In addition, it is critical to encourage continued research into Berloque dermatitis, not only to improve treatment options, but also to identify new photosensitizing agents and develop safer cosmetic products. As the cosmetics industry continues to evolve, the identification and elimination of potentially harmful compounds in everyday products will be crucial to prevent the occurrence of this and other dermatological conditions associated with cosmetic use (6).

Methodology

This study will be conducted under the design of a systematic literature review, which is a type of desk research. Documentary research focuses on the collection, analysis, and synthesis of existing information in the scientific literature. The level of research will be descriptive and explanatory, as it seeks to describe and explain the mechanisms, clinical manifestations, treatments and aesthetic impact of Berloque dermatitis. The modality of the study will be bibliographic and retrospective, as published data sources will be analyzed, without direct intervention in the collection of primary data (7).

The research process will follow a systematic and rigorous approach to ensure that the results are reliable and valid. The selection of sources will be carried out through a

comprehensive search of scientific articles, reviews and case studies related to Berloque dermatitis in academic databases such as PubMed, Scopus, Web of Science and Google Scholar. Relevant dermatological textbooks and clinical guidelines will also be included. Specific keywords such as "Berloque dermatitis", "pigmentary photodermatitis", "furocoumarins", "light-induced hyperpigmentation", among others, will be used to ensure comprehensive coverage of the topic. Articles will be selected based on their relevance, with a focus on recent studies (last 10 years), although key historical studies will also be included to provide context (7).

In terms of inclusion criteria, we will consider articles published in peer-reviewed journals, studies that specifically address Berloque dermatitis, its aetiology, clinical manifestations, treatment, and/or aesthetic impact, systematic reviews and meta-analyses that provide a comprehensive summary of the available evidence, and publications in English and Spanish to maximize the scope and inclusion of relevant sources. Exclusion criteria will include non-peer-reviewed articles such as editorials, opinions and short communications, studies that do not directly address Berloque dermatitis, or that focus on other forms of dermatitis or photodermatitis not specifically related to the topic in question, and duplicate publications or preliminary studies that do not provide conclusive data. Likewise, publications that, after a detailed review, do not meet the established quality or relevance criteria will be eliminated, as well as studies with undeclared conflicts of interest or with significant methodological biases that could compromise the validity of the results (8).

For data analysis, a qualitative analysis of the selected articles will be conducted, identifying common themes, discrepancies and areas of agreement or controversy. Tables and summary matrices will be used to organize the information and facilitate comparison between studies. The results will be synthesized to provide an integrated view of the current state of knowledge on Berloque dermatitis, including its clinical, therapeutic and aesthetic aspects. As this is a literature review, the "population" in this context refers to the population of studies or scientific articles reviewed. No patients or directly collected primary data will be involved. The review will include clinical case studies, literature reviews and previous experimental studies involving both patients diagnosed with Berloque dermatitis and individuals exposed to risk factors, such as the use of cosmetic products containing furocoumarins (8).

The conduct of this literature review will adhere to fundamental ethical principles in academic research. Although the literature review does not involve the collection of primary data, the research will be conducted under the auspices of an academic or research institution and will have the endorsement of its appropriate scientific board or committee. Since the research does not involve the direct participation of human subjects, approval by an ethics committee is not mandatory. However, the study will be conducted

under the ethical guidelines for systematic reviews, ensuring the integrity and respect for the rights of the original authors whose works will be analyzed. Informed consent will not be required as no human subjects or personal data will be involved. However, proper citation and acknowledgement of all sources used will be ensured, respecting copyright and avoiding plagiarism. The authors of this review will explicitly declare the absence of conflicts of interest and guarantee transparency in all aspects of the research (7).

The procedure for writing the paper will include an initial review of each selected source, which will be thoroughly reviewed to extract relevant information. This process will include critical reading of the articles to assess their quality and relevance. The extracted data will be organized into thematic sections according to the objectives of the study, such as aetiology, clinical manifestations, treatments and aesthetic impact. The synthesized information will be integrated into a cohesive document, following the standard structure of a review article, with clear sections for introduction, methodology, results, discussion and conclusions. Clarity and precision in writing will be guaranteed, avoiding ambiguities and ensuring that the document is accessible to both dermatology professionals and others interested in the topic. Finally, the manuscript will be reviewed by experts in the field to ensure the accuracy and relevance of the information presented, and any necessary corrections will be made before final publication (7).

Results

Once the literature review has been carried out, the following results are obtained:

Aetiology and pathogenesis

Berloque dermatitis, also known as pigmentary photodermatitis, is a skin condition resulting from a phototoxic reaction triggered by exposure to certain photosensitizing chemicals in cosmetics, mainly perfumes, and subsequent exposure to ultraviolet (UV) light. This condition is a form of phototoxic contact dermatitis, where the interaction between chemicals and sunlight leads to the formation of characteristic hyperpigmentation's on the skin. To fully understand the aetiology and pathogenesis of this disease, it is essential to examine the underlying causes, the chemicals involved, the mechanism of action and the predisposing factors (9).

Causes of Berloque dermatitis

The main cause of Berloque dermatitis is the combination of topical application of photosensitizing substances, commonly found in perfumes, and subsequent exposure to ultraviolet radiation. Perfumes contain a variety of chemical compounds that can react with sunlight to cause an inflammatory response in the skin. Among these compounds, furocoumarins are the most common and potent photosensitizing agents associated with this condition. Berloque dermatitis typically occurs on areas of the skin where perfume

has been applied, such as the neck, wrists and décolleté, and is characterized by the appearance of hyperpigmentation's that may be linear or droplet-like, depending on how the perfume was applied (2).

Chemicals involved: Furocoumarins in perfumes

Furocoumarins, also known as psoralens, are a group of natural organic compounds found in certain plants, such as citrus fruits, celery, fennel and angelica. These compounds are used in the manufacture of perfumes because of their ability to stabilize fragrances and prolong the duration of the scent on the skin. However, furocoumarins have the property of being highly photosensitizing, meaning that they can absorb ultraviolet light and trigger a series of chemical reactions that result in cell damage and an inflammatory response in the skin (10).

In perfumes, furocoumarins are often found in citrus-derived essential oils, such as bergamot oil, which is a popular component in many fragrances. Bergamot oil contains high levels of bergaptens, a specific furocoumarin that has been widely associated with Berloque dermatitis. When these compounds are applied to the skin and exposed to ultraviolet light, especially UVA radiation, they become activated and begin to interact with DNA and other molecules within the skin cells, leading to a series of events that culminate in hyperpigmentation (11).

Mechanism of action and formation of hyperpigmentation

The mechanism of action behind Berloque dermatitis involves the activation of furocoumarins by ultraviolet light, leading to the generation of reactive oxygen species (ROS) and the formation of covalent bonds between furocoumarins and the DNA of epidermal cells. This process, known as phototoxicity, results in direct cell damage, programmed cell death (apoptosis) and a local inflammatory response. The resulting inflammation stimulates melanocytes, the cells responsible for melanin production in the skin, to increase melanin synthesis as a defense mechanism (11).

Excessive melanin production in response to inflammation leads to the appearance of dark spots or hyperpigmentation in the affected areas. These spots can be persistent and, in some cases, permanent. The distribution of the hyperpigmentation usually follows the pattern in which the perfume was applied, resulting in the typical brown lines or droplets that characterize Berloque dermatitis. This type of post-inflammatory pigmentation can be difficult to treat and represents a significant aesthetic problem for affected patients (2).

Predisposing factors

Several predisposing factors may increase the risk of developing Berloque dermatitis. One of the most important factors is individual susceptibility to phototoxic reactions,

which may be influenced by genetic characteristics, skin type and history of exposure to photosensitizing agents (10).

People with lighter skin, who have less protective melanin, may be more vulnerable to furocoumarin-induced phototoxicity. In addition, frequent use of perfumes and other cosmetic products containing furocoumarins in combination with regular sun exposure, particularly in sunny climates, significantly increases the risk. The habit of applying perfume to areas of the body that are commonly exposed to the sun, such as the neck and décolleté, also contributes to the increased incidence of Berloque dermatitis in these areas (10).

Other predisposing factors include the use of certain medications that may increase skin photosensitivity, such as some antibiotics and diuretics. These drugs may interact with furocoumarins, exacerbating the phototoxic response. Finally, lack of awareness of the risks associated with the use of perfumes containing furocoumarins and exposure to the sun without adequate protection may contribute to the development of this dermatological condition (12).

Clinical manifestations

Berloque dermatitis is characterized by hyperpigmented skin lesions that develop after exposure of the skin to photosensitizing products, such as perfumes containing furocoumarins, in combination with ultraviolet (UV) radiation. These lesions have several distinctive clinical features, which allow them to be differentiated from other forms of hyperpigmentation. In addition, the aesthetic and psychological implications of this condition can be significant for affected patients, due to the visible and persistent nature of the spots that form (4).

Clinical description of the lesions: color, location, and evolution

The skin lesions seen in Berloque dermatitis are typically hyperpigmented, ranging in color from light to dark brown, depending on the intensity of exposure to the photosensitizing agent and the amount of UV radiation received. These spots are usually well-defined with sharp edges, reflecting the way the perfume was applied to the skin. Commonly, these lesions adopt a linear or droplet pattern, following the areas where the perfume was applied, such as the neck, wrists, décolleté and behind the ears (6).

The location of the lesions is one of the most distinctive features of Berloque dermatitis. The spots usually appear on areas of the body that are exposed to both the photosensitizing product and sunlight. Because perfumes are usually applied to specific points on the body, the lesions are confined to these areas. Symmetrical distribution of lesions is common, especially on the sides of the neck or wrists, where perfume is applied similarly on both

sides. As for the evolution of the lesions, they usually develop shortly after exposure to the sun, often within hours or days (4).

Initially, the skin may show redness or erythema, followed by a phase of hyperpigmentation that may persist for weeks, months or even years. In some cases, the pigmentation may become permanent, especially with repeated exposure to photosensitizing agents and UV radiation. The clinical course may vary depending on the severity of the reaction and continued exposure to the triggering factors (6).

Differences with other forms of hyperpigmentation

Berloque dermatitis may be differentiated from other forms of hyperpigmentation based on its unique clinical features. Unlike other hyperpigmentation's, such as melasma or sunspots (solar lentigines), the lesions of Berloque dermatitis are directly related to the topical application of photosensitizing substances and subsequent exposure to the sun. While melasma tends to appear as symmetrical patches of hyperpigmentation on sun-exposed areas such as the forehead, cheeks and upper lip, Berloque dermatitis spots are usually more localized and more distinct in shape (6).

In addition, melasma is generally more diffuse and affects larger areas, while Berloque dermatitis lesions are smaller and confined to the sites of perfume application. Another form of hyperpigmentation, solar lentigines, occur as flat brown spots on skin that has been chronically exposed to the sun. Unlike Berloque dermatitis, which develops rapidly after acute exposure to UV light in the presence of a photosensitizing agent, solar lentigines develop slowly and are the result of accumulated sun damage over time. Solar lentigines do not show the same correlation with topical application of chemicals, and their distribution is generally more diffuse, affecting larger areas of sun-exposed skin (12).

Aesthetic and psychological impact on patients

The aesthetic impact of Berloque dermatitis can be significant, as hyperpigmented lesions are often visible and difficult to treat. Spots on areas such as the neck, wrists and décolleté can be particularly problematic, as these are frequently exposed areas, making it difficult to conceal hyperpigmentation's. The persistence of spots and the possibility of them becoming permanent increases aesthetic concern, especially in individuals who are concerned about the appearance of their skin (13).

From a psychological point of view, Berloque dermatitis can cause considerable emotional distress. Patients may experience a decrease in self-esteem and self-confidence due to the visibility of the lesions. In some cases, concern about the appearance of the patches may lead to avoidance behavior, such as reducing social interaction or avoiding

outdoor activities to prevent sun exposure. Anxiety and frustration are also common, especially when spots persist despite efforts to treat them (14).

The management of Berloque dermatitis involves not only the prevention of new exposures to photosensitizing agents and strict sun protection, but also addressing the psychological impact that this condition can have on patients. It is crucial that healthcare professionals recognize both aesthetic concerns and emotional aspects when treating patients with this condition, providing comprehensive support that addresses all dimensions of the impact of the disease (13).

Diagnosis

Diagnosis of Berloque dermatitis requires a detailed clinical approach combining anamnesis, physical examination and, in some cases, laboratory tests. This condition, although relatively rare, should be considered in patients presenting with linear or droplet hyperpigmentation's on areas of the body exposed to sunlight, especially if perfume or cosmetic products containing furocoumarins have been used recently. In addition, it is crucial to make a differential diagnosis with other photosensitive and pigmented dermatoses to ensure appropriate treatment (12).

Diagnostic methods: Clinical history, physical examination, laboratory tests

The first step in the diagnosis of Berloque dermatitis is a detailed clinical history. It is essential to question the patient about recent use of perfumes, lotions or cosmetic products, particularly those applied to the affected areas prior to the appearance of the patches. Recent exposure to sunlight should also be enquired about, especially if this occurred shortly after the application of cosmetic products. The temporal relationship between perfume use and sun exposure, followed by the development of lesions, is a key clue suggesting Berloque dermatitis (14).

Physical examination is essential to identify the clinical features of the lesions. In Berloque dermatitis, the lesions are usually hyperpigmented, varying in color from light to dark brown. The patches usually have well-defined borders and may take linear or droplet shapes, coinciding with the areas where the perfume was applied. The lesions are commonly found on sun-exposed areas such as the neck, décolleté, wrists and behind the ears. The distribution of the lesions is another critical aspect observed during the physical examination. Symmetry and location in specific areas of perfume application help to differentiate this condition from other dermatological conditions. In some cases, laboratory tests may be performed to confirm the diagnosis and rule out other diseases (13).

Although there are no specific tests to diagnose Berloque dermatitis, the photo patch test may be useful. This test involves applying suspected allergens, such as perfume extracts

or furocoumarins, to the patient's skin, and then exposing the skin to UV radiation. A positive reaction, which manifests as redness or hyperpigmentation at the patch site, can confirm the patient's sensitivity to these compounds. However, the photo patch test is not always necessary, and its use is reserved for cases where the clinical diagnosis is unclear (15).

Differential diagnosis with other photosensitive and pigmented dermatoses

The differential diagnosis of Berloque dermatitis is essential to exclude other dermatological conditions that may present with similar clinical manifestations. Among the photosensitive dermatoses, one of the main ones to consider is idiopathic photodermatitis, which may present with erythema, oedema and vesicles on sun-exposed areas, followed by hyperpigmentation. Unlike Berloque dermatitis, idiopathic photodermatitis is not related to the application of topical photosensitizing agents and usually has a wider and less well-defined distribution of lesions (15).

Another condition to consider in the differential diagnosis is melasma, a facial hyperpigmentation commonly induced by sun exposure, hormonal changes, or oral contraceptive use. Melasma typically presents as brown or grey patches with irregular borders on the forehead, cheeks, and upper lip, areas that do not match the classic distribution of Berloque dermatitis. In addition, melasma has a slower and more chronic course and is not associated with an acute phototoxic reaction as in Berloque dermatitis (14).

Solar lentigines, another form of hyperpigmentation related to chronic sun damage, should also be considered. Solar lentigines manifest as flat, brown spots on chronically sun-exposed areas of skin, such as the back of the hands, face and forearms. Unlike the lesions of Berloque dermatitis, solar lentigines are more diffuse and are not related to the application of photosensitizing cosmetic products (16).

Another clinical entity that can be confused with Berloque dermatitis is post-inflammatory pigmentation, which occurs after any skin inflammation, such as burns, rashes or traumatic injuries. Post-inflammatory pigmentation can occur anywhere on the body and takes various forms and distributions, depending on the primary lesion. However, in post-inflammatory pigmentation, there is no direct association with the use of perfumes or immediate sun exposure (10).

Hyperpigmentation induced by photosensitizing drugs should also be considered. Some drugs, such as tetracyclines, sulphonamides and certain diuretics, can induce a phototoxic reaction resulting in hyperpigmentation. The distribution of lesions in this case depends on the pattern of sun exposure, and the history of recent drug use is key to the differential

diagnosis. Unlike Berloque dermatitis, these lesions are not related to the topical application of perfumes and may be more extensive and less well defined (16).

Treatment

The treatment of Berloque dermatitis focuses on three key aspects: prevention, management of hyperpigmentation and the use of topical and systemic treatments. As this condition is induced by the combination of photosensitizing cosmetic products and exposure to ultraviolet (UV) radiation, prevention is essential to avoid the appearance of new lesions. Once hyperpigmentation has occurred, it is crucial to adopt therapeutic measures to reduce its visibility and improve the aesthetic appearance of the affected skin. In addition, early treatment is vital to minimize the aesthetic impact and avoid the persistence of skin blemishes (17).

Therapeutic options: prevention, management of hyperpigmentation, topical and systemic treatments

Prevention is the cornerstone of the management of Berloque dermatitis. To avoid the development of new lesions, it is essential that patients are aware of the cosmetic products they use and their photosensitizing potential. Patient education about the risks associated with the use of perfumes and lotions containing furocoumarins, as well as the need to avoid immediate sun exposure after application of these products, is essential. Patients should be advised to read cosmetic product labels carefully and select cosmetic products that do not contain furocoumarins or other known photosensitizing agents (17).

Once hyperpigmentation has occurred, spot management is the next step. Therapeutic options for treating hyperpigmentation include topical treatments, such as depigmenting creams containing agents such as hydroquinone, kojic acid, azelaic acid, and vitamin C. These agents work by inhibiting melanin production, which helps to lighten hyperpigmented spots over time. In addition, topical retinoids, such as tretinoin, can be used to accelerate cell turnover and improve skin texture and tone (14).

In more persistent or severe cases of hyperpigmentation, systemic treatments may be considered. However, these are less common in Berloque dermatitis due to the localized nature of the condition. Systemic treatments may include the use of oral antioxidants, such as vitamin C or glutathione, which help to reduce oxidative stress on the skin and prevent further spot formation. In addition, in some cases, controlled phototherapy under medical supervision may be considered to treat hyperpigmentation, although this approach must be carefully evaluated to avoid aggravating the condition (17).

ISSN: **2697-3391**
Vol. 7 No. 3.1, pp. 23 – 45, agosto 2024

www.anatomiadigital.org

Recommendations on the use of cosmetic products and sun protection

Proper use of cosmetic products and sun protection are essential components of the treatment and prevention of Berloque dermatitis. Patients are advised to opt for cosmetic products free of furocoumarins and other photosensitizing agents. If the use of perfume is desired, it should be advised to apply the product to areas that will not be exposed to the sun, such as clothing or hair, rather than directly to the skin. It is also advisable to avoid applying perfume just before going outdoors, especially during peak sunlight hours (9).

Sun protection is critical in the management of Berloque dermatitis. Patients should be instructed to use broad-spectrum sunscreen with a sun protection factor (SPF) of at least 30 on all exposed areas of the skin. It is essential that sunscreen is applied generously and reapplied every two hours, especially after swimming, sweating or toweling. In addition to the use of sunscreen, protective clothing, such as wide-brimmed hats, sunglasses and long-sleeved clothing, is recommended to minimized direct sun exposure (18).

Importance of early treatment to minimize aesthetic impact

Early treatment of Berloque dermatitis is crucial to minimize the aesthetic impact and prevent hyperpigmented patches from becoming permanent. Early intervention can halt the progression of hyperpigmentation and facilitate faster resolution of existing lesions. The earlier treatment is initiated, the better the cosmetic prognosis for the patient, and early treatment can help reduce the psychological distress associated with the visible appearance of the spots. Patients who seek treatment promptly may experience less impact on their self-esteem and emotional well-being, as therapeutic interventions can prevent the darkening and spread of the spots. It is also important to consider that hyperpigmentation may be easier to treat in the early stages, when the spots are more superficial and less established on the skin (16).

Prevention

Prevention of Berloque dermatitis is an essential component of avoiding the onset of this skin condition and minimizing its aesthetic and psychological impact. Since this condition is induced by the combination of photosensitizing products and exposure to ultraviolet (UV) radiation, prevention strategies should focus on patient education, habit modification and the use of safe cosmetic products. The role of dermatologists is critical in the prevention and management of this dermatitis, providing expert guidance and ongoing support to patients (17).

Anatomía Digital
ISSN: **2697-3391**
Vol. 7 No. 3.1, pp. 23 – 45, agosto 2024
www.anatomiadigital.org

Prevention strategies: Patient education, habit modification, use of photosensitizer-free products

Patient education is the first and most important step in the prevention of Berloque dermatitis. Patients should be informed about the risks associated with the use of perfumes and cosmetics containing photosensitizing agents, such as furocoumarins. It is crucial that they understand how these compounds, in combination with sun exposure, can lead to the appearance of hyperpigmented patches on the skin. Dermatologists should educate patients on the importance of reading the labels of cosmetic products and selecting those that do not contain furocoumarins or other ingredients known to cause phototoxic reactions (18). In addition, habit modification is essential to prevent Berloque dermatitis. Patients should be advised to avoid applying perfumes and lotions to areas of skin that will be exposed to the sun, especially during the peak hours of UV radiation. An effective strategy is to apply these products to clothing or hair rather than to the skin, thus reducing the risk of a phototoxic reaction. Patients should also be advised to avoid direct sun exposure immediately after applying cosmetic products, or to consider using these products in the afternoon or evening, when sun exposure is lower (3).

The use of products free of photosensitizers is another key preventive measure. Patients should be encouraged to choose perfumes, lotions and cosmetics that are formulated without furocoumarins and other photosensitizing compounds. The cosmetics industry has begun to respond to the demand for safer products by offering options free of these ingredients. Dermatologists can play a crucial role in guiding patients towards selecting appropriate products that minimize the risk of Berloque dermatitis (1).

Role of dermatologists in the prevention and management of Berloque's dermatitis

Dermatologists play a central role in the prevention and management of Berloque dermatitis. Their expertise allows them to quickly identify risk factors and provide personalized preventive recommendations to each patient. By educating patients about the relationship between the use of certain cosmetics and sun exposure, dermatologists help reduce the incidence of this condition (16).

In the management of Berloque dermatitis, dermatologists are responsible for providing effective treatments for hyperpigmented lesions and monitoring the response to treatment. In addition, their role includes ongoing patient support, addressing both aesthetic concerns and the psychological implications of the disease. Dermatologists must also keep abreast of the latest research and advances in the field of cosmetic products to provide the best possible recommendations to their patients (1).

Anatomía Digital
ISSN: **2697-3391**
Vol. 7 No. 3.1, pp. 23 – 45, agosto 2024
www.anatomiadigital.org

Aesthetic and psychological impact

The aesthetic and psychological impact of Berloque dermatitis is significant, affecting the patient's quality of life in a profound way. The condition, while not usually painful or medically dangerous, can cause considerable emotional distress and affect self-esteem due to the visible and persistent appearance of hyperpigmented patches. The relationship between dermatology and psychology is crucial to properly address these effects, and a multidisciplinary approach is often necessary to provide comprehensive care (14).

Effect on the patient's quality of life

Berloque dermatitis can have a considerable impact on the quality of life of sufferers. The hyperpigmented patches that appear on exposed areas of the body, such as the neck, face and hands, can be difficult to conceal and can create a sense of discomfort or embarrassment for patients. Concern about physical appearance can lead to reduced social interaction, limited participation in outdoor activities, and even affect clothing decisions. Patients may experience decreased self-esteem and feel less confident in social or work situations due to the visibility of the lesions (14).

In addition, fear that the hyperpigmentation is permanent or may worsen over time can lead to anxiety and stress. The perception of the skin as damaged or less attractive may influence the patient's body image, contributing to emotional problems such as depression or anxiety. This emotional impact may be exacerbated in individuals who consider physical appearance as a central aspect of their identity or self-esteem (19).

Aesthetic considerations in dermatological practice

In dermatological practice, it is essential that healthcare professionals not only focus on the medical treatment of Berloque dermatitis, but also consider the patient's aesthetic concerns. Sensitivity to the visual impact of the disease is crucial, and dermatologists must be prepared to address these concerns with empathy and understanding. Treatment should not be limited to resolving the blemishes but should include strategies to improve the appearance of the skin in an aesthetic manner, such as the use of corrective cosmetics, effective depigmenting treatments, and recommendations for skin care products that can help restore the skin's healthy appearance (14).

It is important that dermatologists also provide patients with clear and realistic information about prognosis and treatment options to avoid unrealistic expectations that may lead to further frustration. Effective communication about how long it may take for spots to resolve and what results can be expected is key to maintaining patient confidence and reducing treatment-related anxiety (19).

Multidisciplinary management: dermatology and psychology

Given the complex aesthetic and psychological impact of Berloque dermatitis, multidisciplinary management involving both dermatologists and psychologists can be highly beneficial. Dermatologists can treat the physical manifestations of the disease, while psychologists can help patients manage the emotional aspects and develop coping strategies to deal with anxiety, stress or depression that may arise because of the condition.

Psychological support may be especially important in cases where hyperpigmentation has caused a significant impact on the patient's quality of life. Cognitive behavioral therapy, for example, can help patients restructure negative thoughts about their appearance and develop a more positive body image. In addition, psychological intervention can address stress and anxiety management, and provide techniques to improve self-esteem and emotional resilience.

Collaboration between dermatologists and psychologists ensures that both the physical and emotional aspects of Berloque dermatitis are addressed, providing a more holistic treatment approach. This integrated approach not only improves the aesthetic outcome, but also helps patients regain their emotional well-being and maintain a better quality of life (19).

Discussion

Berloque dermatitis, a condition characterized by hyperpigmentation induced by the interaction of photosensitizing cosmetic products and sun exposure, presents a considerable challenge both in terms of clinical management and impact on the patient's quality of life (1). Prevention plays a crucial role in reducing the incidence of this condition, highlighting the importance of educating patients about the risks associated with the use of products containing furocoumarins and the need for adequate sun protection. Modifying habits such as applying perfumes and lotions to areas not exposed to the sun and choosing cosmetic products free of photosensitizers are effective strategies to prevent the appearance of new lesions. Early intervention, combined with an educational and preventive approach, can significantly minimize the occurrence of Berloque dermatitis and its impact on the skin (1, 4, 12, 18).

In terms of treatment, a combination of strategies is necessary to address both prevention and management of hyperpigmented spots. Topical treatments, such as depigmenting creams and retinoids, together with the use of sunscreen products, are essential to improve the aesthetic appearance of the affected skin. Systemic treatments, although less common, may be considered in persistent cases (1, 3). Early intervention is vital to reduce the extent of hyperpigmentation and improve aesthetic outcomes. Dermatologists should not only

treat physical lesions, but also offer guidance on the appropriate use of cosmetic products and the importance of sun protection, tailoring recommendations to the individual needs of each patient (1, 2, 19).

The aesthetic and psychological impact of Berloque dermatitis underlines the need for a multidisciplinary approach in the management of the disease. The patient's quality of life can be significantly affected due to the visibility of hyperpigmented patches, which can lead to decreased self-esteem and emotional problems such as anxiety and depression. Dermatologists, in collaboration with psychologists, can offer a comprehensive treatment that addresses both the physical and emotional aspects of the condition. This approach not only improves the aesthetic appearance of the skin, but also provides the emotional support needed to help patients cope with the psychological impact of Berloque dermatitis, promoting a more complete recovery and overall well-being (1, 5, 15–17).

Conclusions

- Berloque dermatitis is a dermatological condition that, although not life-threatening, has a significant aesthetic and psychological impact on patients. Its prevention and proper management require a thorough understanding of the underlying mechanisms, as well as a holistic approach that addresses both the medical and emotional aspects of the condition. Given the increased use of cosmetic products and sun exposure, Berloque dermatitis is likely to remain a challenge in modern dermatology, underlining the need for increased awareness and education among both healthcare professionals and the public.
- It is a skin disease caused by the interaction of photosensitizing chemicals, particularly furocoumarins present in perfumes, and exposure to ultraviolet light. The mechanism of action involves the activation of these substances by UV radiation, leading to the formation of hyperpigmentation due to increased melanin production in response to cell damage. Several predisposing factors, including individual susceptibility, frequent use of perfumes and sun exposure, play an important role in the development of this condition, which although not dangerous to health, has a significant aesthetic impact on affected patients.
- It manifests clinically as well-defined hyperpigmented lesions, usually located in sun-exposed areas after the application of photosensitizing perfumes. The characteristic appearance and distribution of the lesions allows differentiation from other forms of hyperpigmentation. The aesthetic and psychological impact on patients can be considerable, underlining the importance of proper and comprehensive management of this dermatological condition.
- Diagnosis is based on a detailed clinical history, a thorough physical examination and, in some cases, laboratory tests. Identifying the relationship between the use of photosensitizing perfumes and sun exposure is key to diagnosing this condition.

Differential diagnosis with other photosensitive and pigmented dermatoses is essential to exclude conditions such as idiopathic photodermatitis, melasma, solar lentigines, post-inflammatory pigmentation and drug-induced hyperpigmentation. This comprehensive approach ensures accurate diagnosis and appropriate management of Berloque dermatitis.

- Treatment of Berloque dermatitis is based on prevention through avoidance of photosensitizing agents and adequate sun protection, as well as management of hyperpigmentation through topical and, in some cases, systemic treatments. Recommendations on the use of safe cosmetic products and sun protection are essential to prevent recurrences. The importance of early treatment cannot be underestimated, as it minimizes the aesthetic and psychological impact on patients affected by this dermatological condition.
- - Prevention relies on a combination of patient education, habit modification and the use of safe cosmetic products. Dermatologists play a vital role in guiding and supporting patients in adopting these preventive strategies, ensuring that the risk of developing this condition and its cosmetic impact is minimized. Collaboration between patient and dermatologist is essential for the successful prevention and management of Berloque dermatitis.

Conflict of interest

Authors must declare that there is no conflict of interest in relation to the submitted article.

Authors' contribution statement

The first three authors have contributed equally to the health-related knowledge around Berloque dermatitis, the fourth author has contributed to the writing and methodology of the research.

References

1. Orgaz DA, Ramos GB, & Fiz CR. Dermatitis de berloque. FMC - Formación Médica Continuada en Atención Primaria [Internet]. 2020 [citado el 03 mayo 2024]; 27(2): 108-109. Disponible en: https://doi.org/10.1016/j.fmc.2019.07.00

2. Carbone A, Piemonte P, Muscardin L, Ferrari A, Catricalà C, Frascione P. Gray color in Berloque dermatitis of the face: dermoscopic pitfall. Giornale Italiano di Dermatologia e Venereologia [Internet]. 2016 [citado el 03 mayo 2024]; 151(4): 451–452. Disponible en:https://pubmed.ncbi.nlm.nih.gov/27348327/

3. Wang L, Sterling B, Don P. Berloque dermatitis induced by “Florida Water.” Cutis [Internet]. 2002 [citado el 03 mayo 2024]; 70(1): 29–30. Disponible en: https://pubmed.ncbi.nlm.nih.gov/12184670/

4. Ginkel CJW Van. Berloque dermatitis by a combination of sunbed and suntanning cream [Berloque dermatitis door combinatie van zonnebank en snelbruiner]. Nederlands Tijdschrift voor Dermatologie en Venereologie [Internet]. 2008 [citado el 03 mayo 2024]; 18(8): 295–296. Disponible en: https://www.researchgate.net/publication/288813393_Berloque_dermatitis_by_a_combination_of_sunbed_and_suntanning_cream

5. Errichetti E. Dermoscopy in general dermatology (non-neoplastic dermatoses): the journey so far. Dermatology and Therapy [Internet]. 2021 [citado el 03 mayo 2024]; 11(6): 1871–1877. Disponible en: https://doi.org/10.1007/s13555-021-00633-6

6. Bonamonte D, Foti C, Gullo G, Angelini G. Hyperpigmentation, hypopigmentation and discolorations due to contactants. in clinical contact dermatitis: a practical approach. Springer International Publishing [Internet]. 2021 [citado el 03 mayo 2024]. Disponible en: https://doi.org/10.1007/978-3-030-49332-5_17

7. Velastegui R, Poler R, Díaz-Madroñero M. Aplicación de algoritmos de aprendizaje automático a sistemas robóticos multiagente para la programación y control de operaciones productivas y logísticas: una revisión de la literatura reciente. Dirección y Organización [Internet]. 2023 [citado el 03 mayo 2024]; 80: 60–70. Disponible en: https://doi.org/10.37610/DYO.V0I80.643

8. Lara Satán AA, Lara Satán N, Velastegui Hernández RS, Pullas Tapia PS. Organization and management in the prevention of occupational psychosocial risks in urban public transport. Universidad y Sociedad [Internet]. 2020 [citado el 03 mayo 2024]; 12(4): 355–62. Disponible en: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2218-36202020000400355&lng=es&tlng=es.

9. Bogdanov I, Darlenski R, Hristakieva E, Manuelyan K. The rash that presents as a vesiculobullous eruption. Clin Dermatol [Internet]. 2020 [citado el 03 mayo 2024]; 38(1): 19–34. Disponible en: https://doi.org/10.1016/j.clindermatol.2019.10.012

10. Imbuluzqueta JML, Alonso IB, Lleó MI, Alonso AE. Dermatitis de contacto. Medicine - Programa de Formación Médica Continuada Acreditado [Internet]. 2014 [citado el 03 mayo 2024]; 11(48): 2813–22. Disponible en: https://doi.org/10.1016/S0304-5412(14)70703-6

11. Niemeyer-Corbellini JP, Lupi O, Klotz L, Montelo L, Elston DM, Haddad V, et al. Environmental Causes of Dermatitis. Tropical Dermatology: Second Edition [Internet]. 2017 [citado el 03 mayo 2024]; 443–70. Disponible en: https://doi.org/10.1016/B978-0-323-29634-2.00036-5

12. Ebihara T, Nakayama H. Pigmented contact dermatitis. Clin Dermatol [Internet]. 1997 [citado el 03 mayo 2024]; 15(4): 593–9. Disponible en: https://doi.org/10.1016/S0738-081X(97)00072-2

13. Beltrani VS, Bernstein IL, Cohen DE, Fonacier L. Contact dermatitis: a practice parameter. Annals of Allergy, Asthma & Immunology [Internet]. 2006 [citado el 03 mayo 2024]; 97(3): S1–38. Disponible en: https://doi.org/10.1016/S1081-1206(10)60811-3

14. Sheehan MP. Plant associated irritant & allergic contact dermatitis (phytodermatitis). Dermatol Clin [Internet]. 2020 [citado el 03 mayo 2024]; 38(3): 389–98. Disponible en: https://doi.org/10.1016/J.DET.2020.02.010

15. Epstein WL. Plant-induced dermatitis. Ann Emerg Med [Internet]. 1987 [citado el 03 mayo 2024]; 16(9): 950–5. Disponible en: https://doi.org/10.1016/S0196-0644(87)80739-4

16. Engasser PG. Cosmetics and Contact Dermatitis. Dermatol Clin [Internet]. 1991 Aug; 9(1): 69–80. Disponible en: https://doi.org/10.1016/S0733-8635(18)30434-0

17. Arribas MP, Soro P, Silvestre JF. Allergic Contact Dermatitis to Fragrances: Part 2. Actas Dermo-Sifiliográficas (English Edition) [Internet]. 2013 [citado el 03 mayo 2024]; 104(1): 29–37. Disponible en: https://doi.org/10.1016/J.ADENGL.2012.11.003

18. Phototoxic Dermatitis. Diagnostic Pathology: Nonneoplastic Dermatopathology [Internet]. 2017 [citado el 03 mayo 2024]; 432–433. Disponible en: https://doi.org/10.1016/B978-0-323-37713-3.50165-5

19. 2444. The darker side of smelling good: Ippen, H. u. Tesche, Susanne (1971). Zur Photodermatitis pigmentary Freund ("Berloque-Dermatitis", "Eau de Cologne Pigmentierung"). Hautarzt 22, 535. Food Cosmet Toxicol [Internet]. 1972 [citado el 03 mayo 2024]; 10(6): 885–6. Disponible en: https://doi.org/10.1016/S0015-6264(72)80034-8

ISSN: **2697-3391**
Vol. 7 No. 3.1, pp. 23 – 45, agosto 2024

www.anatomiadigital.org

El artículo que se publica es de exclusiva responsabilidad de los autores y no necesariamente reflejan el pensamiento de la **Revista Anatomía Digital.**

Indexaciones