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Beyond Skin Deep: Cosmetic Allergens and Perioperative Anaphylaxis

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As a perioperative physician, an anaesthesiologist is always meticulous in eliciting a patient's allergy history. Detailed inquiries regarding previous drug allergies, food allergies, reactions to antibiotics, latex sensitivity and prior exposure to anaesthesia constitute an integral part of preoperative evaluation. Yet, amidst this comprehensive assessment, one increasingly relevant aspect often escapes attention - the history of adverse reactions to cosmetic products and aesthetic enhancement procedures. Specific questions regarding hair dyes, skin-care products, fragrances, tattoo pigments, nail cosmetics, dermal fillers, or other beauty-related interventions rarely find a place in routine pre-anaesthetic interviews, despite their potential immunological significance.

The relevance of cosmetic allergies has grown considerably in recent decades. Rapid urbanization, rising socioeconomic status, expanding beauty and wellness industries, and the pervasive influence of social media have led to an unprecedented increase in the use of cosmetic products and aesthetic procedures across all age groups [1]. Contact dermatitis and hypersensitivity reactions to cosmetic ingredients are increasingly reported worldwide. Studies from India itself showed a substantial burden of cosmetic-related allergic reactions, particularly among young adults and women, reflecting changing lifestyles and consumer behavior [2]. What was once a niche concern is now a common clinical reality. Paradoxically, many patients fail to disclose such reactions during medical consultations. A rash following the use of a new face cream, itching after hair colouring, or swelling associated with a cosmetic product is often dismissed as a simple incompatibility - something that did not suit the individual. The product is discontinued, symptoms eventually resolve, and the episode is forgotten. Unlike drug allergies, these events are rarely perceived as medically relevant. Consequently, they are omitted during preoperative interviews, resulting in a significant gap in allergy documentation and risk assessment. This seemingly trivial history may, however, have important perioperative implications. Repeated exposure to cosmetic allergens can lead to sensitization, priming the immune system against specific compounds or chemically related substances. Subsequent exposure in a different context - including the perioperative environment - may trigger more severe hypersensitivity reactions. In susceptible individuals, sensitization may culminate in immediate hypersensitivity reactions, including anaphylaxis. It occurs when allergen-induced cross-linking of IgE antibodies on mast cells is an important source of sensitization. Such exposure may subsequently manifest as allergic reactions to surgical glues, wound closure products, and medical adhesives used in the perioperative period. Even cosmetic procedures that are not directly related to allergies can have anaesthetic implications. The growing use of botulinum toxin injections for facial rejuvenation may alter responses to facial nerve stimulation, potentially leading

to inaccurate assessment of neuromuscular blockade when orbicularis oculi monitoring is employed [3]. Together, these examples illustrate how seemingly unrelated cosmetic exposures can acquire significant relevance within the operating room, influencing both patient safety and anaesthetic management. The challenge is further compounded by the difficulty in identifying the offending allergen when perioperative actions occur. Hypersensitivity reactions may manifest long after the initial sensitizing exposure, obscuring the link between a cosmetic product used months or years earlier and an adverse event occurring during surgery.

Clinicians often focus their investigations on medications administered immediately before the reaction, while environmental and cosmetic sources of sensitization remain unexplored. In addition, the potential for cross-reactivity between cosmetic ingredients and perioperative basophils causes rapid degranulation, releasing mediators such as histamine, tryptase, leukotrienes, and prostaglandins. The resulting vasodilation, increased vascular permeability, bronchospasm, and cardiovascular collapse can lead to a life-threatening event. The perioperative implications of cosmetic allergies and aesthetic interventions extend far beyond localized skin reactions. Chlorhexidine, a recognized cause of perioperative anaphylaxis, is present not only in healthcare settings but also in a variety of cosmetic and personal care products, including creams, cleansers, wet wipes, and hair products [4]. Repeated exposure through these everyday products may act as a sensitizing event, with subsequent exposure to chlorhexidine-containing antiseptic preparations during surgery triggering severe hypersensitivity reactions. Similarly, exposure to quaternary ammonium compounds found in cosmetics, hair conditioners, disinfectants, and personal care products has been implicated in the development of cross-reactive IgE antibodies capable of recognizing neuromuscular blocking agents [5]. This has been proposed as one explanation for anaphylaxis occurring during a patient's first apparent exposure to neuromuscular blocking agents. Acrylates and cyanoacrylates used in artificial nails, gel nail systems, eyelash adhesives, and other cosmetic products represent another agent that is frequently underestimated. Patients who develop reactions to products containing chlorhexidine, acrylates, cyanoacrylates, fragrances, preservatives, or quaternary ammonium compounds may not appreciate the medical significance of these events, and clinicians may fail to recognize their relevance to perioperative care.

This gap is reinforced by the checklist-driven nature of modern pre-anaesthetic evaluation. Standard preoperative questionnaires routinely inquire about drug allergies, food allergies, latex sensitivity, and prior anaesthetic exposure, yet seldom include questions regarding adverse reactions to cosmetics, personal care products, tattoo pigments, nail products, hair dyes, skin-care formulations, or aesthetic procedures. As a result, a potentially valuable source of information remains evident but unutilized. This limits our ability to identify patients at risk and complicates subsequent allergy investigations.

As cosmetic product use and aesthetic enhancement procedures become increasingly integrated into everyday life, anaesthesiologists must broaden their understanding of what constitutes a clinically relevant allergy history.

The distinction between a "cosmetic reaction" and a "medical allergy" is often artificial; both represent interactions between an individual's immune system and environmental exposures that may have consequences far beyond their original context. A history of a rash following a facial cream, itching after hair colouring, intolerance to nail adhesives, or previous cosmetic interventions may provide important clues regarding sensitization, cross-reactivity, or altered perioperative monitoring. Incorporating targeted questions regarding cosmetic products and aesthetic procedures into routine preoperative assessment requires minimal effort but has the potential to improve risk stratification, facilitate identification of causative allergens, and enhance patient safety.

In an era characterized by expanding cosmetic use and rapidly evolving aesthetic practices, the pre-anaesthetic interview must evolve accordingly. Perhaps the time has come for cosmetic allergy history and aesthetic procedure history to become routine components of the pre-anaesthetic

assessment, much like drug and food allergies are today.

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