CONTACT DERMATITIS TO COSMETICS

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OUTLINE

- Introduction
- Emollients
- Hair care products
- Nail care products
- Lipstick

INTRODUCTION

- Everybody uses cosmetics: shampoos, soaps, toothpaste, perfume, deodorants, hair dye, moisturizers, makeup, nail polish, etc.
- Adverse reactions are rare in proportion of use, but common in absolute numbers
- Irritant contact dermatitis is more frequent than allergy. Some people with very sensitive skin are intolerant of most cosmetics (status cosmeticus)

EMOLLIENTS AND EMULSIFIERS

- Propylene glycol
  - Viscous liquid used as emollient in many cosmetics, moisturizing creams and lotions, lubricating and deodorant gels, as well as in corticosteroid ointments and creams, some foods (to preserve moisture)
  - Allergic reactions are not common but do exist
  - Patch testing is difficult to interpret due to irritant reactions
  - Testing done with 10%-30% pet (NACDG tests 30% and 100%)
  - Avoidance is a problem because PG is ubiquitous

EMOLLIENTS AND EMULSIFIERS

- Lanolin (Wool Wax)
  - Extract of sebaceous glands of sheep
  - Allergens are long chain fatty alcohols such as cetyl and stearyl alcohols
  - Rarely causes sensitization on normal skin
  - Sensitization is frequent in leg ulcer/stasis dermatitis, from moisturizers or topical medicament
  - Best tested with Amerchol L-101 50% pet

EMOLLIENTS AND EMULSIFIERS

- Alkyl Glucosides
  - "Natural" surfactants made from starch glucose and fatty alcohols from palm or coconut oil
  - Lauryl, decyl, cetearyl glucosides, etc. are emergent allergens in moisturizers, shampoos, cleansers, sunscreens
- Ethylhexylglycerin
  - Glyceryl ether used as emollient and preservative
  - Still uncommon but emergent allergen

HAIR CARE PRODUCTS: DYES

- Permanent hair dyeing requires 2 small molecules (base and coupler) that, when oxidized by H_2O_2, form colored polymers that bind to hair keratin
- The bases are the usual allergens:
  - Paraphenylenediamine (PPD)
  - Paratoluenediamine (PTD)
  - O-Nitro-paraphenylenediamine
- Couplers sensitize and cross-react with PPD
  - 4-Aminophenol
  - 3-Aminophenol
  - Resorcinol

HAIR DYE: CLINICAL ASPECTS

- All para-amino compounds are strong allergens
- Major cause of allergic contact dermatitis in customers and hairdressers
- Dermatitis is usually acute, onset 8-48 hours after dye is applied
- Involves the face, neck and ears > scalp
- Considerable eyelid edema
- May cause dyschromia

ALLERGIC CONTACT DERMATITIS: PPD



DYSCHROMIA FROM ALLERGY TO PPD



HAIR DYE: CLINICAL ASPECTS

- Occupational dermatitis in hairdressers involves hands, wrists, forearms
- Immediate reactions with anaphylaxis can occur but are rare.
- "Black Henna" temporary tattoos contain PPD, with cross-reactions to other para-amino compounds: Benzocaine, PABA, ½ permanent dyes, textile dyes, black rubber
- Alternatives are few: Elumen (Goldwell)

ALLERGY TO "BLACK HENNA" TATTOO



HAIR CARE: PERMANENTS

- Nowadays, most are of the "acid type"
- Main ingredient and allergen is:
  - Glyceryl monothioglycolate (GMTG)
- Sometimes: allergic contact dermatitis in customers, similar to dyes
- Often: occupational dermatitis in hairdressers:
  - Persists for months on permed hair
  - Rapidly penetrates latex glove

HAIR CARE PRODUCTS: BLEACH

- Bleaching is done with a "booster" + H_2O_2
- The booster is Ammonium Persulfate
- Causes irritant and allergic contact dermatitis
- A major hazard is the occurrence of immediate hypersensitivity, with urticaria, facial edema, asthma and syncope
- Persulfates are also used as "shock treatment" for swimming pools & spas

HAIR PRODUCTS: SHAMPOOS

- Contain detergents and surfactants such as sodium lauryl sulfate (SLS) that can irritate
- Cocamidopropyl betaine (CAPB):
  - Nonionic surfactant, low irritancy potential
  - Allergy is caused by residual contaminants:
    - Amidoamine
    - Dimethylaminopropylamine (DMAPA)
  - Dermatitis affects scalp, face, neck, trunk
  - Hands are involved with occupational exposure

NAIL CARE PRODUCTS: VARNISH

- Contains film formers (nitrocellulose), resins (epoxy!), plasticizers (phthalates), large co-polymers, solvents (butyl acetate), dyes, etc.
- Allergen is usually:
  - Tosylamide Formaldehyde Resin (TSFR)
- Allergic contact dermatitis is "ectopic":
  - Rarely affects the periungual area
  - Involves the eyelids, face, sides of neck, genitalia
- Hypoallergenic brands contain alkyd or polyester resins

ALLERGIC CONTACT DERMATITIS: TSFR



ARTIFICIAL NAILS

- 3 types are available:
  - Sculptured
    - Acrylic: Liquid Monomer + Powder Polymer + Catalyst → Curing at room T°
    - Gel: Acrylic Monomer + Polymer Gel + Photoinitiator → Curing with UV Light
  - Nail Wrap (Silk Nail)
    - A piece of silk is glued to the nail and painted
  - Preformed Nails (Press-on Nails)
    - A plastic nail is glued to the natural nail

ARTIFICIAL NAILS

- All sculptured nails are based on strongly allergenic acrylates
- Methyl methacrylate has been banned in USA since 1974 but is still present in some products, mostly imported from Asia
- Modern allergens :
  - 2-hydroxyethyl methacrylate (2-HEMA)
  - 2-hydroxyethyl acrylate (2-HEA)
  - Triethyleneglycol dimethacrylate (TREGDMA)
- All nail glues contain ethyl cyanoacrylate (ECA)

ALLERGY TO ARTIFICIAL NAILS

- Occupational hand dermatitis in beauticians:
  - hyperkeratotic, fissured, painful and incapacitating
  - involving the pulp of the fingers
- Customers develop periungual dermatitis and paronychia
- Other side effects:
  - Onychodystrophy, permanent nail destruction
  - Painful, persistent paresthesias of fingertips

ONYCHOMADESIS: ACRYLIC NAILS



LIPSTICK

- Allergy causes cheilitis with swelling, redness, desquamation beyond the vermilion border
- Offenders may include:
  - Hydrogenated castor oil (ricinoleic acid)
  - Gallates (antioxidants, also in eye cosmetics)
  - BHA and BHT (Butylhydroxyanisole, toluene)
  - Flavoring agents
  - Shellac
  - Dyes (D&C Red 7, D&C Yellow 11)
  - Branched-chain fatty acid esters
  - Isopalmityl diglyceryl sebacate

ALLERGIC CONTACT CHEILITIS: LIPSTICK



CONCLUSION

- Cosmetics are generally safe but at times cause a lot of discomfort
- Prevalence of adverse reactions is unknown as most victims never report
- Hair dyes and artificial nails cause the worst reactions
- Occupational dermatitis is frequent among hairdressers and beauticians
- Patch testing is the key diagnostic procedure