Occupational Skin Diseases

Introduction

- The second cause of occupational diseases (25- 30% of all occ.diseases)
- A skin disease that is caused by physical, biological or chemical factor in work
- Also a worsening of pre-existing skin disease can be termed as occupational skin disease (Psoriasis, Acne)

Absenteesm & Cost

 4 million working days are lost due to occupational skin disease and the UK Health & Safety Executive has calculated an associated cost to British industry of £200 million per year.

Classification of skin disease

- Occupational dermatitis
- Occupational photosensitivity reactions
- Occupational phototoxicity reaction
- Occupational skin cancers
- Occupational contact urticaria
- Occupational acne
- Occupational skin infections
- Occupational pigmentary disorders
- Miscellaneous

Work place agents that induced skin disorder

Chemicals

Acids Alkalis Solvents Oils Detergents Resins Plastics Metals Petroleum product Plant & wood

D Physicals

Temperature Ionizing radiation Non ionizing radiation

Biologic

Viruses (orf-wart-herpes) Bacteria(anthrax-erisopeloid) Fungi(candida-dermatophyte) Parasites(scabies-(schistosomiasis)

Mechanicals

Pressure Friction Vibration

Diagnosis Of Occupational Skin Diseases

- History : present illness, occ.information, personal history
- □ **P**/E
- Diagnostic techniques
- Supplemental information

Questions

- □ When did disease start?
- □ In which skin area was the first symptom?
- □ What is work technique?
- □ Free time, other works
- Cleaning measures
- Protection
- Vacation, holidays

Contact Dermatitis

- Occupational dermatitis is an inflammation of the skin causing itching, pain, redness, swelling and small blisters.
- Contact dermatitis is an eczematous eruption caused by external agents, which can be broadly divided into:
 - Irritant substances that have a direct toxic effect on the skin (irritant contact dermatitis, ICD)
 - Allergic chemicals where immune delayed hypersensitivity reactions occur (allergic contact dermatitis, ACD).

What Types?

Irritant Contact

80% of all dermatitis is caused by direct contact with a substance It may occur randomly

Allergic Contact

Once sensitised, the problem is life long and any exposure to the substance will result in an attack

What Causes it?

<u>Irritants</u>

- Detergents
- Solvents
- Engine oils
- Cutting fluid
- Lubricants
- Fibreglass

<u>Allergens</u>

- □ Salts
- Nickel
- Epoxy resins
- Dyes
- Rubber

Irritant versus Allergic dermatitis

ICD

- Hx. Of contact with known irritant
- Acute onset
- Stinging, Burning
- Neg. patch test
- Localized

ACD

- Hx. Of contact with known allergen
- Delay onset (1-3d)
- Itching
- Positive patch test
- spreads

Classification of ICD

□ Acute

Chronic

Acute ICD

- This is often the result of a single overwhelming exposure or a few brief exposures to strong irritants or caustic agents.
- Common work chemicals:
 - Concentrated acids
 - Strong alkali
 - Organic and inorganic salts
 - Solvents/gases

Clinical Presentation

- Stinging, burning, painful, erythematous eruption occur after brief contact with strong irritant chemicals.
- Erosion and skin ulceration may occur.
- □ May result in permanent scar.

ACUTE CONTACT DERMATITIS – MODERATE TO SEVERE



Figure 1.4 *Irritant:* This acute, irritant reaction on the scalp was due to hair bleach. Such reactions can vary widely in intensity – this is a moderate reaction.

Chronic (cumulative) ICD

- Repetitive exposure to weaker irritants
 -Wet : detergents, organic solvents, soaps, weak acids, and alkalis
 - -Dry : low humidity air, heat ,dusts , and powders
- Disease of the *stratum corneum*

Occupational at high risk

- **Cleaner**
- Housekeeping
- Construction
- Food service
- Medical dental
- **Engineer**

- Hairdresser
- Mechanic
- Printer
- **Butcher**
- Agricultural/Gardening
- Machinist

Clinical Presentations

- Usually presents with dry, scaly fissuring, lichenified and eczematous lesions on the fingers and hands.
- Vesicular lesions do occur but are less common than in ACD.
- May in face (forehead, eyelids, ears, neck) and arms due to airborne irritant dusts and volatile irritant chemicals

8 Atlas of Contact Dermatitis

CHRONIC CONTACT DERMATITIS



Figure 1.12 Irritant: Desquamation, lichenification and post-inflammatory hyperpigmentation are seen on both the palmar (a) and dorsal (b) aspects of the hands of this man who had been repeatedly exposed to floor wax stripper. Patch tests to screening allergens were negative. There were no vesicles.

(a)

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Management

- Removal from exposure in active lesion
- Treating the active case
 - Topical corticosteroids
 - Soap substitutes
 - Emollients
- □ Second line (for steroid resistant cases):
 - Topical PUVA
 - Azathioprine
 - Cyclosporin

Allergic Contact Dermatitis

Caused by low-molecular weight haptens
Hapten is "incomplete allergen"
Binds to carrier protein for immunogenicity

Occupational Skin Allergens

- Poison oak/ivy
- □ Metals:
 - Chromium
 - Nickel
 - Gold
 - Mercury
 - Cobalt
- Rubber industry
 - Accelerators
 - Antioxidants
- Plastic resins
 - Epoxy resins
 - PU resins
 - Phenolic resins
 - Formaldehyde resins
 - Acrylic resins
- Rosin (colophony)
 - Soft soldering

- Organic dyes (azo dyes)
- Dependence PPDA, CDAs, PBA-1
 - Photography
 - Hair dye
- Methyl metacrylate
- Plants
- Latex and its powder
- Germicides and biocides
 - e.g. lanolin
- Some pesticides
- □ Some solvents
 - Formaldehyde
 - Turpentine
 - Aliphatic amines
- Nitrates
- **Ethylene oxide**

Classification of ACD



□ chronic

Clinical Features (Acute Form)

- Rash appears in areas exposed to the sensitizing agent, usually asymmetric or unilat.
- Sensitizing agent on the hands or clothes is often transferred to other body parts.
- The rash is characterized by erythema, vesicles and sever edema.
- Pruritus is the overriding symp.



222 Bullous allergic contact dermatitis from Rhus species in a North American nursery worker.



Figure 1.3 *Allergic:* This is a classic example of allergic contact dermatitis, showing typical clinical lesions, with vesicles, blisters and exudation.



Figure 7.51 Acute dermatitis developed in this woman after she made leather handbags glued together with a *p-tert*-butylphenolformaldehyde resin type of product. The dermatitis is seen in (a). The glue is seen in (b). Patch test to the *p-tert*-butylphenol-formaldehyde resin in the standard screening series was negative, but, as noted in the introduction to this section, the specific resin may be required to confirm the allergen.



Figure 1.6 Allergic: Spreading vesicular dermatitis is seen on the forearm of this man. The dermatitis occurred three days after he cleaned out vines in his garden. This is the typical appearance of poison ivy dermatitis, a classic cause of acute allergic contact dermatitis of moderate to severe intensity.

Clinical Features (Chronic Form)

- Thickened, fissured, lichenified skin with scaling
- □ The most common sites:
 - Dorsal aspect of hands
 - Eyelids
 - periorbital



Figure 4.66 The tips of the fingers can be the exclusive site of allergic contact dermatitis, as seen in this dentist because of the nature of his exposure to acrylates. Florists may develop a nearly identical fingertip eruption from Alstroemeria plants (van Ketel et al, 1975). Working with tulip bulbs can likewise cause a fingertip eruption, and both garlic and onion can also produce this picture (Sinha et al, 1977). (See also Figures 7.92-7.95.)

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Figure 7.41 Orthopaedic surgeons use acrylate bone cement to attach hip prostheses, and may develop contact dermatitis to this material, which passes rapidly through gloves (Fisher, 1975). (a) The hands of such a surgeon, who was patch-test positive to multiple acrylates. (b) The method of making bond cement. (c) The components.

(a)



Figure 4.99 The rubber insole of the black rubber boots worn by a construction worker was responsible for this plantar dermatitis. The allergens proved to be the antioxidants added to the insole: *N*-isopropyl-*N*'-phenyl-*p*-phenylenediamine (IPPD) and cyclohexyl-phenylparaphenylenediamine (CPPD).

Contact Dermatitis by Specific Body Region

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Figure 4.100 This chronic dermatitis on the dorsum of the foot was caused by chromate contained in the leather of Spanish-manufactured footware.



Figure 7.49 Epoxy resins are used as adhesives in the manufacture of electronic printed circuit boards and electronic chips. The hand dermatitis seen in (a) was caused by contact with objects such as those seen in (b). A patch test to epoxy resin was positive.



Figure 7.14 These lesions on the back of the hand are typical of chromate allergic contact dermatitis in the construction trades. This worker was sensitive to both chromate and cobalt.

Figure 7.15 Chronic exposure to chromates in cement can be associated with hyperkeratotic and crusted changes, as seen here (Conde-Salazar et al, 1995a).





(a)

Figure 7.16 (a) The palm may also be involved in allergic contact dermatitis due to chromate in cement. (b) These are the patch tests of the patient: he was allergic to cobalt and chromate, both of which are found in cement.

Diagnosis

Complete history

- Occupational
- Non-occupational
- Physical examination

Patch test

Management & Prevention

- □ Removal from exposure (lifelong)
- Drug treatment
 - Topical steroid
 - Emollients
- Prevention
 - Like ICDs

Occupational Skin Cancers

- The second m/c form of occupational skin diseases
- About 17% of all cases of occupational skin diseases

Occupational Skin Cancer

- Ultraviolet light
- Poly cyclic aromatic hydrocarbones
- □ Arsenic
- Ionizing radiation
- Trauma

Neoplasms Radiation

UV : SCC, BCC ,Lentigo malignant melanoma

Ionizing radiation : SCC, BCC ,malignant melanoma ,Sarcoma

Neoplasm Poly Aromatic Hydrocarbons

- Dimethylbenzantheracene, Benzyprine
 After latent intervals of 6-20 years : keratotic papillomas (tar warts) in face ,forearms ,hands ,ankles ,dorsal feet ,scrotum
- Co factors: UV ,trauma

Neoplasm Arsenic

- Chronic exposure: (water, fowlers solution, inorganic arsenic) keratotic papules on palms and soles
- No exposed skin surfaces ,intra epidermal SCC (Bowens disease)





266 Solar keratoses.



267 Solar keratoses.



265 Tar keratoses.



Squamous cell carcinoma on the back of the hand of a soldier who had observed nuclear weapons tests.

Multiple BCC following arsenic ingestion.



271 Superficial BCC on the shoulder of a professional yachtsman.

Environmental Acnea

- Preexisting acne vulgaris may be aggravated by various occupational stress
- 1-Tropical acne: Acne prone individuals employed in tropical climates
- 2-Acne mechanica: Tight fitting work clothing ,pressure from seat belt

Oil Acne

- Occupation at risk
- Machinist
- Oil field worker
- Oil refiner
- Auto,truck,air craft,boat mechanics
- Rubber worker
- Roofers
- Road maintenance workers

Cloracne

Occupation at risk

- Workers in production of pesticides, herbicides
- Electrical workers exposed to PCB (transformer oil)



Differential Features of Acne

Oil acne Any age
 Acne vulgaris Peak incidence, ages 11-20
 Chloracne Any age

Distribution Differential Features of Acne

• Oil acne

Exposed area

□ Acne vulgaris Face ,Neck ,Chest

 Chloracne Face, Especially Malar Crescent & Auricular Creases, Axillae, Groin, Nose Spared

Clinical Features Differential Features of Acne

	Oil acne	Open comedones,
		Postules
	Acne vulgaris	Open and closed back
		Comedones, Papules,
	Pos	tules, Cysts, Scar
	Chloracne	Open and closed
	Cor	nedones,
Straw Colored Cysts		

239 Oil folliculitis with follicular plugging and inflammatory papules (courtesy of the National Institute for Occupational Safety and Health, Cincinnati, OH).



