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Atmospheric pressure disorders (Dysparism)

High atmospheric pressure (as in mines): Caisson Disease

2. **Low atmospheric pressure:** (as in high attitudes in mountain climbers& aero planes when going up)

- The symptoms are mainly the manifestations of hypoxia, breathlessness, barotitis (due to blocking of Eustachian tubes), pulmonary and cerebral edema.
- : Persons at high altitude exposed to cold, pressure change & ultraviolet rays. At high altitude 6100 m, oxygen saturation decreases by 50% and become incompatible with life.

Caisson disease (decompression sickness) It occurs to:

Sea divers.

- Workers who dig under water tunnels in certain chamber called caisson chamber.

Etiology of caisson's disease:

- On exposure to high atmospheric pressure under water, more oxygen and nitrogen gases dissolve in blood, on rapid decompression there is rapid lowering of pressure causes bubbling of the more dissolved gases.
- Oxygen is going to be utilized by tissues while nitrogen bubbles cause embolic phenomena in different parts of the body.

Symptoms result from releasing the nitrogen to tissues & form gas bubbles causing the following:

- 1) Simple type: skin rash & joint –limb pain.
- 2) Serious type:
 - Respiratory problem e.g. dyspnea & angina pectoris.
 - Neurological problems e.g. paralysis & loss of sensation.
 - Auditory & vestibular problem.
- 3) Chronic type: Osteo-necrosis in long bones.

Treatment:

- Recompression in hyperbaric chamber followed by gradual decompression.

Radiation related health problems 1- Ionizing radiation:

➡ As X-rays and radio-active isotopes

A- Acute effects: (Acute radiation syndrome):

These occur when the body is exposed to very heavy (1 to 9 Gy) doses of radiation for short period of time. This is usually accidental. (more than 10 Gy may cause death in a day or two).

Main symptoms: anorexia, nausea, vomiting, Diarrhea, pancytopenia, paralytic ileus, paresthesia, motor disturbances, ataxia and disorientation.

Treatment

- Supportive care
- Prophylactic antibiotics
- Bone marrow transplantation

B- Chronic effects:

- Somatic effects: Leukemia, aplastic anemia, cancer, tumor induction, pancytopenia.
- Genetic effects: Stillbirths, congenital defects, neonatal deaths, sex chromosome aneuploidy, sterility.

2. Nonionizing radiation:

Ultraviolet radiation:

On the skin: Darkening of the skin, thickening of the skin, erythema, cancer of the skin.

On the eyes (Ex: Welding): Photophobia, conjunctivitis, keratitis, corneal ulcer, blindness (Welder's flash), snow blindness.

- **Infrared radiation:** Cataract
- **Microwaves:** Microwave sickness
- **Laser radiations:** Thermal burns, cataract, retinal burns.

Factors influencing radiation hazards:

- Type of tissue involved:** Tissues like gonads, lymph nodes, bone marrow and thyroid glands are highly susceptible.
- b.Type of ionizing radiation:** Electromagnetic radiations as x-ray are less harmful compared to corpuscular radiations
- c.Area of the body exposed:** Larger the surface area of the body exposed, more will be the bone marrow depression
- d.Protective clothing:** Reduces the effect.
- e.Other factors:** These are intensity of the radiation, duration of exposure and individual susceptibility are other influencing factors.

Common occupational cancers:

They are also called as 'Industrial cancers'.

- The most common types of occupational cancers are those of skin, lungs, bladder and blood forming organs (like bone marrow).

Risks factors for Occupational cancers Agent Factors:

- These are mainly chemical carcinogens, both organic and inorganic.
- Organic chemical carcinogens mainly result in lung cancer and inorganic ones mainly result in skin cancer.

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Environmental Factors like heat and radiation.

Type of cancer	Carcinogen	'At risk' group in the industry
Skin cancer*	coal-tar, oils dyes, acids, U-V rays, X-rays.	Farmers, road-builders, oil refiners, dye-stuff makers, radiology department staff
Lung cancer	Arsenic, asbestos, uranium, tobacco,	Asbestos factory, uranium mines, gas industry, tobacco industry
Bladder cancer	b-naphthylamine, benzidine, aromatic amines	Aniline industry, rubber industry, electric cable industry
Leukemia	Ionizing radiations Radioactive isotopes	Radiology department, atomic energy research station

Features of occupational cancers:

- They occur in those sites, where the action of carcinogens is constant, most intense and prolonged.
- They appear after a prolonged exposure of about 10 to 15 years.
- They can occur even after cessation of exposure as in asbestos industry.
- The average age incidence of occupational cancers is much earlier than that for cancers in general.
- It is more among men than among women.
- The localization of the tumor is remarkably constant in any one occupation.
- Maintenance of high standard of personal hygiene is very important in the prevention of occupational cancers