Diseases caused by atmospheric compression or decompression

Definition of causal agent

Certain disorders are associated with spending time in a compressed atmosphere and are directly due to pressure itself resp. to changes of the pressure or to inhalation of compressed gas mixtures.
Other disorders occur during or after decompression.
These disorders affect professional divers and those working in compressed air.

Acute effects

☐ Acute diseases caused by the mechanical effects of pressure

- *Barotrauma of the middle ear*
  Haemorrhagic exudate or burst eardrum accompanied by otalgia, otorrhagia, tinnitus aurium or hypoacusis.
- *Barotrauma of the inner ear*
  Sometimes dissociated cochleovestibular disorder.
- *Barotrauma of the sinuses*
- *Excess pressure on the lungs*
  Breathlessness, haemoptysis

Exposure criteria:

Minimum intensity of exposure: Occupational exposure confirmed by the anamnesis providing evidence of work being carried out in conditions where pressure exceeds atmospheric pressure.

Minimum duration of exposure: Brief.

Maximum latent period: 36 hours.

☐ Conditions caused by the toxic effects of inhaled gases

- *Nitrogen narcosis ("rapture of the deep")*

Exposure criteria:

Minimum intensity of exposure: Occupational exposure confirmed by the anamnesis providing evidence of diving work to depths in excess of 50 metres.

Minimum duration of exposure: Brief.

Maximum latent period: A few minutes.

- *Hypo-oxaemic attack*
  Convulsions preceded by cramp, dizziness and nausea.

Exposure criteria:

Minimum intensity of exposure: Occupational exposure, confirmed by the anamnesis providing evidence of work involving diving to depths in excess of 100 metres, with inhalation of compressed air.

Minimum duration of exposure: Brief.

Maximum latent period: A few minutes.

- *High pressure neurological syndrome*
  Tremors, muscle contractions, dizziness and nausea.

Exposure criteria:

Minimum intensity of exposure: Occupational exposure confirmed by the anamnesis providing evidence of work involving diving under helium to depths in excess of 50 metres.

Minimum duration of exposure: Brief.

Maximum latent period: A few minutes.

☐ Decompression diseases

- *Bends*
  Osteoarticular pain
- *Subcutaneous formication*
- *Neurological disturbances*
  Paraplegia, etc.

Exposure criteria:

Minimum intensity of exposure: Occupational exposure confirmed by the anamnesis providing evidence of diving work involving rapid resurfacing.

Minimum duration of exposure: Brief.

Maximum latent period: A few hours.

Chronic effects

☐ Diseases caused by pressure

Hypoacusis

Caused by irreversible cochlear damage with or without labyrinthic syndrome.

Exposure criteria:

Minimum intensity of exposure: Occupational exposure confirmed by the anamnesis.

Minimum duration of exposure: Three months.

Maximum latent period: One month.

☐ Decompression diseases

Dysbaric osteonecrosis

Affecting the shoulder, hip, or knee with characteristic skeletal X-ray picture.

Minimum intensity of exposure: Occupational exposure confirmed by the anamnesis.

Minimum duration of exposure: Three months.

Maximum latent period: 20 years.

Pressure below that of ground level atmospheric pressure

Definition of causal agent

In order to permit passengers of modern aircraft to breathe without using masks the cabins of both pilot and passenger sections are pressurised. However, the pressure level produced is not that of ground level atmospheric pressure but only that equivalent to 2000 m above sea level (moderate low pressure).

Manufacturing or maintenance companies often modify, adapt or repair the equipment of the aircraft during flight without passengers. Similar activity takes place during the testing of new aircraft.

In flight, during repair, changes, and in unplanned incidents, pressure may become considerably lower than that of ground level atmospheric pressure.

Physiologic effects may occur both when low pressure is established and when atmospheric pressure corresponding to ground level is re-established. Organs most susceptible are the middle ear and sinuses.

Another risk is given by modern fire protection systems in store-rooms working by reduction of the oxygen content of the air down to 13 % of oxygen.

Acute effects

☐ Barotrauma of the middle ear

Symptoms and signs: Sudden pain, hearing loss, bleeding from the ear. Burst eardrum (confirmed by inspection).

Exposure criteria:

Minimum intensity of exposure: Occupational change of external pressure, confirmed by anamnesis and measurement outprints, if possible.

Minimum duration of exposure: Brief.

Maximum latent period: A few minutes.

☐ Effects of modern fire protection systems

Symptoms and signs: Cognitive impairments, Headache, Dizziness, Tiredness, Tachycardia, Lowering of the blood pressure.

Exposure criteria:

Minimum intensity of exposure: Occupational exposure confirmed by anamnesis

Minimum duration of exposure: A few minutes

Maximum latent period: 2 hours

Chronic sub-acute effects

☐ Barotrauma of the middle ear

Symptoms and signs: Increasing pain, hearing loss, inflammation and bleeding from the ear.

Exposure criteria:

Minimum intensity of exposure: Occupational change of external pressure, confirmed by anamnesis and measurement outprints, if possible.

Minimum duration of exposure: Six months.

Maximum latent period: One month.

☐ Effects of modern fire protection systems

Symptoms and signs: Neurological failures.

Exposure criteria:

See above