DEFINITIONS

1. The term **pneumothorax** denotes air in the **pleural cavity** - i.e. between the outer surface of the lung and the inner surface of the chest wall.

2. As the layers of the pleura lining the outside of the lungs and the inside of the chest wall are held in contact with each other by the cohesion of their moist surfaces, the pleural "cavity" is a potential rather than an actual space. If a hole occurs in either of the pleural layers with a connection to the outside air, the elastic retraction of the lung draws air into the cavity until the point of entry is sealed off.

3. There are three principal types of pneumothorax -

    3.1 **Spontaneous** - this results from a hole produced by disease, chiefly lung disease.

    3.2 **Traumatic** - this may occur with or without penetrating wounds of the chest.

    3.3 **Artificial** - this results from the deliberate introduction of air as an investigative or therapeutic measure.

4. Further descriptive terms used are -

    4.1 **Localized pneumothorax**, when part of the pleural cavity has been sealed off by adhesions.

    4.2 **Generalized pneumothorax**, when the whole pleural cavity contains air.

    4.3 **Open pneumothorax**, when the air moves freely in and out of the space during respiration.

    4.4 **Closed pneumothorax**, when no movement of air takes place.

    4.5 **Valvular pneumothorax**, when air enters during inspiration and is prevented from escaping during expiration. In this form, when the accumulation of air increases to such an extent as to displace the heart and major blood vessels in the chest, the pneumothorax is usually referred to as a **Tension pneumothorax**.

CLINICAL MANIFESTATIONS

5. The onset of spontaneous pneumothorax, which is by far the commonest form encountered in clinical practice, is usually more or less sudden with unilateral chest pain and breathlessness, the degree of the latter varying according to the size of the pneumothorax and the age of the patient.

6. There may be cough which is short and unproductive although this aspect may be affected by coincidental lung disease.

7. If tension pneumothorax develops, there is increasing anxiety, restlessness and respiratory distress.

8. The manifestations of traumatic pneumothorax are similar but may be overshadowed by other effects of the causal injury.

9. Artificial pneumothorax is usually performed in such a way as not to cause symptomatic response.

10. Pneumothorax, if properly treated, does not, of itself, produce any residual abnormality, lung function returning to normal following reduction of the pneumothorax and re-expansion of the lung. The condition may, however, become chronic with consequent respiratory function impairment.

AETIOLOGY

SPONTANEOUS PNEUMOTHORAX

11. Spontaneous pneumothorax is always secondary to pulmonary or pleural abnormality.

12. **Congenital cysts** derived from malformed terminal bronchioles may retain their connection with the bronchial system and are liable to rupture, thus causing a spontaneous pneumothorax. Such events usually occur in childhood.

13. The most common occurrence of spontaneous pneumothorax is in previously healthy men between 20 and 40 years of age as a result of rupture of sub-pleural blebs which appear most commonly at the apex of the lung. The two lungs are affected equally. The cause of such blebs and their predominance in men is not known but the chief cause is probably a chance congenital defect in the elastic layer of the alveolar wall. The precipitating event is usually not clear although there may be a history of vigorous effort immediately preceding the occurrence of the pneumothorax.

14. In patients over the age of 40 years spontaneous pneumothorax is most often due to chronic bronchitis and emphysema, the factors concerned being progressive destruction of alveolar walls and the high intra-pulmonary pressures produced by coughing.

15. Rarer causes of spontaneous pneumothorax include bronchial asthma, rupture of tension cysts in staphylococcal pneumonia, rupture of caseating subpleural tuberculous lesions and cavities and rupture of tension cysts caused by partial obstruction of an end bronchus by carcinoma.

16. Still rarer causes of spontaneous pneumothorax are interstitial pulmonary fibrosis, pneumoconiosis, silicosis, berylliosis, aluminosis, bauxite lung, pulmonary sarcoidosis.

17. Escape of air through a weak area of the pleura may be initiated by marked variations in intra-thoracic pressure such as occur during ascent in an aeroplane to sub-atmospheric pressures, in too rapid decompression to atmospheric pressure of divers and caisson workers or in pilots who have to eject at high altitudes.

TRAUMATIC PNEUMOTHORAX

18. External wounds of the chest which penetrate to the pleural cavity and non-penetrating trauma which causes rupture of a bronchus or puncture of a lung by the sharp end of a fractured rib may give rise to pneumothorax.

ARTIFICIAL PNEUMOTHORAX

19. This a deliberately-induced condition performed under strict control.

CONCLUSION

20. **Pneumothorax** may result from both penetrating and non-penetrating injuries of the chest or be induced as a deliberate medical investigative or therapeutic measure. It may also occur spontaneously without apparent involvement of external factors. **Spontaneous pneumothorax** always results from underlying pulmonary or pleural abnormality, causes of which are listed above. External factors which may precipitate a pneumothorax in the presence of such abnormalities are also listed.

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