Helium Dilution Method

It allows the determination of the functional residual capacity of the lungs (the volume of air that the lungs contain after normal expiration).

Procedure

After normal exhalation, the examinee begins to breathe in a closed circuit with a mixture of oxygen and a known amount of helium. We measure the concentration of helium that remains in the device after the helium expands into the gas mixture in the lungs and a new equilibrium is established.

Mathematical relationships

Since the system is isolated from the environment, it is possible to calculate the functional residual capacity of the lungs according to the relationships:

$$C_1 V_1 = C_2 V_2$$

$$C_1 V_1 = C_2 (V_1 + FRC)$$

$$FRC = V_1 \frac{(C_1 - C_2)}{C_2}$$

- V_2 = total gas volume in the system (FRC + gas volume in the device)
- V_1 = volume of gas in the device
- C_1 = initial (known) concentration of helium in the device
- C_2 = final concentration of helium in the device after use by the subject

References

Related Articles

- Lung volumes
- Functional examination of the cardiorespiratory system

Source

- Wikipedia (Helium_dilution_technique) (https://en.wikipedia.org/wiki/Helium_dilution_technique)

Bibliography