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1: Cardiovasc Intervent Radiol. 2006 Jul-Aug;29(4):637-41.



Potential air contamination during CO2 angiography using a hand-held syringe: theoretical considerations and gas chromatography.

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PURPOSE: To assess air contamination in the hand-held syringes currently used for CO2 delivery and to determine whether there is an association between their position and the rate of air contamination. METHODS: Assessment of air contamination in the syringe (20 ml) included theoretical modeling, mathematical calculation, and gas chromatography (GC). The model was used with Fick's first law to calculate the diffusion of CO2 and the amount of air contamination. For GC studies, the syringes were placed in the upright, horizontal, and inverted positions and gas samples were obtained after 5, 10, 20, 30, and 60 min. All trials with each position for each sampling time were performed five times. RESULTS: The amounts of air contamination with time calculated mathematically were 5-10% less than those of GC. With the diffusivity of air-CO2 at 0.1599 cm2/sec (9.594 cm2/min), air contamination was calculated to be 60% at 60 min. With GC air contamination was 13% at 5 min, 31% at 20 min, 43% at 30 min, and 68% at 60 min. There was no difference in air contamination between the different syringe positions. CONCLUSION: Air contamination occurs in hand-held syringes filled with CO2 when they are open to the ambient air. The amounts of air contamination over time are similar among syringes placed in the upright, horizontal, and inverted positions.

PMID: 16604407 [PubMed - indexed for MEDLINE]

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