Influence of lung fixation technique on the state of alveolar expansion-a histomorphometrical study

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Lungs removed at necropsy normally collapse due to the loss of negative pleural pressure leading to a quite unnatural appearance of both gross and histological specimens. In order to demonstrate the influence of post-mortem lung retraction on the degree of alveolar expansion, a histomorphometrical analysis was performed in lungs from a 9-month-old healthy infant. Tissue specimens from the right lung were obtained at autopsy and routinely fixed after retraction ('routinely fixed lung'), whereas the left lung was fixed in situ before opening the thoracic cage ('in situ fixed lung'). The size of the alveoli as well as the thickness of the alveolar walls were measured using an automatic image processing and analysis system (Leica QWIN) in both lungs. The mean alveolar size was $8.7 \times 10^3$ microm$^2$ in the routinely fixed lung (alveoli, $n=1.1576$) and $10.9 \times 10^3$ microm$^2$ in the in situ fixed lung (alveoli, $n=841$). In contrast, the diameter of the alveolar walls showed no significant difference in both lungs. The average thickness of the alveolar walls was 7.9 microm (measuring sites, $n=1.190$) in the routinely fixed lung and 8.1 microm in the in situ fixed lung (measuring sites, $n=1.027$), respectively. The results provide evidence of significantly reduced aeration in the retracted and routinely fixed lung which could be of special forensic interest in cases of suspicious infanticide, stillbirth or infant death by drowning or suffocation.

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