



Spanish Journal of Legal Medicine

Revista Española de Medicina Legal

www.elsevier.es/mlegal



FORENSIC MEDICINE IN IMAGES

Iatrogenic gas embolism☆

Embolismo gaseoso iatrogénico



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An 81 year-old male with a history of arterial hypertension, type 2 diabetes mellitus, and left pneumectomy visited the emergency department due to dyspnoea on exertion and orthopnoea without previous respiratory symptoms. Computed tomography showed a right pulmonary hilar mass compatible with neoplasia. Treatment commenced with antibiotics, laxatives, benzodiazepines, and nebulizers. 1.30 h after starting treatment with nebulized 250 µg/2 ml ipratropium bromide, the patient was found on the floor with emphysema and ventricular fibrillation, and he died immediately. When the endovenous catheters were removed, one of the lines from the nebulizer compressor was found to be directly connected to the serum, and this originated the gaseous embolism.

During the external examination of the autopsy, we found massive emphysema with blisters on the lower limbs, and internal examination found multiple bubbles in the vascular tree (Fig. 1). Histopathological study revealed a poorly differentiated epidermoid carcinoma, ganglion metastasis, and visually empty pulmonary vessels resulting from the gaseous emphysema.

This case highlights the importance of medical-legal autopsies in the evaluation of medical praxis.

Injection of air into a vein or artery may occur accidentally during clinical procedures.^{1,2} The lethal dose is from 3–5 ml/Kg or 300–500 ml of gas injected at 100 ml/s.³

No case similar to the one described was found in the bibliographical review we performed. We found experimentally that it is extraordinarily difficult to directly connect

the compressor to the serum, as the fit is not good and a certain degree of leakage occurs. It was therefore impossible to calculate the exact amount of gas that had been injected.

Cases such as this one show that care services must be instructed not to remove devices or catheters, etc. used



Fig. 1 (a) Emphysematous body. (b) Blisters on the lower limbs. (c) Bubbles in the vascular bed of the open subclavian artery.

☆ Please cite this article as: Subirana-Domènech M, Anglada-Gotor D, Martínez-Alcázar H. Embolismo gaseoso iatrogénico. Revista Española de Medicina Legal. 2023. <https://doi.org/10.1016/j.reml.2023.02.001>.

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in giving care. We have to admit that if the hospital staff had not explained the causal mechanism, it would have been very difficult to diagnose the cause of the embolism.

Acknowledgements

The authors would like to thank the Library Department and the specialist forensic pathology technicians for their enthusiasm and dedication.

References

1. Judge C, Mello S, Bradley D, Harbison J. A Systematic review of the causes and management of ischaemic stroke caused by nontissue emboli. *Stroke Res Treat*. 2017;2017:7565702. <https://doi.org/10.1155/2017/7565702>.
2. van Hulst RA, Klein J, Lachmann B. Gas embolism: pathophysiology and treatment. *Clin Physiol Funct Imaging*. 2003;23(5):46–237. <https://doi.org/10.1046/j.1475-097x.2003.00505.x>.
3. Gordy S, Rowell S. Vascular air embolism. *Int J Crit Illn Inj Sci*. 2013;3(1):6–73. <https://doi.org/10.4103/2229-5151.109428>.