Haemoptysis and pulmonary haemorrhage associated with cryoballoon ablation

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A 55-year-old male patient underwent pulmonary vein isolation by cryoballoon of symptomatic medication-resistant paroxysmal atrial fibrillation. During cryoablation application at −50°C, sudden haemoptysis was developed. Fluoroscopy demonstrated wedge-shaped consolidation of the left middle zone that may be consistent with pulmonary infarction. The computed tomography scan of the chest confirmed the consolidation in the left lower lobe suggestive of a pulmonary haemorrhage.

Background

Pulmonary vein isolation (PVI) by cryoballoon has evolved over the past years as an alternative for the treatment of paroxysmal atrial fibrillation (PAF) refractory to anti-arrhythmic drug treatment. Pulmonary haemorrhage is a very rare complication after cryoballoon application.

Case

A 55-year-old male patient was referred to our hospital for PVI by cryoballoon of drug-resistant PAF. Two PAF episodes per day were observed on the 24 h ambulatory Holter monitoring. Pulmonary vein isolation was performed with a 28 mm cryoballoon (Arctic Front Advanced™, Medtronic Cryocath). The patient was anti-coagulated with iv heparin and the activated clotting time (ACT) was kept ∼350 s after a transseptal puncture.

Firstly, the left superior pulmonary vein (LSPV) was targeted. After inflation of the cryoballoon within the ostium of LSPV, −48°C temperatures were reached during the first application. During the second application at −50°C, sudden haemoptysis was developed (∼100 cc in 15 s). Cryoablation was stopped and the balloon was deflated. Activated clotting time was checked and was 400 s. Patient desaturated to 85% and fluoroscopy demonstrated wedge-shaped consolidation of the left middle zone that may be consistent with pulmonary infarction (Hampton hump-like image) (*Figure 1*, left panel). Nasal oxygen therapy increased the saturation and haemoptysis was discontinued. The consolidation area did not enlarge on fluoroscopic examination. Other pulmonary veins were isolated successfully within optimal ACT values.

The computed tomography (CT) scan of the chest (*Figure 1*, right panel) confirmed the consolidation in the left lower lobe at the superior boundary suggestive of a pulmonary haemorrhage. Warfarin was started at the third day after the procedure and haemoptysis did not re-occur. Six months after the ablation, no haemoptysis re-occurred and the patient has not any AF episodes since. The chest X-ray abnormality was resolved completely.

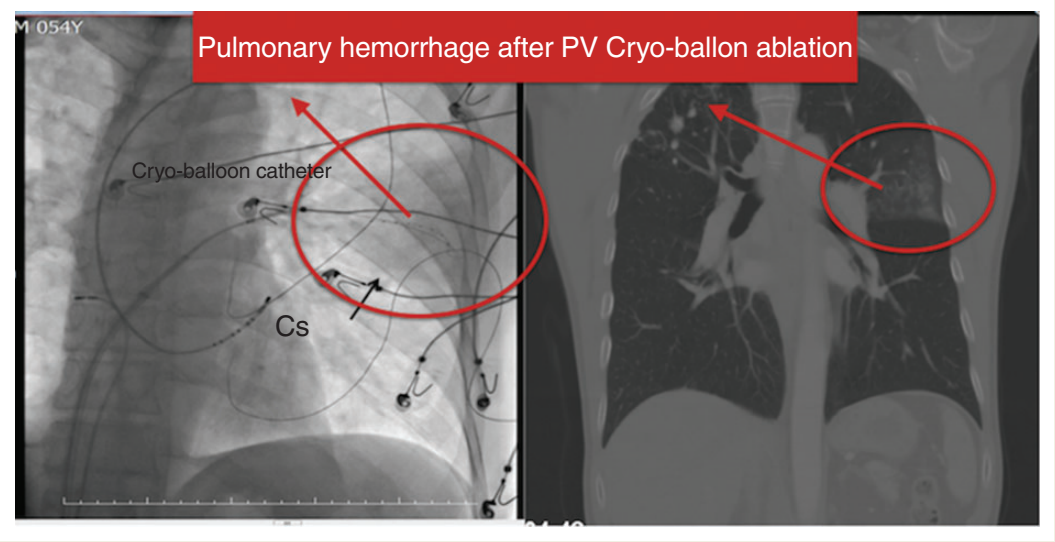

Figure 1 Pulmonary haemorrhage after PV cryoballoon ablation.

Discussion

Haemoptysis as a complication of cryoballoon ablation for AF is an uncommon side effect seen in 2.1% of patients.[1] In our experience (in 74 cryoballoon applications), this was the first haemoptysis case. Unfortunately, the exact cause of this complication is uncertain and could be due to catheter trauma. Direct damage to the tissue surrounding the pulmonary vein or deeper inside the lung could be caused by catheterizing it with the guide wire or by distal inflation of the balloon. In our case, this mechanism could be involved, because causing a vascular rupture through instrumentation, bleeding should be expected to occur immediately. Another possible mechanism might be that a complete isolation with very low-freezing temperatures causes cryo-injury to the adjacent tissues and vasculature. Haemoptysis after the cryoablation procedure was reported in three cases.[2,3] Two of these cases were evaluated by the CT scan of the chest. The aetiology was pulmonary infarction[2] and pulmonary vein intramural haematoma,[3] respectively, in these cases. To our knowledge, our case is the first report of pulmonary haemorrhage as a cause of haemoptysis during cryoablation. We doubt that freezing was the cause, as the bleeding should have occurred following the rewarming.

Conflict of interest: none declared.

References

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