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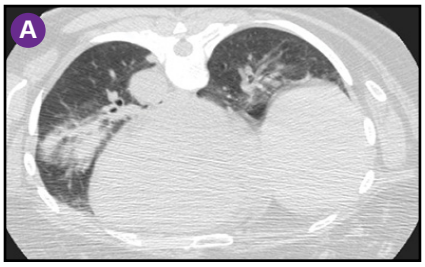
CASE STUDY: LUNG CYROABLATION

Cryoablation of mCRC in the Lung Located Adjacent to the Aorta

Professor Thierry de Baere | Gustave Roussy Cancer Institute | Villejuif, France

PRESENTATION

- 57-year-old female with history of lung metastases from colorectal cancer
  - Video-assisted thoracic surgery 20 months previously for wedge resection of single 1.2 cm lung metastasis in right upper lobe
- New 1 cm lung metastasis identified in the left lower lobe (A)



Presentation: CT in the prone position under general anaesthesia shows a 1 cm lung nodule close to the aorta

TREATMENT PLAN

- Tumor board decided on thermal ablation
  - Cryoablation was selected from the thermal ablation techniques available due to the proximity of the nodule to the aorta, which rendered it difficult to target with an expandable needle
  - For successful cryoablation, the metastasis would need to be moved away from the aorta to avoid both the possible damage to the aorta from the ice and the heat-sink effect that would reduce the chances of complete ablation

TREATMENT

- One IceSphere™ 1.5 needle was placed in the target tumor under CT guidance (B)
- 50 ml of CO_2 was injected into the pleural space using a spring-loaded needle (C)
- The IceSphere™ 1.5 needle was activated for 30 seconds at 20% maximum power to stick the needle to the tumor ("stick-mode") to allow the needle and tumor to be gently pulled back by 3 cm (D)
- An additional 250 ml CO_2 was then injected and the needle pulled back a few centimeters further (E)
- With the tumor isolated in the middle of CO_2-filled pleural cavity, away from vulnerable neighboring structures, ablation could be completed safely
- Freeze and thaw cycles were completed per lung protocol
- The iceball was visible on CT as a 'ground glass' opacity covering the tumor with appropriate 'safety' margin beyond the tumor edge

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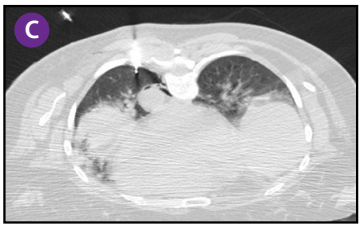
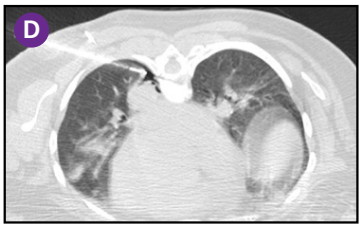
Cryoablation: CT (axial view) showing single puncture for placement of IceSphere™ 1.5 needle in the target tumor



Cryoablation: CT (axial view) showing 50 ml of CO_2 injected into pleural space. Some CO_2 visible in the pleural space (arrow)

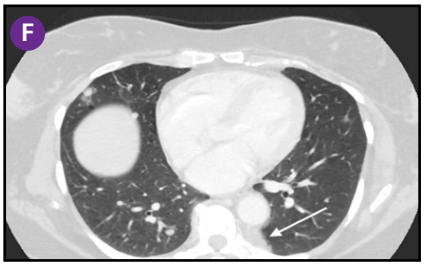


Cryoablation: After 30 seconds of activation at 20% maximum power, the IceSphere™ needle is gently pulled back by 3 cm

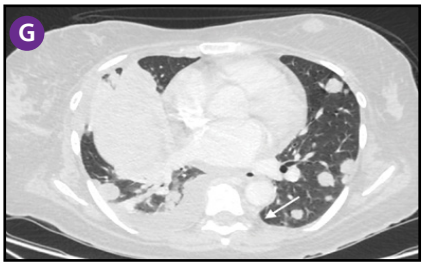
Cryoablation: Additional 250 ml of CO_2 is injected and the needle pulled back by a few more centimeters to isolate the tumor

OUTCOME

- One-month follow-up CT showed condensation at the location of the cryoablation F
- One-year follow-up CT showed near-complete regression of the ablation zone but unfortunately also confirmed progression of metastatic disease with appearance of multiple distant nodules G



Post cryoablation: One-month follow-up CT (axial view) shows condensation in the location of the cryoablation (arrow)



Post cryoablation: One-year follow-up CT shows nearly complete regression of the ablation zone (arrow) and multiple distant metastases.

CONCLUSION

- The unique "stick-mode" feature offered by cryoablation allows the tumor to be moved away from vulnerable adjacent organs, and consequently for technically challenging lung tumors to be treated safely and effectively

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