

2. Suwatanapongched T, Boonkasem S, Sathianpitayakul E, Leelachaikul P. Intrathoracic gossypiboma: radiographic and CT findings. Br J Radiol. 2005; 78:851-3.
3. Patel AM, Trastek VF, Coles DT. Gossypibomas mimicking echinococcal cyst disease of the lung. Chest. 1994; 105:284-5.
4. Taylor FH, Zollinger RW, Edgerton TA, Harr CD, Shenoy VB. Intrapulmonary foreign body: sponge retained for 43 years. J Thorac Imaging. 1994; 9:56-9.
5. Topal U, Gebitekin C, Tuncel E. Intrathoracic gossypiboma. AJR Am J Roentgenol. 2001; 177:1585-6.
6. Nomori H, Horio H, Hasegawa T, Naruke T. Retained sponge after thoracotomy that mimicked aspergilloma. Ann Thorac Surg. 1996; 61:1535-6.

Carlos Miguélez Vara\* and Manuel Mariñan Gorospe

Servicio de Cirugía Torácica, Hospital San Pedro, Logroño, Spain

\*Corresponding author.

E-mail address: cmvara@eresmas.com (C. Miguélez Vara).

### Multiple Pulmonary Embolisms caused by Acrylic Cement after Vertebroplasty

#### *Embolismo pulmonar múltiple por cemento acrílico tras vertebroplastia*

To the Editor:

The number of vertebral fractures related with osteoporosis has become more frequent in developed countries given the increase in population age. Percutaneous vertebroplasty with acrylic cement is one of the palliative therapies available. A rare complication provoked from this technique is cement embolism. We present the case of a multiple pulmonary embolism caused by acrylic cement observed in our radiodiagnostic department.

The patient is an 85-year-old woman with history of osteoporosis and fracture of the dorsal vertebra treated with vertebroplasty. Multiple hyperdense, branching linear opacities were identified in a chest x-ray, necessary according to pre-anesthetic protocol to perform a new vertebroplasty procedure. The opacities were discovered in both pulmonary fields and were in line with vascular structures (fig. 1). The findings described above were not found in previous radiological tests, considering the diagnosis to be a pulmonary embolism caused by cement leaking into the circulation system. Multiple linear hyperdense structures (cement) were found inside the segmental pulmonary arteries of several lobes during the high resolution CT (HRCT).

Vertebroplasty with acrylic cement is an alternative to conventional vertebral fracture treatments. Its main function is to

alleviate the pain associated with the fracture, given that the cement used in the solidification process is extremely hot, damaging the nerve endings of the fracture's focal point. Secondly, it achieves functional stabilisation by increasing the vertebra's resistance to compression, ensuring that the fracture does not evolve into vertebral collapse.<sup>1</sup>

The acrylic cement is mixed with a radioopaque substance so that it is visible during the procedure<sup>2</sup> and injected into the vertebral body through the skin. It is usually controlled by CT or biplane fluoroscopy.

Pulmonary embolism is considered as one of the rarest possible complications associated with vertebroplasty (0-4.8%).<sup>3</sup> It is caused by accidental leakage of acrylic cement emboli into the circulatory system through perivertebral venous plexus and through the inferior vena cava to the pulmonary vascular network.<sup>2</sup> This complication is more frequent if the cement has not solidified enough when it is injected into the vertebral body.<sup>2</sup> Furthermore, the exothermic reaction, which is associated with the cement hardening, increases the intramedullary pressure.<sup>4</sup> Both of these factors make it more likely for material to come away and for emboli to migrate. This complication is also more frequent when the treated vertebra has hypervasculised injuries.<sup>2</sup>

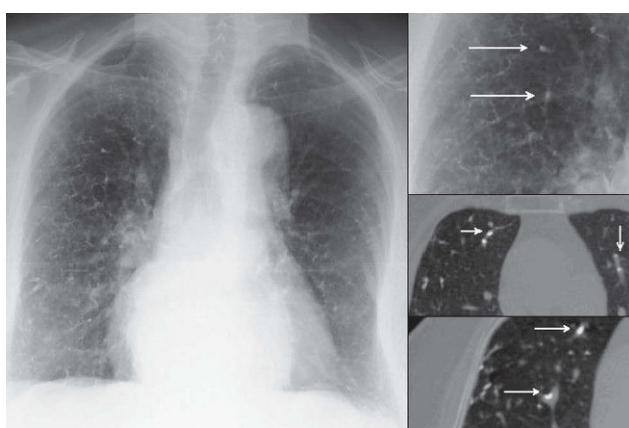
Our case is similar to others published as the patient showed no usual symptoms of pulmonary embolism during or after the procedure.<sup>3-5</sup> Krueger et al conducted a literature review which included 76 asymptomatic cases and 43 with pulmonary embolism symptoms (the most common being dyspnoea). Of the 43 patients with pulmonary embolism symptoms 5 died.<sup>5</sup> Given that most cases are asymptomatic, some authors recommend a chest x-ray to be performed 24 hours after the intervention to ensure that emboli are not present.<sup>3,5</sup>

No agreement has been reached regarding the therapeutic strategy to be used for pulmonary embolism caused by cement. Krueger et al recommend that asymptomatic peripheral embolisms are not treated and that only a clinical follow-up is necessary.<sup>5</sup> Recommendations for symptomatic embolisms indicate that pulmonary thromboembolism therapy protocols are to be followed, although other authors suggest for centrally located embolisms to be surgically removed.<sup>6</sup> Anticoagulant treatment for longer than 6 months has not been indicated.<sup>5</sup>

Although authors have described that emboli caused by cement could gradually cause the pulmonary arteries to become occluded, and that anticoagulant therapy leads to embolisms being endothelialised, minimising this risk.<sup>5</sup> Patients that have undergone 12-month follow-up with CT have not shown significant after effects or delayed reactions to cement in the arteries.<sup>3</sup>

### References

1. Pérez-Higueras A, Álvarez L, Rossi R, Quiñónez D. Vertebroplastia percutánea. Radiología. 2002; 44:16-22.



**Figure 1.** Multiple branching linear opacities in both pulmonary fields (top right, arrows). Bottom right: Close-up of the high resolution CT showing cement emboli (arrows) inside the pulmonary artery branches.

2. Padovani B, Kasriel O, Brunner P, Peretti-Viton P. Pulmonary embolism caused by acrylic cement: a rare complication of percutaneous vertebroplasty. Am J Neuroradiol. 1999; 20:375-7.
3. Venmans A, Lohle PN, van Rooij WJ, Verhaar H, Mali W. Frequency and outcome of pulmonary polymethylmethacrylate embolism during percutaneous vertebroplasty. Am J Neuroradiol. 2008; 29:1983-5.
4. Torres ML, Suárez V. Embolismo pulmonar por cemento tras vertebroplastia. Rev Esp Anestesiol Reanim. 2003; 50:489-91.
5. Krueger A, Bliemeier C, Zettl R, Ruchholtz S. Management of pulmonary cement embolism after percutaneous vertebroplasty and kyphoplasty: a systematic review of the literature. Eur Spine J. 2009; 18:1257-65.
6. Tozzi P, Abdelmoumene Y, Corno AF, Gersbach PA, Hoogewoud HM, von Segesser LK. Management of pulmonary embolism during acrylic vertebroplasty. Ann Thorac Surg. 2002; 74:1706-8.

Roberto Fornell-Pérez, \* José Manuel Santana-Montesdeoca, and Paula Junquera-Rionda

Servicio de Radiodiagnóstico, Complejo Hospitalario Universitario Insular-Materno Infantil, Las Palmas de Gran Canaria, Spain

\* Corresponding author.

E-mail address: feanim2000@yahoo.es (R. Fornell-Pérez).

## Air Travel Pneumothorax as a First Sign of Metastasis of Cancer of the Tongue

### **Neumotórax itinerante como primera manifestación de metástasis de un cáncer de lengua**

To the Editor:

The case that we present (table 1), corresponds to a 68 year old woman with a 4 month history of squamous cell carcinoma of the tongue border treated with surgery and radiotherapy. After pneumothorax was overlooked in an emergency X-ray, the patient was admitted for 20-30% pneumothorax seen on a control CT. While studying this pneumothorax several metastases were discovered.

Coexistence of pneumothorax with malignant lung disease is very rare (0.37<sup>1</sup>-2%<sup>2</sup> of the total number of pneumothoraxes), and is the cause of pneumothorax in only 0.03-0.85% of spontaneous pneumothoraxes. When this malignant aetiology corresponds to secondary tumour disease, it is usually due to metastasis of osteogenic tumours, soft tissue sarcomas and germ cell tumours, and is especially frequent in cases in which chemotherapy has been administered.<sup>3</sup>

Four main theories exist to explain pneumothorax secondary to a metastasis, and these are: (1) direct tumour necrosis due to ischaemia of the tumour due to rapid growth, this conditions the bronchopleural fistula which causes the persistent air leakage<sup>4</sup>; (2) valvular mechanism due to bronchial stenosis due to growth of the neoplasm, which causes distal hyperinsufflation, which results in a bulla that finally ruptures towards the pleural cavity<sup>4</sup>, (3) the existence of previous bronchitis or emphysematous bulla, which break due to perturbation of the pulmonary architecture secondary to cancer<sup>2</sup> and (4), on rare occasions, tumour involvement of the pleura.

The aetiopathogenic mechanism in this case could be on one hand due to rupture of subpleural cystic cavities towards the pleura, although it is not possible to rule out direct pleural involvement as a mechanism both of production and of perpetuation, given the fact that the pleural fluid obtained was positive for cells compatible with squamous cell carcinoma.

Head and neck squamous cell carcinomas have a great tendency to spread. Although the most frequently affected organs are the lungs, the production of spontaneous pneumothorax secondary to these carcinomas is extremely rare, and only 2 cases are described in the literature.<sup>5,6</sup>

To conclude, spontaneous pneumothorax associated with lung metastasis is a rare condition. Even so, pneumothorax may be the first sign of lung metastatic disease, and therefore in patients with a history of cancer it is necessary to rule this out.

## References

1. Regueiro F, Arnau A, Pérez D, Cañizares MA, Martínez P, Cantó A. Neumotórax espontáneo como presentación clínica de un carcinoma broncogénico. Aportación de tres casos. Arch Bronconeumol. 2000;36:55-7.
2. Venceviäus V, Cicónas S. Spontaneous pneumothorax as a first sign of pulmonary carcinoma. World J Surg Oncol. 2009;7:57.
3. Bini A, Zompatori M, Ansaldi L, Grazia M, Stella F, Bazzocchi R. Bilateral recurrent pneumothorax complicating chemotherapy for pulmonary metastatic breast ductal carcinoma: report of a case. Surg Today. 2000;30:469-72.
4. Galbis Caravajal JM, Mafé Madueño JJ, Baschwitz Gómez B, Pérez Carbonell A, Rodríguez Paniagua JM. Neumotórax espontáneo como primera manifestación de un carcinoma pulmonar. Arch Bronconeumol. 2001;37:397-400.
5. Hsu JS, Chou SH, Tsai KB, Chuang MT. Lingual carcinoma metastases presenting as spontaneous pneumothorax. J Formos Med Assoc. 2009;108:736-8.

**Table 1**

Timelines of the patient's clinical evolution

4 months PRE admittance	<ul style="list-style-type: none"> <li>• 68 year old woman</li> <li>• Moderately differentiated squamous cell carcinoma of the tongue border</li> <li>• Left hemiglossectomy+bilateral dissection (2 positive lymph nodes)</li> </ul>
3 months to 1 month PRE admittance	<ul style="list-style-type: none"> <li>• RT (110 Gy) from 3 months to 1 month PRE admittance</li> </ul>
1 month PRE admittance	<ul style="list-style-type: none"> <li>• RIGHT pneumothorax overlooked on X-ray</li> <li>• Clinical condition infection of upper airways+herpes zoster: Antibiotic therapy</li> </ul>
Day 1 Admittance	<ul style="list-style-type: none"> <li>• CT: 20-30% RIGHT pneumothorax. Multiple thin walled cysts. Solid node formation in RLL</li> <li>• Weight loss 4 kg</li> <li>• Placement of right ETD</li> </ul>
Day 4 Admittance	<ul style="list-style-type: none"> <li>• Resolution pneumothorax. ETD withdrawal</li> </ul>
Day 6 Admittance	<ul style="list-style-type: none"> <li>• Upper left lobe moderately differentiated squamous cell carcinoma</li> </ul>
Day 8 Admittance	<ul style="list-style-type: none"> <li>• Complete LEFT hydropneumothorax</li> <li>• Placement of left ETD</li> </ul>
Day 12 Admittance	<ul style="list-style-type: none"> <li>• Pleural fluid: squamous cell carcinoma</li> <li>• Resolution pneumothorax. ETD Withdrawal</li> <li>• Recurrence left pneumothorax. ETD placement</li> </ul>
Day 16 Admittance	<ul style="list-style-type: none"> <li>• CT: LUL pneumatocele. Costal and liver metastasis (PA: squamous cell carcinoma)</li> </ul>
Day 30 Admittance	<ul style="list-style-type: none"> <li>• Death</li> </ul>

ETD, endothoracic drainage; LUL, left upper lobe; PA, pathological anatomy; RLL, right lower lobe; X-ray, chest X-ray.