Pneumocephalus can be seen after head injury with fracture of the skull-base or in cerebral neoplasm, infection, or after intracranial or spinal surgery. We report on a 69-year-old male patient with pneumocephalus after right-sided lobectomy and en bloc resection of the chest wall for non-small-cell lung cancer. Postoperatively, the patient showed a reduced vigilance level with no response to pain stimuli and anisocoria. The CCT scan revealed an extensive pneumocephalus; following which, the patient underwent neurosurgery with laminectomy and ligature of the transected nerve roots. After operation the patient returned to his baseline mental status.
symptoms of vertigo and headache remained. CT scan of the brain showed a complete decline of the pneumocephalus and hyperdensity in the external subarachnoid spaces. Chest X-ray revealed the accumulation of thoracic apical fluid. Under the assumption of a cerebrospinal fluid fistula with the loss of cerebrospinal fluid into the pleural space, a CT-guided thoracentesis was performed. Laboratory analysis of the pleural effusion showed high values of β-trace-protein. Myelography and MRI were carried out for diagnosing and locating of the subarachnoid-pleural fistula, which was detected at the level of the T2 to T3 nerve roots (►Fig. 3). The patient underwent neurosurgery with laminectomy and ligature of the transected nerve roots. After surgery the patient reported a slow decline of headache and vertigo. After 1 month, brain pressure was normalized and the patient did well without neurological symptoms. Two months after the initial thoracic surgical intervention, the patient was discharged home in good general condition.

Comment

Pneumocephalus is a rare but well-known complication. It can be caused by trauma, neurosurgical procedure, epidural anesthesia, and also as a complication of thoracic surgical procedures. The body of literature is limited to a few articles after thoracic surgery.1-2 Symptoms such as headache, vertigo, nausea, vomiting, disorientation, and convulsion are described and may be a complication of meningitis due to pleuro-subarachnoid fistulas. Nevertheless, it was discussed whether pleuro-subarachnoid fistulas are often not recognized in the postoperative course. Moreover, the time till symptoms become evident may vary. In our case, the patient developed first symptoms on the first postoperative day, while other authors describe first symptoms between 1 and 8 wk after operation.1-5 Most reported cases of pneumocephalus developed after removal of the chest tube when intrapleural air extends under positive pressure into the subarachnoid space.2 Dural tear during rib resections at the costovertebral junction or around the intercostal nerve root facilitates pleuro-subarachnoid fistulas. CT scan of the brain is mandatory to verify the diagnosis. The initial treatment encompasses bed rest, flat-head positioning (Trendelenburg position), and drainage tube placement to control intrathoracic air pressure. An antibiotic prophylaxis against meningitis should be initiated and the patient should be monitored neurosurgically.4,5 Complementary or in case of symptom persistence, further investigations should be performed including MRI and myelographic studies to locate the cerebrospinal fistula.1 In addition, laboratory tests of the pleural effusion may help to identify a cerebrospinal leakage. Obliteration of a persistent cerebrospinal fistula should be sought.
and this makes laminectomy or a thoracotomy with nerve root ligation usually necessary. After operation, most of the reported patients showed rapid improvement of their neurological symptoms.\textsuperscript{1,3}

References
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