Epidural migration of hemostatic agents as a cause of postthoracotomy paraplegia

Report of two cases

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Paraplegia secondary to pulmonary surgery occurred in two patients because of epidural migration of hemostatic agents. Computerized tomography following myelography revealed the lesion clearly. Both patients achieved satisfactory neurological recovery through prompt diagnosis and treatment.

KEY WORDS • postthoracotomy paraplegia • spinal cord compression • hemostasis • pulmonary carcinoma

Paraplegia following nonspinal surgery is a rare but catastrophic complication. There have been reports of paraplegia associated with surgery of the thoracic or abdominal aorta\(^1\text{-}^4\text{,}^9\text{-}^1^1\) and with pulmonary surgery.\(^1\text{-}^5\text{,}^8\text{-}^1^0\) The most common cause is spinal cord ischemia due to a compromised blood supply.\(^2\text{-}^3\text{,}^5\text{-}^6\text{,}^9\text{-}^1^1\) In a few cases an epidural hematoma has been reported as a cause of paraplegia.\(^1\text{-}^8\) We describe two uncommon cases in which no neurological complication existed immediately after lobectomy but paraplegia developed some hours later secondary to expanded hemostatic agents migrating into the epidural space.

Case Reports

Case 1

This 69-year-old man with pulmonary small-cell carcinoma underwent a right upper lobectomy. During the thoracotomy through the fifth intercostal space, the fifth rib fractured near the costovertebral joint. Hemostasis at the fracture site was achieved by packing with oxidized cellulose (Oxycel) pledges. Except for this fracture, the surgical procedure was uneventful. The patient was extubated in the operating room, and his cardiovascular, respiratory, and neuromuscular status was satisfactory.

The next morning, the patient was able to walk a short distance unaided. During the morning of the 2nd postoperative day, he felt increased numbness in his lower extremities and, on the 3rd postoperative day, developed paraplegia associated with urinary incontinence.

Examination. Physical examination showed a sensory and motor deficit below the T-5 level. A myelogram and a computerized tomography (CT) myelogram were obtained and revealed spinal cord compression at the T5-6 level by a mass in the right epidural space (Fig. 1). The mass was initially thought to be an epidural metastatic tumor.

Operation. Emergency laminectomy of T-5 and T-6 revealed that the mass consisted of expanded oxidized cellulose in the epidural space, which was carefully removed along with an associated hematoma. The dural sac then expanded and pulsated normally. The weight of the mass removed was approximately 2 gm.

Postoperative Course. Postoperatively, the patient experienced the gradual return of lower-extremity strength. Four months after the laminectomy, he was discharged fully ambulatory from the hospital, with only slight numbness remaining.

Case 2

This 37-year-old with suspected pulmonary carcinoma underwent a right upper lobectomy with lymph node dissection. During the thoracotomy through the fifth intercostal space, severe bleeding from the intercostal artery occurred around the fifth transverse process. The bleeding was controlled by packing with oxidized cellulose (Oxycel) and thrombin. Except for this complication, the surgical procedure was uneventful.
Hemostatic agents causing postthoracotomy paraplegia

The patient was extubated in the operating room, and his cardiovascular, respiratory, and neuromuscular status was satisfactory.

The next morning, the patient was able to stand for the purpose of voiding urine. However, on the 2nd postoperative day, he felt numbness and motor weakness in his right lower extremity and developed paraplegia associated with urinary incontinence.

Examination. Physical examination showed a sensory and motor deficit below the T-5 level. Radiographs and tomograms of the thoracic spine showed no destructive lesion. A myelogram showed a complete block at the T5-6 level (Fig. 1), and a CT scan revealed that a soft-tissue mass had entered the epidural space through the right intervertebral foramen. The mass was thought to be a metastatic tumor or hematoma.

Operation. Emergency reopening of the recent thoracotomy site revealed that the oxidized cellulose and hematoma had invaded the epidural space through the intervertebral foramen. With partial resection of the sixth rib and the fifth and sixth pedicles, the oxidized cellulose and hematoma were totally removed.

Postoperative Course. The patient experienced the gradual return of lower-extremity strength. Three months later, he was discharged from the hospital fully ambulatory.

Discussion

Oxidized cellulose has been used as a hemostatic agent in various surgical fields. However, complications of optic nerve damage associated with surgery in the maxillary antrum or around the sella turcica have been reported. It is documented in the literature that oxidized cellulose could generate dangerous pressure from swelling in the closed or bone-walled space. Furthermore, the product disclosure statement for Oxycel states that wadding or packing tightly should be avoided, especially within the bony enclosure of the central nervous system and within other relatively rigid cavities where the extra pressure induced by the swelling mass of oxidized cellulose may interfere with normal function and may even cause necrosis.

In the two cases currently reported, the mass of oxidized cellulose was placed in the intervertebral foramen by a pack-and-pressure maneuver, intended to arrest hemorrhage during thoracotomy. After surgery, the oxidized cellulose became soaked and swollen from contact with blood, migrated into the epidural space, and eventually caused paraplegia. In the presence of an intact pleura, the epidural space has no communication with the pleural cavity. However, in these two cases, a...
route from the pleural cavity to the epidural space appeared to be created by injuring the parietal pleura around the intervertebral foramen during the chest wall incisions or the hemostatic procedures.

References

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