Case Report

Adamkiewicz Artery Demonstrated by MRA for Operated Posterior Mediastinal Tumors

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In the thoracolumbar region, it is well known that the great anterior medullary artery (the artery of Adamkiewicz: AKA) is the dominant feeder of the spinal cord. During surgery for posterior mediastinal tumor adjacent to the lower thoracic aorta, perioperative distortion of the spinal cord blood supply could lead to neurological complication. To avoid postoperative paralysis, it would be useful to know the level of the intercostal artery from which the AKA originates. Recently, we have attempted to identify the AKA preoperatively using magnetic resonance angiography (MRA). (Ann Thorac Cardiovasc Surg 2006; 12: 270–2)

Key words: magnetic resonance angiography, mediastinal tumor, spinal cord

Cases

We performed preoperative evaluation of the great anterior medullary artery (the artery of Adamkiewicz: AKA), in 3 recent cases of posterior mediastinal tumor adjacent to the lower thoracic aorta. Imaging protocols, data processing of magnetic resonance angiography (MRA), and the criteria for detection of the AKA are as described previously.[1] The characteristics of the 3 patients are summarized in Table 1. In all cases, the tumors were located at the left side, between T8 and L1 vertebral levels. In 1 patient (case 3), the side and the level of the tumor (Fig. 1) coincided with those of the identified AKA by MRA (Fig. 2), preoperatively. In this case, the tumor was approached by a left posterolateral thoracotomy incision through the 5th rib interspace. The upper edge of the tumor was densely adherent to the adjacent 9th intercostal artery, from which the AKA originates. We performed careful dissection along the artery without any ligation or clamping methods to avoid possible distortion of the spinal cord blood supply. The tumor was resected successfully, and the patient's recovery was unremarkable.

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Comment

AKA supplies most of the blood to the anterior spinal artery, which perfuses the anterior two-thirds of the spinal cord. In anatomical studies, the AKA was found to originate from the left side in 68 to 72% of patients, between T8 and L1 vertebral levels in 68 to 91% of patients.[2,3] Spinal cord injury generally results from temporary or permanent interruption of spinal cord blood supply.

Takamori and colleagues[4] have reported a surgically resected case of the posterior mediastinal tumor that resulted in postoperative paraplegia as an inevitable complication. In their case, the tumor was vascularlized by the 7th to 9th intercostal arteries, and the AKA likely originated from the 10th intercostal artery (by angiogram). In order to remove the malignant tumor completely, they sacrificed the involved intercostal arteries with full informed consent as to postoperative neurological deficit.

MRA, which is noninvasive, has been developed, and the usefulness of contrast MRA has been established in aortic and major peripheral arterial studies.[5,6] Hyodoh and colleagues[1] have reported that the detectable rate of the AKA by MRA is about 80% in patients with aortic aneurysm. In the present series of patients, the AKA was iden-

Table 1. Patient characteristics

Patient no.	Tumor size	Vertebral level of tumor	AKA identified	Pathological diagnosis
1	86×39 mm	T8-L1	Right T9	Ganglioneuroma
2	30×25 mm	T9-T11	Not identified	Schwannoma
3	23×44 mm	T8-T10	Left T9	Schwannoma

AKA, the artery of Adamkiewicz.

Fig. 1. Case 3 with posterior mediastinal schwannoma located on the left side at T8-T10 vertebral level.

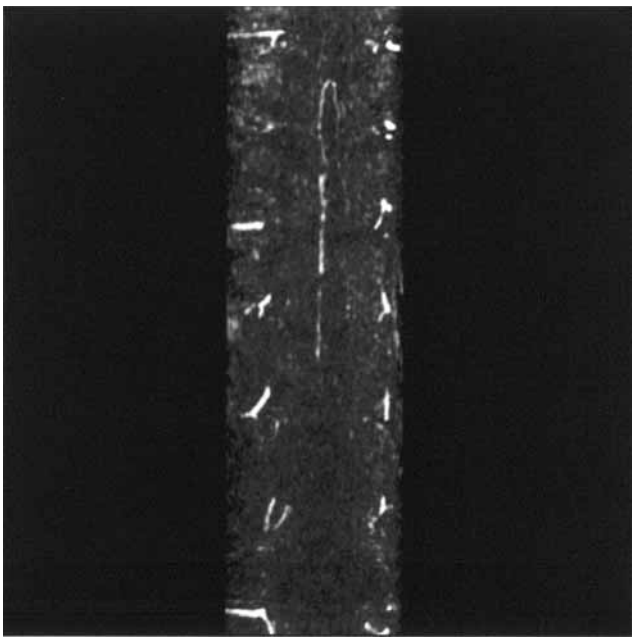

Fig. 2. The artery of Adamkiewicz (AKA) ascended from the left T9 intercostal artery, and the anterior spinal artery was continuous to the AKA in a so-called hairpin curve configuration.

tified in 2 of 3 cases (66%). Moreover, the side and the level of the tumor were revealed to coincide with those of the identified AKA by MRA in case 3. Considering the low malignancy of the tumor (schwannoma),[7] we removed the tumor without sacrificing the involved intercostal arteries, although the surgical margin was not sufficient for complete resection of the tumor.

In summary, preoperative detection of AKA by MRA is very useful for reducing the incidence of ischemic injury of the spinal cord and for obtaining full informed consents from the patients with emphasis on the complications.

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