症例報告

Posterolateral Approach to a Cervical Dumbbell Type Neurinoma : A Case Report

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Abstract

This is a case of a dumbbell type neurinoma for which a posterolateral approach to surgery was adopted, resulting in the total removal of the neurinoma with a single surgical procedure. The patient is a 61-year-old woman with a solid mass in her neck, which was incidentally found. Magnetic resonance images suggested a dumbbell neurinoma with a large extraspinal part extending laterally through the C2-3 neural foramen. She was operated on with the successful removal of the mass using a posterolateral approach through the posterior margin of the sternocleidomastoid muscle. This approach provided excellent access, not only to the extraspinal portion of the tumor, but also to the intraspinal portion of the tumor through partial laminectomy without removing any part of the vertebral bodies and facet joints.

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Introduction

Two surgical procedures have been generally performed for cervical dumbbell type neurinomas : the intraspinal portion of the tumor is first removed posteriorly by laminectomy, and the extraspinal portion of the tumor is removed after a few weeks interval through an anterior approach²⁾. Operating on a patient twice within a brief period of time is physically taxing on the patients. It would seem more beneficial for the patient if such neurinomas could be removed with one surgical procedure.

It was recently reported that a cervical dumbbell type neurinoma was completely removed at one stage by means of an anterior approach^{3,4)}. However, an anterior approach usually requires resection of parts of the vertebral bodies and/or facet joints to widen the operating space. Bone

grafting is also mandatory to repair the excised vertebral body. These procedures possibly induce instability of the spine if the fusion of the graft bone fails. The patient will be, therefore, placed in a firm corset or a halo vest to achieve the fusion of the graft bone after surgery³⁾. In the present case of a C3 dumbbell neurinoma, we operated, using a posterolateral approach through the posterior end of the sternocleidomastoid muscle and gained access to the intraspinal lesion by means of a partial laminectomy. We were able to excise successfully the entire tumor with this single surgical procedure. The posterolateral approach we employed also ensures postoperative stability of the spine because none of the vertebra or facet joint is removed. In this paper, we present the case and provide details of the surgical procedure.

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A/B

Fig. 1 Axial (A) and coronal (B) T1-weighted magnetic resonance images with gadolinium administration illustrating a dumbbell type spinal tumor extending markedly outside the spinal canal

Fig. 2 A computerized tomography scan after myelography

Subarachnoid space is seen between the tumor and spinal cord, suggesting that the tumor is situated exclusively outside the dura.

Case Report

In August, 1992, a 61-year-old woman visited a surgeon with a 2-month history of a palpable mass in the left part of her neck. A computerized tomography (CT) scan revealed a spinal tumor with a marked extraspinal extension, so she was referred and admitted to our neurosurgical department in February, 1993. Examination on admission found a 3×4cm solid palpable mass. She was neurologically normal with no motor, sensory or reflex changes.

1 Neuroradiological examinations

An oblique X-ray film of the cervical spine showed an enlarged left C2-3 neural foramen. Magnetic resonance (MR) images revealed a dumbbell type spinal tumor with a large

extraspinal part right under the sternocleidomastoid muscle (Fig. 1). Myelography and postmyelographic CT scans suggested that the tumor existed exclusively outside the dura and had not eroded any vertebrae (Fig. 2). Although angiography was not performed, MR images indicated there was no occlusion of the left vertebral artery (Fig. 1).

2 Surgical procedure

The patient was positioned laterally. A 7 cm incision was transversely made in the left section of her neck crossing the posterior edge of the sternocleidomastoid muscle. The extraspinal part of the tumor under the sternocleidomastoid muscle was easily excised piecemeal through the posterior margin by using an ultrasonic aspirator. We gained access to the neural foramen by following the tumor medially under a microscope. The vertebral artery, located ventral to the foramen, was easily identified and safely separated from the anterior surface of the tumor while bleeding from the arteries supplying blood to the tumor was securely restricted. After exposing the facet joint, which is situated posterior to the neural foramen, the C2 and C3 ipsilateral laminae, which are situated dorsally to the facet joint, were further exposed by detaching multifidus muscles. A partial laminectomy was performed on the lower half of the C2 and upper half of the C3 ipsilateral laminae with a high speed air drill, thus, creating a hole in the laminae which functioned as a

Fig. 3 A postoperative computerized tomography scan of the spine showing the location and size of laminectomy

Fig. 5 Postoperative T1-weighted magnetic resonance images with gadolinium enhancement demonstrating that the tumor is completely excised

window into the spinal canal (Fig. 3). The portion of the tumor within the spinal canal could be seen and approached through this opening. No attempt to remove the facet joint or any part of the vertebral body was made due to fear that instability of the spine would develop postoperatively. The intraspinal part of the tumor could be completely excised, mainly through the opening in the laminae posterior to the facet joint, and partially through the neural foramen anterior to the facet joint (Fig. 4). Finally, the C3 nerve root was severed close to the dura. The dura was not opened because preoperative radiological examination had not suggested the existence of a tumor inside the dura.

[3] Postoperative course

No change in the patient's neurological condition occurred after the operation and the patient's postoperative course was uneventful. The

Fig. 4 Schematic illustration of operative approach

Note that posterolateral approach is capable of performing partial laminectomy through which the tumor within the spinal canal is feasibly removed.

patient was placed in a soft cervical collar for 8 weeks. Postoperative MR images revealed the tumor had been totally removed (Fig. 5). The location and size of laminectomy are illustrated on a postoperative CT scan of the spine (Fig. 3). At a follow-up examination 12 months after surgery, the patient had no evidence of kyphosis or scoliosis.

Discussion

Two operations are generally performed for removal of a cervical dumbbell tumor: the first operation is for the removal of that portion of the tumor located within the spinal canal, which is done by laminectomy using a posterior approach, and the second operation, commonly performed a few weeks after the first operation, is performed to remove the extravertebral portion of the tumor by using an anterior approach²⁾. This combined posteroanterior approach, thus, imposes a burden on the patient of undergoing surgery twice in a brief period of time.

Two approaches which eliminate the need for a second surgery are the anterior and posterolateral. In the former, the intraspinal part of the tumor is approached through the space between the vertebral body and the facet joint, i.e. the neural foramen, wherein the tumor is located, causing the space to enlarge as the tumor grows. Usually in this procedure, part of the vertebral body and

facet joint is excised in order to widen the operating space, and bone grafting is required after tumor resection to repair the vertebral body. If the failure in fusion of the graft bone occurs, there is concern about instability of the spine, which possibly cause kyphosis or scoliosis known to develop after vertebrectomy or facet injury⁵⁾. A firm orthosis such as a cervicothoracic corset or a halo vest is usually used after the operation in order to provide support to the spine³⁾.

A posterolateral approach, as fully described above, on the other hand, does not require removal of vertebral body or facet joints and gain access to the intraspinal portion of the tumor through a partial laminectomy, thereby ensuring postoperative stability of the spine. Since the postoperative care in terms of external support to the spine is not crucial in this approach, a simple orthosis such as a soft cervical collar is usually satisfactory. The posterolateral approach also readily isolates the vertebral artery from the anterior surface of the tumor which occupies the neural foramen, and securely restricts bleeding from branches of the vertebral artery which supply blood to the tumor. Thus, the posterolateral approach avoids the bleeding from the vertebral artery which often occurs in the anterior approach due to compression and displacement of the vertebral artery by dumbbell neurinoma¹⁾.

In conclusion, both the anterior and posterolateral approach to removal of a cervical dumbbell tumor allow the removal of the extraspinal and intraspinal portions of the tumor in one surgical procedure, rather than two. The anterior

approach seems useful exclusively for tumors where the vertebral body has been extensively eroded or where there is marked enlargement of the neural foramen, so that the intraspinal tumor can be removed through the enlarged space caused by the tumor. A posterolateral approach would be indicated for tumors with less erosion of the vertebral body and only moderately enlarged neural foramen since the space caused by the tumor is not large enough to facilitate removal of the tumor within the spinal canal.

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要 旨

後側方到達法にて一期的全摘出を行った頸髄 dumbbell 型神経鞘腫の1例

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側頸部の腫瘍を主訴とした61歳の女性のC3 dumbbell 型神経鞘腫に対し、後側方到達法を用いて一期的に全摘出術を行った。胸鎖乳突筋後縁より進入して脊柱管外の腫瘍を摘出し、椎間孔に達し、さらに後方に進んで同側の部分椎弓切除術を行い、そこから脊柱管内の腫瘍を全摘出した。頸髄 dumbbell 型腫瘍に対しては従来、前後二期的手術が行われてきた。近年、前方からの一期的手術の報告がみられる。しかし、前方法は椎体や椎間関節の削除が必要であり、骨移植も必要となる。術後に骨癒合が達成されないと不安定性が問題となることがあり、比較的強固な外固定が術後に必要である。これに対し、後側方到達法は同側の部分椎弓切除術により、椎体、椎間関節を切除することなく脊柱管内外の腫瘍を一期的に全摘出することが可能であり、頸椎の支持性に及ぼす影響は少ない。術後の固定も簡単なもので十分であり、腫瘍の進展方向によっては非常に有用な術式と思われる。

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