



Case Report

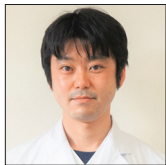
Cervical dumbbell-type tumor spontaneously shrinking following an ischemic stroke

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ABSTRACT

Background: Asymptomatic cervical dumbbell-type tumors can be incidentally diagnosed. Notably, the chronological changes in the size of these tumors have not been satisfactorily described.

Case Description: A 57-year-old man was clinically followed for an asymptomatic cervical dumbbell-type tumor that had the appearance of a schwannoma on magnetic resonance (MR) images obtained over a 7-year period. Notably, the tumor compressed both the spinal cord and the right vertebral artery. At the end of the 7-year period, the patient sustained a cerebral infarction due to atherosclerosis of the right vertebral artery; the angiogram revealed both atherosclerosis and the tumor compressing the right vertebral artery. After the stroke/ischemic event, the tumor progressively shrank on MR images obtained for the following 4 years, and the spinal cord compression was similarly relieved.

Conclusion: Here, we report on a 57-year-old man with cervical MR images revealing that a cervical dumbbell schwannoma was progressively compressing both the spinal cord and the right vertebral artery. However, following a cerebral infarction, the tumor underwent spontaneous shrinkage over the next 4 years, thus relieving the compression.

Keywords: Cervical dumbbell-type tumor, Ischemic stroke, Natural course, Spontaneous shrinkage, Vertebral artery stenosis

INTRODUCTION

In some cases, conservative treatment may be appropriate for the management of asymptomatic dumbbell-type tumors.^[4] Here, we report an interesting case in which a 57-year-old patient's cervical dumbbell-type tumor, which was increasing over a 7-year period, spontaneously regressed after a cerebral infarction.

CASE PRESENTATION

For 7 years, a 57-year-old man underwent repeated magnetic resonance (MR) scans that documented progressive spinal cord and right vertebral artery compression attributed to a

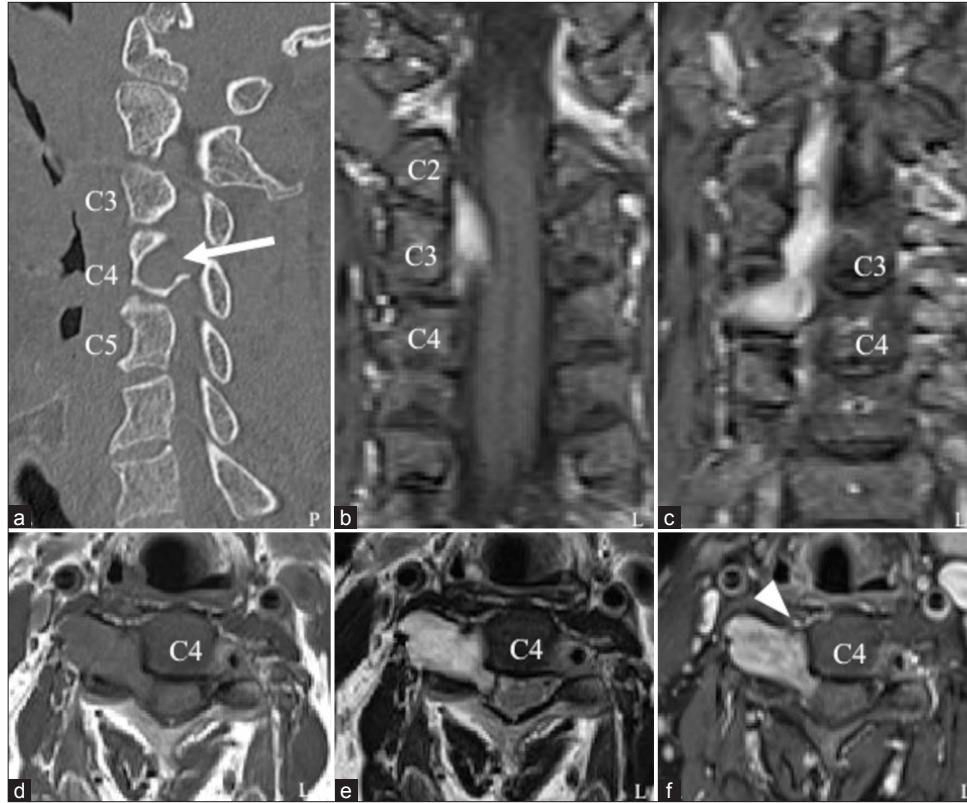


Figure 1: Initial radiological characteristics. Sagittal computed tomography images reveal the enlargement of the right C3/4 intervertebral foramen (arrow) and no calcification (a). A cervical dumbbell-type tumor exhibits isointensity on an axial T1-weighted magnetic resonance image (d) and heterogeneous hyperintensity on an axial T2-weighted magnetic resonance image (e). The tumor is heterogeneously enhanced with a gadolinium contrast agent (f). The tumor is located at the C2–4 level (b and c: coronal T1-weighted images with a gadolinium contrast agent). The cervical spinal cord and right vertebral artery (f, arrowhead) are compressed by the tumor.



Figure 2: Angiographical characteristics. Right vertebral angiography reveals atherosclerotic stenosis of the V4 segment (arrowheads), and the V2 segment of the right vertebral artery is medially shifted (arrow) (a). Blood flow to the right V4 segment from the left vertebral artery is observed through left vertebral angiography (b). The blood flow is interrupted upon right vertebral angiography performed during right rotation of the neck (c).

dumbbell schwannoma with a likely origin in the C4 root. The lesion was isointense on T1-weighted and hyperintense on T2-weighted MR images, and it was heterogeneously enhanced with gadolinium [Figure 1]. Seven years later, the patient sustained a cerebral infarction involving both occipital lobes, which resulted in visual field defects. On angiography, right vertebral compression was attributed both to the tumor and atherosclerosis [Figure 2]. The only treatment we initiated was anticoagulant therapy, to prevent a recurrent infarction. Over the next 4 years, repeated MR imaging studies revealed that the cervical tumor was spontaneously shrinking [Figure 3]. No surgery for tumor removal was indicated.

DISCUSSION

Concerning spontaneous shrinkage of spinal schwannomas, both a vascular theory (necrosis and bleeding due to thrombi in hyalinized and dilated vessels) and a mechanical theory (laceration of intratumoral arteries due to vertebral motion) of shrinkage have been proposed [Table 1].^[1-4] However, in our case, no preceding intratumoral hemorrhage (i.e., reabsorption of a hematoma) was observed. Alternatively, cerebral angiography might have revealed that the blood supply to the right vertebral artery was insufficient owing to both atherosclerosis and tumor compression; however, such angiography was never performed. Further, as surgical treatment was not required in this study, we could not make a definitive pathological diagnosis of schwannoma.

Table 1: Summary of references.

	Sex, age	Tumor location	Clinical symptoms	Radiological characteristics	Treatment	Pathological characteristics	Outcome
Luxon and Harrison, 1978	Man, 67	C3-4	Severe headache, nausea, vomiting, pain in the left shoulder tip; preceding subarachnoid hemorrhage suspected	(Myelography) Intradural extramedullary mass	Laminectomy of C3–5, total removal of tumor	Schwannoma; multiple large, thick-walled vascular channels accompanied by aggregated hemosiderin	Postoperatively asymptomatic
De Divitiis <i>et al.</i> , 1985	Woman, 72	C4-7	Sudden pain in the occipitocervical region, motor weakness in the left leg, right hemihypesthesia, urinary incontinence; preceding subarachnoid hemorrhage suspected	(Myelography) Intradural tumor	Laminectomy of C3–T2, total removal of tumor	Schwannoma, hemorrhagic change	Urinary incontinence progressively resolved, motor weakness markedly improved
Mills <i>et al.</i> , 1993	Man, 53	C7-T1	Sudden pain in the right subscapularis muscle, ambulation difficulty, urinary incontinence	(Myelography) Intradural extramedullary mass	Laminectomy of C6–T1, total removal of tumor	Schwannoma; hemorrhage; dilated, thin-walled vascular channels	Complete recovery 6 months after surgery
Suzuki <i>et al.</i> , 2020	Woman, 57	T3-4	Asymptomatic	(Initial MRI) Dumbbell type, isointense on T1WI, heterointensity on T2WI. heterogeneously enhanced with a gadolinium contrast agent (7-year follow-up MRI) Intratumoral hyperintensity lesion suggestive of intratumoral hemorrhage on T1WI	MRI-based follow-up	N.A.	Spontaneous shrinkage following hemorrhagic change on MRI, continuation of shrinkage confirmed over 6 years

MRI: Magnetic resonance imaging, N.A.: Not applicable, T1WI: T1-weighted imaging, T2WI: T2-weighted imaging

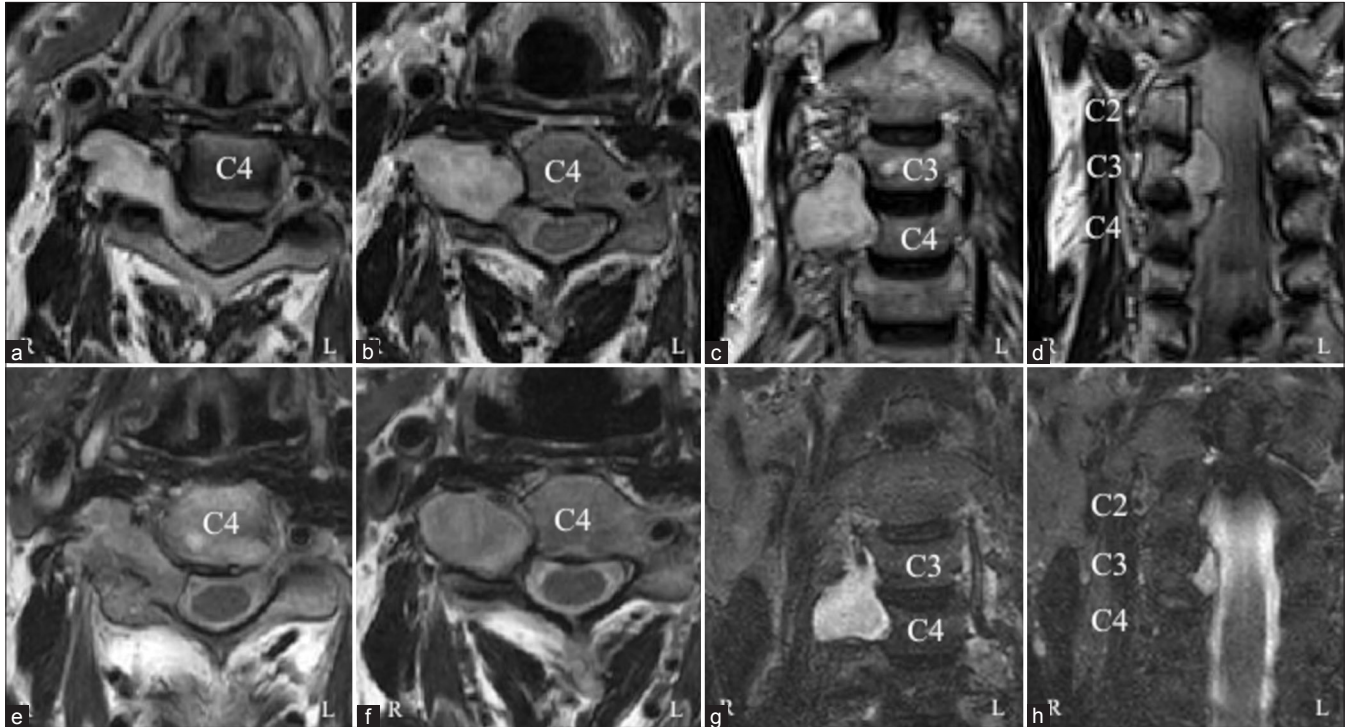


Figure 3: Comparison of initial and follow-up magnetic resonance images. Gadolinium-enhanced, T1-weighted magnetic resonance images reveal spontaneous shrinkage of the cervical dumbbell-type tumor (a-d: Initial images, e-h: Follow-up images, 7 years after the initial examination).

CONCLUSION

A cervical dumbbell-type tumor (likely a schwannoma) may spontaneously shrink following a cerebral infarction.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consents.

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Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of Artificial Intelligence (AI)-Assisted Technology for assisting in the

writing or editing of the manuscript and no images were manipulated using the AI.

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