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A rare Cervical Nerve Root, C2-C3 Schwannoma

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Introduction

Schwannomas, neurilemmomas or neurinomas are benign nerve sheath tumors deriving from Schwann cells that occur in the head and neck region in 25-45% of cases[1].About 10% of schwannoma that occur in the head and neck region generally originate from the vagus or sympathetic nervous system, those arising from C2 nerve root are extremely rare.[2]Preoperative imaging studies such as magnetic resonance imaging (MRI) and computed tomography (CT) are used to distinguish its location and origin. The treatment of schwannoma is surgical resection, with several surgical modalities have been introduced to preserve the neurological function.

We present a rare case of Cervical nerve (C2-C3) root schwannoma of 70 years old male who presented with lateral neck swelling with no neurological deficit ,swelling which also had intervertebral part was removed successfully through neck incision with no post-operative neurological symptoms.

Case Report

70 year old male patient presented to our ENT department with a right sided lateral neck slow growing swelling which was noticed 3 months back (fig 1). There was no dysphagia, dyspnea or hoarseness of voice or associated pain, fever or trauma. It was a well defined swelling 3cm×2 cm in the posterior triangle of the neck deep to the right Sternocleidomastoid muscle. It was firm in consistency with restricted mobility in all planes and showed no signs of inflammation. Carotid pulsations were displaced anteriorly. Neurological examination revealed no local or focal neurological deficits. On indirect laryngoscopy bilateral vocal cords were mobile.USG of the neck revealed a well definedheterogeneous hypoechoic mass $3\times2.7\times2cm^3$ underneath the right Sternocleidomastoid muscle.CT scan of the neck confirmed the findings as the mass was originating from the C2-C3 intervertebral foramen causing widening of the same and extending out into the paravertebral space. This mass, lying in the right paravertebral space caused the anterior displacement of the carotid vessels but the fat planes were well maintained along with surrounding structures and there was no significant lymphadenopathy (fig 2; fig3). MRI revealed a heterogeneously enhancing well defined oval lesion in the right paravertebral region originating from the right neural foramen of C2-3 representing neoplastic etiology of neurogenic origin. Aspiration cytology of the mass revealed few clusters of spindle cells in fibro collagenous stromal matrix suggestive of a spindle cell neoplasm.

An excision of the mass was planned by a lateral neck incision (fig 4). Tumour was approached from anterior and posterior aspects of the Sternocleidomastoid to gain adequate exposure. A globular yellowish well defined mass visualized and the capsule (intracapsular) dissected out after taking an incision over it. Vital structures such as vagus nerve, IJV, CCA, ansa cervicalis were identified and carefully dissected away reaching up to the root of the swelling which was seen arising from the C2-C3 intervertebral foramen. Gentle traction was applied and the intervertebral foramen part was delivered through the foramen. Post operatively the patient was stable with no neurological deficits (fig 5). Histopathological examination revealed a benign encapsulated neural tumour comprising of spindle shaped cells arranged in Antoni A and Antoni B pattern with verocay bodies. No evidence of any atypia or malignancy was noted.

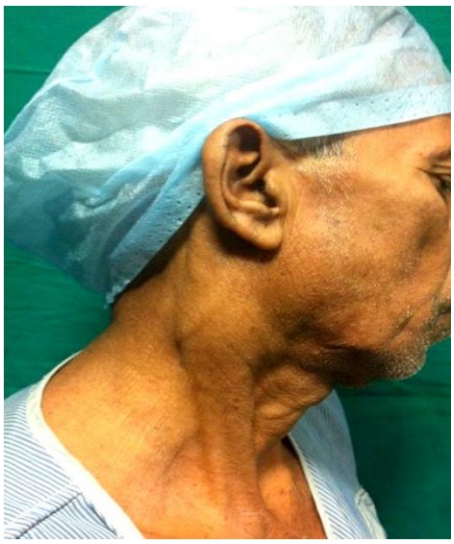
Fig 1: Pre-operative clinical presentation.

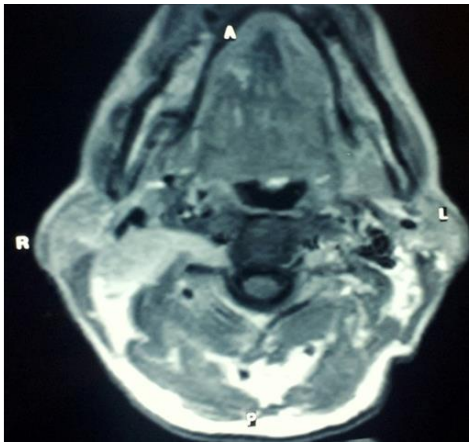

Fig 2: CT scan axial cut between C2 and C3 vertebrae showing ‘dumbell shaped ‘mass

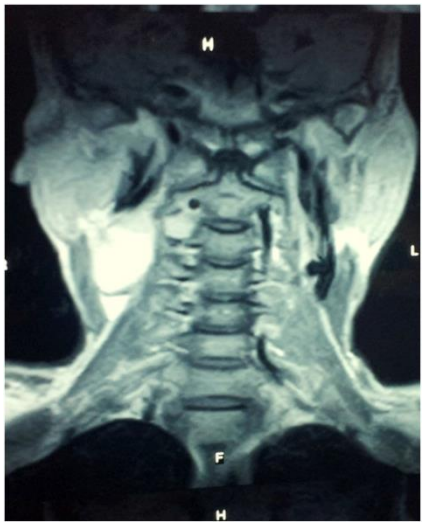

Fig 3: CT scan coronal view showing mass arising from intervertebra C2-C3.

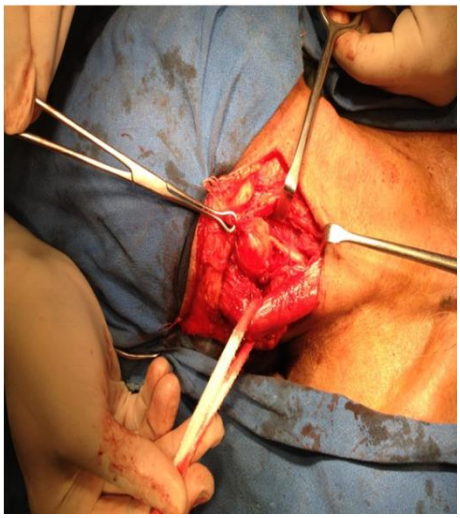
Fig 4: Intra operative photo showing the mass relation with carotid artery.

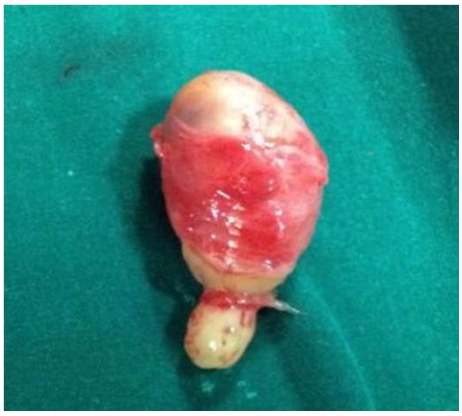
Fig 5: Specimen showing larger neck and smaller intervertbral part.

Discussion

Schwannomas, neurilemmomas or neurinomas are benign nerve sheath tumors deriving from Schwann cells that occur in the head and neck region in 25-45% of cases[1].About 10% of schwannoma that occur in the head and neck region generally originate from the vagus or sympathetic nervous system[2]. Rarely, they arise near the vertebral foramina presenting with intraspinal and extraspinal components[1]. Schwannoma can compress the maternal nerve fibers which go over the tumor capsule as its size is gradually increased. Therefore, nerve paralysis may occur preoperatively. Vagal schwannoma is typically characterized by dysphagia and hoarseness. Sympathetic schwannoma is characterized by Horner's syndrome. In most cases, however, there are no symptoms, thus it is difficult to identify the neurological origin based on the physical examination[3]. As in our case though tumour was arising from C2 nerve root which had intervertebral extraspinal part, patient had no pre-operative neurological deficit.

Imaging diagnostic modalities like CT and MRI offer great help in identifying the tumor and its correlations with surrounding vascular structures, muscles and nerves. From an anatomical perspective, the carotid sheath contains the carotid artery, the internal jugular vein, and the vagus nerve and the carotid sympathetic ganglion descends medioposteiror aspect to the carotid sheath. Accordingly, when a vagal schwannoma is enlarged, the internal jugular vein is displaced laterally, and the carotid artery is displaced medially, displaying each other. Incontrast,when a sympathetic schwannoma is enlarged, the carotid sheath is displaced anterolaterally, not displaying the internal jugular vein and the carotid artery [4]and in our case carotid sheath was displayed anteriorly and slightly laterally.

Previously, to prevent the recurrence of tumors, radical dissection including the neuroprogenitor cells was performed. Even in cases in which recovery was achieved following the nerve transplantation or primary anastomosis, preservation of the neurological function was not to be expected. Most of the neuroprogenitor fibers do not run through schwannoma and they pass over the tumor capsule. Most schwannomas are encapsulated. In cases where the nerve fibers surround the surface of tumors, the intracapsular enucleation can be performed while preserving the nerve fibers.[4] According to the study by Valentino, et al., intracapsular enucleation while preserving the nerve fibers preserved its function by more than 30% when compared to tumor resection with primary anastomsosis.[5]According to Zbären, et al., there was no significant difference in the recurrence rate

between the total tumor resection including nerve fibers and the intracapsular enucleation. In cases where partial removal of the tumor was performed, however, the recurrence rate has been reported to rise.[6]In our case, we found that swelling was dumbbell shaped which was successfully removed with intracapsular dissection through neck incision along with intervertebral part avoiding possible laminectomy and its complications, postoperatively no neurological deficit was noticed.

Microscopically, schwannomas are encapsulated, solid or cystic tumors. They can be composed of two cellular zones: Antony type A, densely arranged with spindle-shaped Schwann cells and areas of palisading nuclei, Verocay bodies and Antony B, characterized by a hypo cellular arrangement and a large quantity of myxoid tissue.[1]

In conclusion, extracranial schwannomas in the head and neck region are rare neoplasm. Diagnosis is establish by imaging studies suchas magnetic resonance imaging or computed tomography, while FNAC is used to rule out other condition. Histopathology gives definitive diagnosis. The accepted treatment for these tumors is surgical resection with preservation of the neural pathway.

Conflict of Interests

None of the authors has any conflict of interests, financial or otherwise.

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