Clinical improvement after surgical treatment posterior approaches of cervical schwannoma C5-6 anterior with radiculopathy bilateral: A case report

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Abstract. Schwannoma is a benign, encapsulated, benign tumor that grows slowly from neural fairy cells in the nerve sheath. Extracranial schwannoma is a rare case. These tumors can cause neurological deficits because of their intradural location and suppress the spinal cord so it needs to be decompressed to prevent permanent nerve damage. We reported one case of cervical schwannoma with a neurologic deficit in the form of a numbness in four of limbs since 6 month before admission, we finally performed a laminectomy – posterior durotomy and tumor excision with posterior approach without intraoperative monitoring. The result is a return of neurological function in the patient no complain about pain and patient satisfy with the result.

1. Introduction
Spinal tumors that have 1.1: 100,000 people 25% are intradural extramedullar tumors [1]. Spinal Schwannoma is a type of extramedullar tumor, this tumor can arise from intradural, extradural, or hourglass (intra and extramedullar) forms. As many as 25% are intradural tumors in adulthood, between 20-50 years. These tumors typically arise from schwann cells of a nerve root, they appear as a globular, encapsulated, well-border [2,3]. Although including benign tumors, these tumors can cause neurological deficits due to intradural function and the spinal cord segment must be decompressed to prevent permanent nerve damage. Standard treatment for symptomatic spinal schwannoma is complete surgical resection, it helps recover in most patients and decreases the rate of recurrence [2,4].

Almost all patients with spinal schwannoma experience improved postoperative neurological status. Postoperative recurrence can occur but only in a small proportion of cases [2,4]. In this case report, the author tries to discuss the difficult case of intradural extramedullar cervical spine schwannoma in anterior part of spinal cord that are encountered diagnostically and the management that has been done by difficult surgical approach with no intraoperative monitoring device and the evaluation of the result that has been achieved.

2. Case report
The patient is a 53-year-old male lives in Central Java. The patient is an office worker. The patient came to Dr. Moewardi General Hospital Surakarta with chief complain numbness in both of arm and leg since 6 months before entering the hospital. Initially the patient only complained of paresthesia and anesthesia at the tips of the fingers, sometimes followed by pain around upper arm bilaterally, but dominantly at
right side. Since 3 months before entering the hospital, the patient worried because the pain in his upper arm did not immediately relief, even more pain and tingling. There is no history of trauma, no fever, no weight loss, activity as usual, normal appetite. The patient has no history of other diseases such as diabetes, hypertension, and other metabolic diseases. The patient does not have a history of the same disease on his family.

Figure 1. pre-operative MRI.

On physical examination the patient still be able to walk without any device, in general condition, there is no abnormality. Examination of motor neurological status revealed normal in the upper extremities ranging from C5, C6, C7, C8, T1 bilateral motor strength 5. Whereas in the lower extremities ranging from L2, L3, L4, L5, S1 bilateral motor strength is 5. Examination of sensoric function revealed hypoesthesia from C5 bilateral. Physiological reflexes are found to be normal in all four extremities. Whereas pathological reflexes were found negative: Hoffman (- / -), Tromner (- / -), Babinski (- / -), Chaddox (- / -), Oppenheim (- / -), and clonus (- / -). Autonomic function is still within normal limits, there is no evidence of micturition and defecation disorder in patients.

On MRI examination, there is an isointense mass as high as extramedular intradural Vertebra Cervical (VC) 5-6 which suppresses the spinal cord in anterior side (figure 1). The structure of the vertebral body is still normal and there is no abnormal vascularization. Impressing the presence of localized extramedular intradural tumors leading to schwannoma. The tumor position is in difficult position to approach, because it appears in cervical spine and in anterior of medulla spinalis where there are a lot of vital structure surround the tumor.

The patient carried out a surgical excision with consent. Patient in general anesthesia in the pronation position, incision was carried out about 7 cm long above VC5-6 with the help of fluoroscopic C-arm. The incision is layer by layer up to the spinous process, then lateral mass screw is installed from VC4-VC6. Laminectomy was then carried out until it appeared as high as VC5-VC6. There is an intradura “bulging” as high as VC5-6 after opening at the duramater, we found the spinal cord. We did explore the anterior side of spinal cord and found a fat-like yellowish tissue with irregular structure. We isolated the tumor from the spinal cord and nerve root. Excision and removal of the entire tissue with preservation of surrounding nerves and blood vessels. We did that excision without intraoperative monitoring. Usually the surgery is held with operative microscope and microsurgical instrumentation [2]. In our department with limited resources, we did the surgery with the aid of surgical loupes. The tumor was taken and sent to pathology anatomy laboratory to be examined. After surgery, patients treated in the intensive care unit and were given antibiotics and analgesics, wound care, and joint motion exercise of the upper and lower limbs. Then the patient is also evaluated for neurological function.
Figure 2. Microscopic feature of schwannoma.

Postoperatively, the patient performs wound medication regularly and passive and active joint exercises on the second day. Three days postoperatively, surgical wounds were obtained in good condition with upper extremity motor neurological function as high as C5, C6, C7, C8, bilateral T1 are 5 respectively. Whereas lower extremity motor neurological function was as high as L2, L3, L4, L5, S1, each are 5 bilateral respectively. No lateralization and normoesthesia sensory function were obtained. We did the second MRI postoperatively and found the tumor was disappear with some residue (figure 3). 1 week postoperatively the patient is able to walk with normal gait and the patient is able to button the shirt well showing fine coordination and motor skills used in daily independent activities. One month follow up the patient had no complain about pain, he had an improvement in walking with excellent motoric coordination.

Figure 3. Post-operative MRI.
3. Discussion
Spinal schwannoma occurs as many as 25% of all intradural spinal tumors in adults. There are no significant differences between men and women. The age is often between the fourth and fifth decades [4]. These tumors can arise from all phases of evolution of the spine, although the most common locations are cervical and lumbar. Schwannoma most often appears as an intradural tumor while intramedullary schwannoma is very rare.

The initial symptoms of this tumor vary depending on the level of the tumor. Pain are most commonly mentioned, pain is felt locally or radiates, usually dissipates. Initially pain is caused by a disturbance in nerve conductivity or direct irritation due to compression of the tumor. The longer the tumor enlarges and the stronger the compression, resulting in myelopathy. Neurological deficits that arise include motoric and sensory weakness. Pre-operative diagnosis is difficult and further investigations are needed such as MRI. The patient here was examined by MRI. Imaging studies are necessary in the diagnosis of cervical schwannoma. The principal aim is to distinguish between a intradural, extradural, or intramedullary schwannoma. MRI reveals the tumor with low signal intensity on T1 and high signal intensity on T2-weighted images (figure 1).

There are two obstacles in resecting this schwannoma tumor, the first is adhesion to the spinal cord due to haemorrhagic, inflammatory, and localization. While the second is a vital structure around the extradural components such as the vertebral arteries. However, a good understanding of the anatomy of the structure around the tumor and meticulous surgery techniques will be able to overcome these obstacles. In incomplete tumor resection, long-term observation is needed to identify tumor recurrence [5]. In this cases we found that the tumor is in cervical spine, intradural extramedullar and in anterior of spinal cord. We used posterior approach for the tumor excision because anterior approach is too risky and surrounded by many vital structure. However in most previous study, a posterior-lateral and/or combined with anterior approach sometimes required for anterior, Dumbbell / hour glass appearance of tumor [2]. Surgical resection was done using intraoperative monitoring (IOM), with the aid of microscope and microsurgery instrument to improve total removal of tumor by carefully dissecting it from nerve root [2]. However in our study, we used the aid of surgical loupes and performed as possibly as total resection to decrease the risk of recurrence. Although the data about these are conflicting, the degree of resection is one of the two factors influencing the recurrence of the tumor, the another factor is the size of lesion [6]. Because of those factors, cutting nerve root is relatively common choice during schwannoma surgery with assumption that sensory root origin is way more common and that functional compensation by surrounding spinal roots has been demonstrated, most authors report that cutting nerve root does not significantly increase the risk of postoperative neurological deficits [7]. Despite of being rare, the schwannoma that originating from motor deficit is at risk of had severe postoperative neurological motoric deficit when the nerve was cut [8]. For this reason, as our goal for this surgical treatment is not only considered by tumor total resection but also by the patient’s quality of life.

The results of excision of schwannoma tumors are based on preoperative and postoperative neurological conditions. Symptoms and signs that appear can improve up to 95% [4]. If there is a deficit, it is usually due to the presence of the spinal cord that is resected and usually tolerated and minor. As in our study the postoperative neurological is improved without any neurological deficit. Overall, our study has all the limitation of a long time retrospective series and number of cases because this case is the rare case found in our department. As the treatment too has the limitation for the surgical instrumentation such as no IOM, no microsurgery instrument, and microscope. Although we could get the good outcome for the patient, we wish to improve our instrumentation to make the better total removal of the tumor.

4. Conclusion
A rare case has been reported, it is difficult and need surgical intervention. A male patient 53 years old with spinal schwannoma on VC 5-6 with neurological deficit. The patient had a laminectomy, posterior durotomy, and tumor excision. There is two obstacle intra operative, the first one is the structure around the vertebra cervical, especially this tumor is on the anterior side of the cervical canal and second is to
remove the tumor from the surrounding tissue adhesion with spinal cord and nerve root. Post operatively, the patient had a good result and good outcome in motoric strength, sensory, and coordination. No complain about pain and patient satisfy with the result. As a spine surgeon, although in one case it got good result, but to maintain a more optimal outcome in the following cases, a more adequate supporting instrument is still needed.

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