

Brachial Plexus Schwannoma: Report of 4 cases with Intralesional Enucleation

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Abstract

Brachial plexus tumors are rare. It comprises of only 5% of all tumors of upper limb. The two most common brachial plexus region tumors are schwannomas and neurofibromas. Brachial plexus tumours comprises of only 5% of all tumours of upper limb. Schwannomas are most frequently found in the head and neck region, which comprises 25% of all Schwannomas. There are only about 5% of schwannomas present as brachial plexus tumours. Here we report four cases of brachial plexus schwannoma with surgical removal managed in our centre from 2013 to 2016.

Keywords: Schwannomas; Neurofibromas; Clinical; Brain

Introduction

Brachial plexus tumours are rare. It comprises of only 5% of all tumours of upper limb [1]. The two most common brachial plexus region tumors are schwannomas and neurofibromas [2-4]. Both are benign and arise from the nerve sheath. Jia et al. published a large case series of 143 patients with primary brachial plexus tumors in 2016. In his series, there are 119 schwannoma and 12 neurofibromas [3]. Schwannomas are most frequently found in the head and neck region, which comprises 25% of all Schwannomas. There are only about 5% of schwannomas present as brachial plexus tumours [5].

The most common clinical presentation of primary brachial plexus tumor includes palpable mass, pain, numbness or paresthesias, weakness etc. [3,4,6]. Brachial plexus schwannoma can present as neck mass, axillary mass, supraclavicular mass or apical lung mass [7-10]. On CT, most schwannomas are iso-dense relative to brain parenchyma. Calcification or areas of hemorrhage are rare, and the enhancement pattern is typically homogeneous. On MRI, schwannomas are iso-intense to hypo-intense on T1-weighted MRI and enhance with gadolinium [11,12]. Malignant transformation of schwannoma is very rare, but it has been reported in literature [13]. Outcome of surgical removal of brachial plexus schwannoma has been reported to be satisfactory [6].

Methods

There were four cases of brachial plexus schwannoma managed operatively in our centre from 2013 to 2016. Pre-operatively, magnetic resonance imaging (MRI) and fine needle aspiration (FNA)/biopsy were performed. All the four cases had intranuclear enucleation done under general anesthesia. Microscope was used to assist the procedure intra-operatively. Pre- and post excision of the tumor, nerve stimulator was used to confirm intact motor function of the nerve. At the site of enucleation, the nerve was wrapped with commercial anti-adhesive paper made of polylactic acid after removal of tumor. All the excised tumors had histopathological proof of schwannoma. There was no evidence of malignancy in all cases. The clinical information of the four cases was summarized in the Table 1.

Case Reports

Case 1

A 69-year-old lady complained of a painful palpable mass at her right supraclavicular fossa (Figure 1). There was no neurological deficit. Tinsel sign was positive. MRI showed there was a well-defined homogenous T1 hypointense (Figure 2) and T2 hyperintense lesion at right C5 nerve root (Figure 3). Supraclavicular approach was used with a L-shaped incision at the lateral border of sternocleidomastoid muscle and upper border of clavicle (Figure 4). A 1.9 cm × 1.4 cm × 1.1 cm

tumor was surgically removed from right C5 nerve root (Figure 5). After the operation, there was temporary numbness at right C5 dermatome for 3 weeks. It completely subsided afterwards.

Case 2

Patient was a 41-year-old male. He presented with left upper limb numbness and weakness. There was no palpable mass. Upon physical examination, there was decreased sensation at left C5 and C6 dermatome. There was also weakness at left supraspinatus, infraspinatus and biceps muscle with MRC grade 3/5. MRI found that there was a well-defined homogenous T1 hypointense and T2 hyperintense lesion (Figures 6 and 7) at upper trunk of left brachial plexus. Supraclavicular approach was used to remove the lesion (Figure 8). Post-operatively, there was no more upper limb numbness. The power of the involved muscle improved to MRC grade 4/5.

Case 3

A 32 year-old lady complained of a palpable painless mass at her right supraclavicular fossa. Sensory and motor function was intact. There was positive Tinel sign. Pre-operative MRI scan showed typical feature of schwannoma (Figures 9 and 10). Supraclavicular approach was adopted for enucleation of lesion. There was a 1.5 cm × 1.0 cm × 1.5 cm schwannoma at the upper trunk of right brachial plexus. No neurological deficit was found after the surgery.

Case 4

A 39-year-old lady had cancer of right breast. There was an incidental finding of an axillary mass during lumpectomy of right breast and sentinel lymph node biopsy surgery. Patient was asymptomatic. She was then referred to our team for further management. MRI and biopsy confirmed the mass was a brachial plexus schwannoma (Figures 11 and 12). Deltopectoral approach was used in this case (Figure 13). There was a 2.0 cm × 2.8 cm × 2.3 cm lesion located at posterior cord of right brachial. Enucleation was performed. There was no neurological deficit after the operation.

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Sex/Age	Chief complaint	Palpable mass	Pain	Sensory deficit	Motor deficit	Tinel sign	Surgical approach	OT time (min)	Site of tumor	Size in cm	Post-op neurology
F/69	Palpable mass at right supraclavicular fossa	Y	Y	N	N	Y	Supraclavicular	95	Right C5 root	1.9 × 1.4 × 1.1	Temporary numbness at right C5 for 3 weeks, completely subsided afterwards
M/41	Left upper limb numbness and weakness	N	N	Left C5 C6 decreased sensation	Left supraspinatous, infraspinatous and biceps weakness (power 3/5)	N	Supraclavicular	240	Left upper trunk	3.0 × 2.5 × 1.5	No more numbness Motor recovery to power 4/5
F/32	Palpable mass at right supraclavicular fossa	Y	N	N	N	Y	Supraclavicular	170	Right lower trunk	1.5 × 1.0 × 1.5	Nil
F/39	Nil (Incidental finding during lumpectomy and sentinel LN biopsy for Ca right breast)	N	N	N	N	N	Deltpectora	120	Right posterior cord	2.0 × 2.8 × 2.3	Nil

Table 1: Summary of clinical information of 4 cases.



Figure 1: Palpable mass at supraclavicular fossa.



Figure 4: Supraclavicular approach (Head of patient at superior part of the figure).

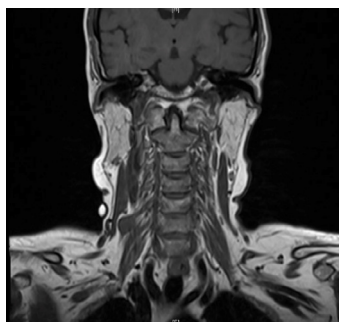


Figure 2: T1 weighted MRI.

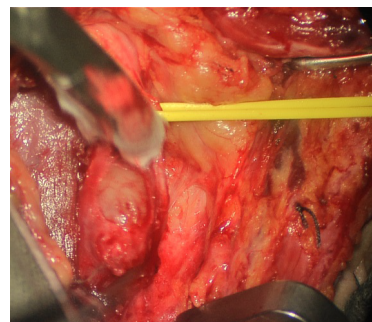


Figure 5: Intralesional enucleation under microscope.

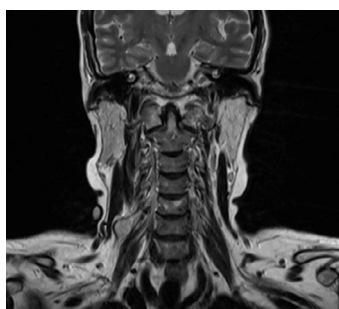


Figure 3: T2 weighted MRI.

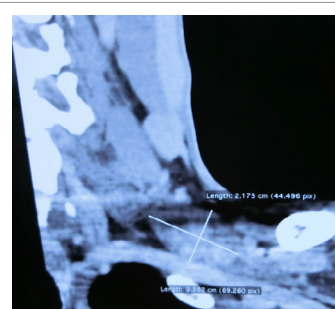


Figure 6: Coronal view on MRI.

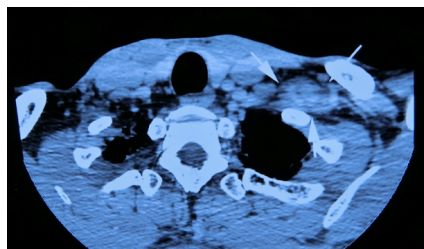


Figure 7: Transverse view on MRI.



Figure 12: T2 weighted MRI.

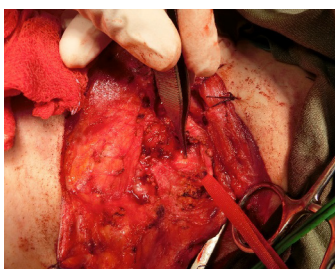


Figure 8: Lesion at left upper trunk of brachial plexus.

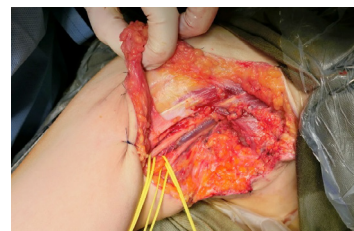


Figure 13: Deltopectoral approach with extension of incision to axilla.

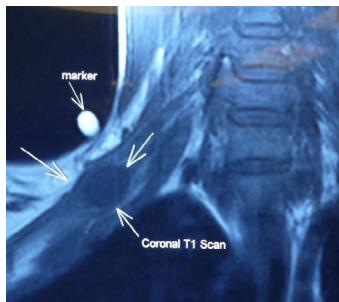


Figure 9: T1 weighted MRI.

Discussion

We obtained similar clinical characteristics of brachial plexus schwannoma as those reported in literature [3,4,6-10]. Brachial plexus schwannoma could be a painless or painful mass. Neurological deficit was not always present. The lesions were found at supraclavicular or axillary region. MRI was a valuable diagnostic tool [14]. In our cases, the MRI features of the tumors were consistent. It showed a well-defined homogenous lesion, hypointense in T1 weighted film and hyperintense in T2 weighted film.

Since the lesion is benign, the aim of surgery should be maximal debulking of tumor with minimal damage to normal nerve fibres.

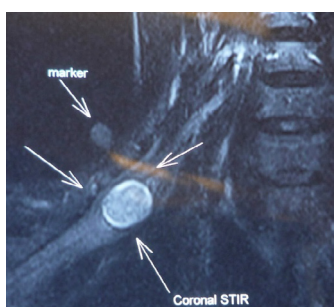


Figure 10: T2 weighted MRI.

Conclusion

The described method of intralesional enucleation provided satisfactory outcome in all 4 cases. There was no irreversible neurological damage after the operation. With the mean follow-up period of 27 months, there was no evidence of recurrence of tumor. Our management pathway for brachial plexus schwannoma was summarized below in Figure 14.



Figure 11: T1 weighted MRI.

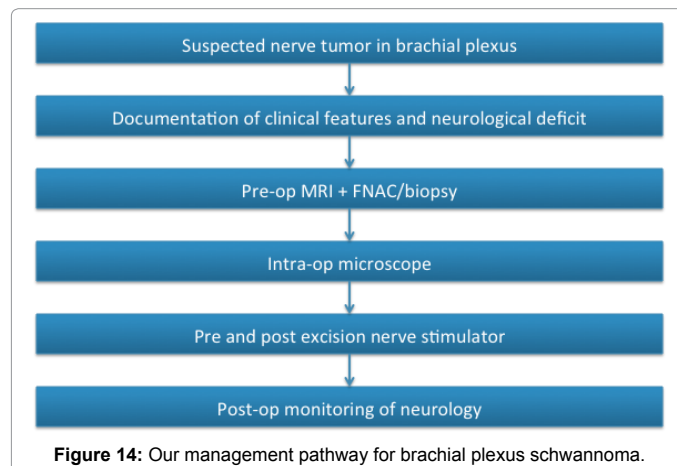


Figure 14: Our management pathway for brachial plexus schwannoma.

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