Journal of Chemical Health Risks

www.jchr.org

JCHR (2023) 13(6), 3120-3123 | ISSN:2251-6727

Peripheral nerve schwannoma - Our Experience

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(Received: 07 October 2023 Revised: 12 November Accepted: 06 December)

KEYWORDS
Schwannoma, Enucleation, Nerve graft, Paresthesia

ABSTRACT:
Schwannomas (also known as neurilemmomas) are benign tumors of the neural sheaths of peripheral nerves. The presentation of schwannoma is slow growing, well circumscribed, eccentric and painless mass which may or may not be tender. Fifteen cases of schwannoma involving the various nerves in the extremities were operated at Mahatma Gandhi hospital, Jaipur, Rajasthan from January 2022. Out of the fifteen cases operated for schwannoma twelve were male and three were female. These cases were in the age group from 19 years to 61 years, twelve cases involved the upper limb, two cases affected the lower limb and one case involved the brachial plexus. Seven patients came with complain of paresthesia affecting the limb. Preoperative evaluation with high resolution USG and MRI was done. Nerve preserving enucleation was done in all the cases except two cases, in one case neurolysis was required and in other case, part of the involved nerve was excised followed by nerve graft. Following nerve grafting there was a temporary finger-drop, which recovered after surgical intervention. Complete histopathological examination was performed in all the cases suggestive of schwannoma. None of the patients had any other local or regional complications in a follow up period of 22 months.

Introduction

Schwannoma is a benign nerve sheath tumor which involves the peripheral nerves. It is also known as 'neurilemmoma'[1]. It presents as a solitary swelling. Schwannoma may cause paresthesia in the sensory distribution of involved nerve[4]. Investigations useful for the confirmation of the diagnosis are USG/MRI/ EMG/NCV[2]. Chief complain of the patient is tender swelling in the region with/without radiating pain. Mostly there is no sensory or motor deficit in the neurological territory of nerve involved in schwannoma. Careful enucleation of schwannoma and preservation of nerve is necessary[3]. Here we are presenting our experience with schwannoma of 15 patients, operated at Mahatma Gandhi hospital, Jaipur, Rajasthan, India.

Method

All fifteen cases of schwannoma were operated at our hospital from January 2022. Preoperative diagnosis of schwannoma was confirmed clinically as well as radiologically. Size and anatomical details of schwannoma were detected by high resolution ultrasonography and/or MRI preoperatively. Preoperative EMG/NCV were done. All cases were operated under general anesthesia without muscle relaxant. Careful resection was done in all cases under magnification. Post-operative histopathology examination suggested of schwannoma in all cases.

Results

Intraoperative pictures of schwannomas (1 to 6), 1) Median nerve schwannoma, 2) Tibial nerve multiple schwannoma, 3) Radial nerve schwannoma, 4) Medial cord of brachial plexus schwannoma, 5) Radial nerve schwannoma, 6) Superficial radial nerve schwannoma.

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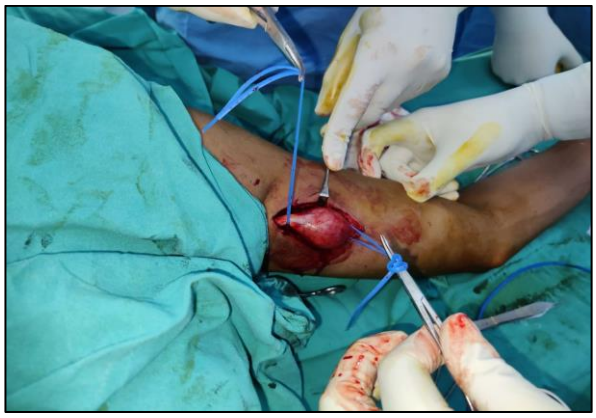

Fig. 1: Median nerve schwannoma

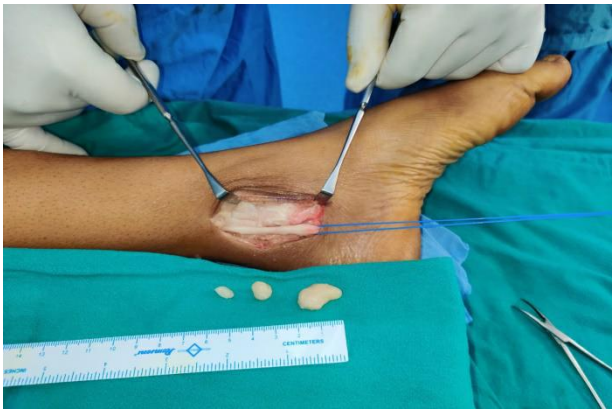

Fig. 2: Tibial nerve multiple schwannoma

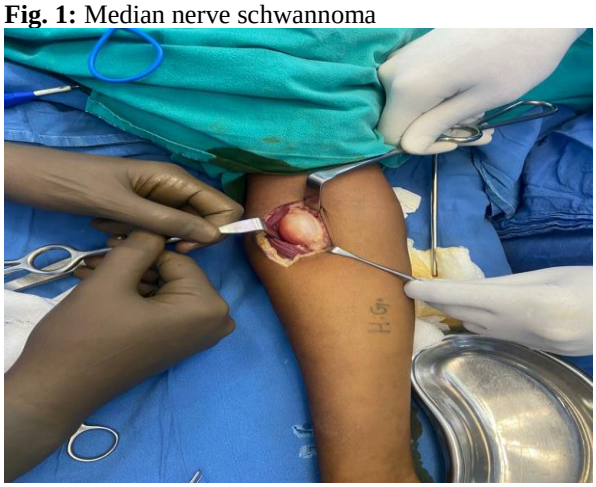

Fig. 3: Radial nerve schwannoma

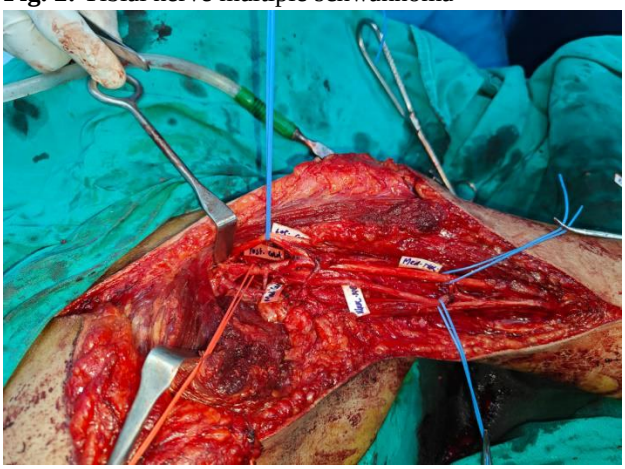

Fig. 4: Medial cord of brachial plexus schwannoma

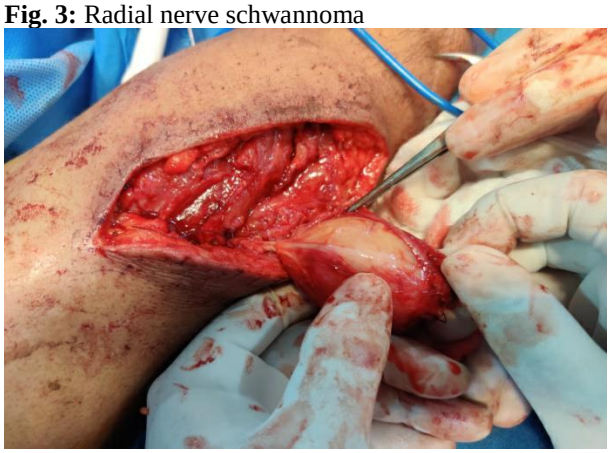

Fig. 5: Radial nerve schwannoma

Fig. 6: Superficial radial nerve schwannoma

Table 1: Nerve Involved

INVOLVED NERVE	No. of CASES	SIZE
Median nerve	**4**	**3 - 5.2 cm**
Ulnar nerve	**1**	**3 cm**

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Radial nerve	**2**	**4 - 6 cm**
Superficial radial nerve	**5**	**2 - 5.5 cm**
Medial cord of brachial plexus	**1**	**2 cm**
Tibial nerve	**2**	**1-4 cm**

Table 2: Pre and Post Operative findings

Patient No.	**Involved nerve**	**Pain** (pre-op)	**Mobility (pre-op)**	**Post operative complications**
1	Median	+	+	-
2	Ulnar	+	+	-
3	Radial	+	+	-
4	Median	+	+	-
5	Superficial radial	-	+	-
6	Median	+	+	-
7	Tibial	+	+	-
8	Superficial radial	+	+	-
9	Medial cord of brachial plexus	+	-	-
10	Superficial radial	+	+	-
11	Radial	+	+	Inability to extend fingers
12	Median	+	+	-
13	Superficial radial	-	+	-
14	Tibial	+	+	-
15	Superficial radial	+	+	-

Out of the fifteen cases, twelve were male, three were female, age group ranging from 19 years to 61 years with average being 31 years. Anatomical distribution:- Median Nerve - 4, Ulnar Nerve - 1, Radial Nerve - 2, Medial cord of brachial plexus-1, Tibial Nerve - 2, Superficial Radial Nerve -5 [Table 1]. All patients came with the chief primary complain of swelling with pain in the limb. Seven patients came with complaint of paresthesia in affected limb. No functional deficit was found in any patient. None of the patients had similar family history. Seven lesions were above 5 cm with the largest being 6 cm (Radial nerve) and smallest was of 1cm (tibial nerve). The severity of symptoms was directly proportionate to the duration and size of the swelling.

The nerve was identified in the region proximal to the lesion and then traced distally for better control. The tumor was very well encapsulated, and it was possible to find a plane of dissection between the lesion and nerve. Dissection was done carefully separating the

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lesion from the nerve fascicles. In most of the cases it was possible to completely enucleate the tumor except in two cases. First one, medial cord schwannoma where neurolysis was required. Second one, where radial nerve schwannoma excision was done and radial nerve repaired with sural nerve-graft. Patient developed inability to extend digits at MCP joint in the immediate post operative period which recovered fully later [Table 2]. Complete histopathological examination was performed in all the cases. Besides the general features of a benign tumor they showed characteristic Antony A and Antony B cells. This was clearly suggestive of Schwannoma.

Discussion

Schwannomas (also known as neurilemmomas) are the most common type of peripheral nerve sheath tumors[1]. Commonly seen in the upper extremity. They are typically found on hand and forearm in the fourth to sixth decades of life[3]. These benign tumors arise from schwann cells[5]. They are slow growing, well-circumscribed masses often lie eccentrically within a peripheral nerve[6]. Patients often present with a painless/painful mass, though they can occasionally present with radiating pain that occurs when the nerve is traumatized or with even neurological deficits[2]. Examination reveal a firm mass that is often mobile transversely (together with the nerve) and not longitudinally[1].

MRI is the most useful investigation in delineating the lesion (presence of target sign) and to identify nerve of origin, however it is often difficult to differentiate a schwannoma from other nerve tumors such as neurofibromas or even malignant peripheral nerve sheath tumors on MRI.[4]. Schwannomas can be easily dissected and shelled out from the nerve. Magnification should be used to separate the nerve fascicles from the tumor mass[6]. The risk of postoperative neurologic deficit is around 4%[3]. There are very rare reports of malignant transformation.

On pathological examination, a schwannoma has a true capsule composed of epineurium[4]. The hallmark of schwannoma is the alternating pattern of Antony A and B areas. Histological staining reveals a strongly positive S-100 protein that is specific for schwannoma[1]. Depending on the nerve of origin either they can be very superficial and easily accessible or can be deep in the intermuscular plane. Planning of the incision should be done in such a way that it is directly overlying the tumor and extending on to the uninvolved segment of the nerve. The point of injury in the most of the cases is the area between tumor and normal segment of the nerve. Surgery should be done under tourniquet-control to facilitate a blood-less field and under magnification, either with the help of a microscope or loupe. Sometimes it may be very difficult to distinguish between the tumor and the nerve tissue. Once the right plane is identified it is possible to completely enucleate the tumor without damaging the nerve fascicles which can also be confirmed with intraoperative nerve stimulation. Schwannoma is a very well encapsulated tumor and rarely infiltrates the nerve. Hence, there is very little chance to leave behind any tumor tissue which can cause recurrence.

Conclusion

Schwannomas are benign nerve sheath tumors which usually present with painful swelling and paresthesia. We confirmed our diagnosis with the help of high resolution USG and MRI of the involved region. In our experience, these tumors can be successfully managed by meticulous dissection and enucleation of schwannoma.

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