ORIGINAL RESEARCH

Surgical excision of extremity schwannomas: analysis of 21 patients

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Received: 21 February, 2023 Accepted: 25 March, 2023

INTRODUCTION

Peripheral neural sheath tumours are very rare, and schwannomas, which are also known as neurilemmomas. Most of these tumours are incidentally diagnosed as slow-growing solitary tumours in middle-aged patients, and there is no sex predilection. These tumors most commonly occur in the head and neck and involve the brachial plexus and spinal nerves; the extremities are affected less often(1). Verocay was the first to state the widely acknowledged theory that neuromas arise from Schwann cells(2). Clinical signs and symptoms are usually caused by direct and indirect effects of the tumor, such as nerve invasion or compression and infiltration of surrounding tissues. They may present with pain or paraesthesia in the sensory distribution of the involved nerve. The most common presenting complaints of PNTs are soft tissue mass, pain, and sensory loss or weakness in the hand. However, none of these manifestations can particularly suggest one certain type of nerve tumor, nor can they be used as a basis for differential diagnosis with, for example, foreign bony inclusion granuloma, flexor tendon cysts, gang, and mucous cysts. Diagnosis is made with help of Ultrasonography and MRI. These patients did not have any neurological deficit besides some paraesthesia in the territory of the nerve. However, large swellings in tight fascial compartments can lead to motor deficit. Due to proximity of nerve there are significant chances of iatrogenic nerve damage. Hence, these patients can land up with permanent nerve damage which can be a devastating end result.

The aim of the present study was to establish the clinical characteristics of schwannoma cases, including the incidence of preoperative symptoms, incidence of postoperative neurological deficits, tumour size, duration of symptoms, histopathological classification and location of the tumour.

PATIENTS AND METHODS

We prospectively reviewed the data of 21 patients who underwent surgical excisions of peripheral nerve schwannomas at our institution between 2017 and 2021.

INCLUSION CRITERIA

Only histopathologically confirmed schwannomas of the major peripheral and cutaneous nerves of the extremities were included.

EXCLUSION CRITERIA

Intramuscular, plexiform, brachial plexus and spinal nerve schwannomas were excluded from the study. The patient who did not give consent to join the study were also excluded.

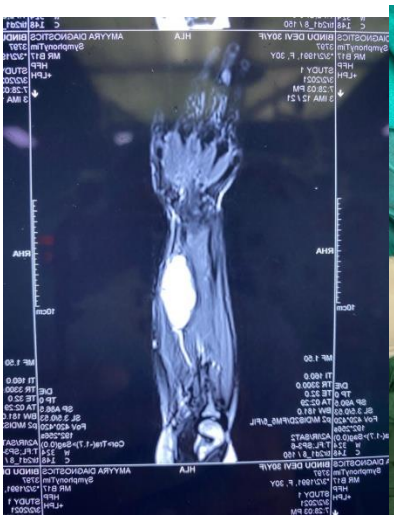
The schwannomas were diagnosed clinically as a tumor in the line of a nerve, accompanied by a positive Tinel's sign or by sensory disturbance in the distribution of the nerve. Magnetic resonance imaging (MRI) was performed preoperatively in all patients to determine the size, limits and anatomical location of the tumors. In most cases, MRI showed a well-defined tumor with contrast enhancement. We did not routinely perform biopsy because of the risk of iatrogenic neurological injury. All tumors were excised by using microsurgical techniques under microscopic magnification. We carefully made a longitudinal incision in the epineurium until the shiny surface of the tumour was exposed. Then, we performed extra-capsular dissection after retracting the nerve fibres that surrounded the tumor. Clinical follow-up was performed at the following time points:

the first postoperative day; 1, 3, 6 and 12 months after the surgery.

RESULTS

The study population included 13 males and 8 females with a mean age of 34.09 (range from 16-62) years. The duration of symptoms ranged from between 4 months to 6 years. Location of tumors were mostly in the forearm and extremities of lower limb. Size of tumors ranged between 6x3x2cm (smallest) to 16x7x5cm(largest). Patients in the study had recognized a growing tumor before presentation. Patients involved in this study, had undergone excisional biopsy and benign schwannoma was diagnosed histopathologically. The most common schwannoma types observed was AntoniA in 10 patients,Antoni B in 7 patients and mixed in 4 patients. In 16 patients (76%), preoperatively, pain was present and postoperatively pain was relieved .In 12 patients, preoperatively,were detected to have sensory deficit and postoperatively only 1 patient,the deficit worsened. Rest all 11 patients showed full recovery. Recurrences were not observed during follow up.

Case	Age	Sex	Duration	Pain	Neurological symtoms	Site	Size(cm)	Histological type	FollowUp (M)
1	28yrs	M	1and half years	+	sensory	N.ischiadicus	9x3x4	A	38
2	34yrs	F	9months	+	sensory	N.ulnaris	12x8x4	A	63
3	16yrs	M	6months	+	sensory	N.ischiadicus	6x5x4	A+B	43
4	44yrs	M	3years	-	sensory	N.ulnaris	12x8x4	B	88
5	22yrs	F	9months	+	sensory	N.ischiadicus	5x2x2	B	56
6	20yrs	F	8months		sensory	N.radialis ramus superficialis	7x5x3	A+B	78
7	38yrs	M	2years	+		N.tibialis	6x5x3	A+B	45
8	31yrs	F	10 months	+	sensory	N.ischiadicus	6x5x2	A+B	72
9	25yrs	M	1 year	-		N.radialis ramus superficialis	7x6x4	B	78
10	35yrs	M	7months	+	sensory	N.tibialis	6x4x2	B	78
11	62yrs	M	5years	+		N.peroneuscommunis	5x3x2	A	68
12	50yrs	F	3years	+		N.radialis ramus superficialis	9x4x3	A	45
13	33yrs	M	2 and half years			N.radialis ramus superficialis	6x3x2	A	40
14	30yrs	F	1year 8 months	+		N.tibialis	7x3x2	A	26
15	29yrs	M	6months	+	sensory	N.tibialis	7x4x3	A	66
16	46yrs	M	6years	+		N.tibialis	10x8x6	A	78
17	37yrs	F	5months	+	sensory	N.tibialis	6x4x5	B	67
18	27yrs	M	4 months	+	sensory	N.ischiadicus	7x3x2	B	45
19	20yrs	F	1 year	+		N.tibialis	8x6x4	A	67
20	40yrs	M	2 years		sensory	N.ischiadicus	11x6x4	A	60
21	49yrs	M	3years	+		N.ischiadicus	10x9x5	B	56



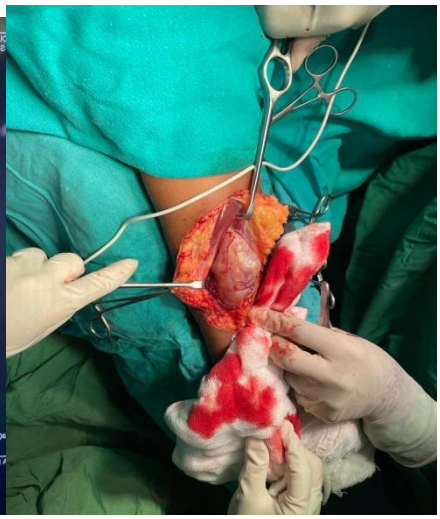


Fig 1 (a) **Fig 1 (b)**

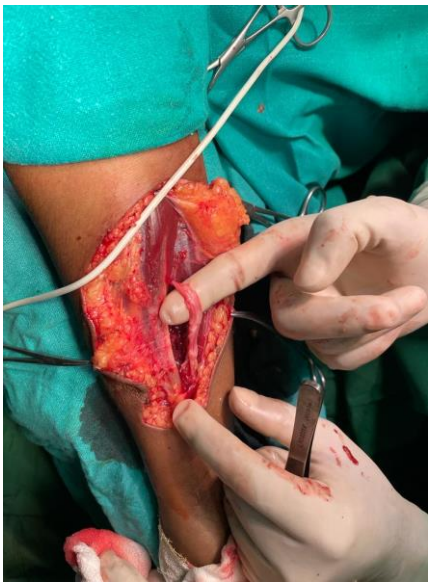


Fig 1 (c)

Fig 1.
Radial nerve schwannoma right forearm.
a) MRI picture
b) Intraoperative picture showing schwannoma
c) Post operative picture of the nerve after tumour removal

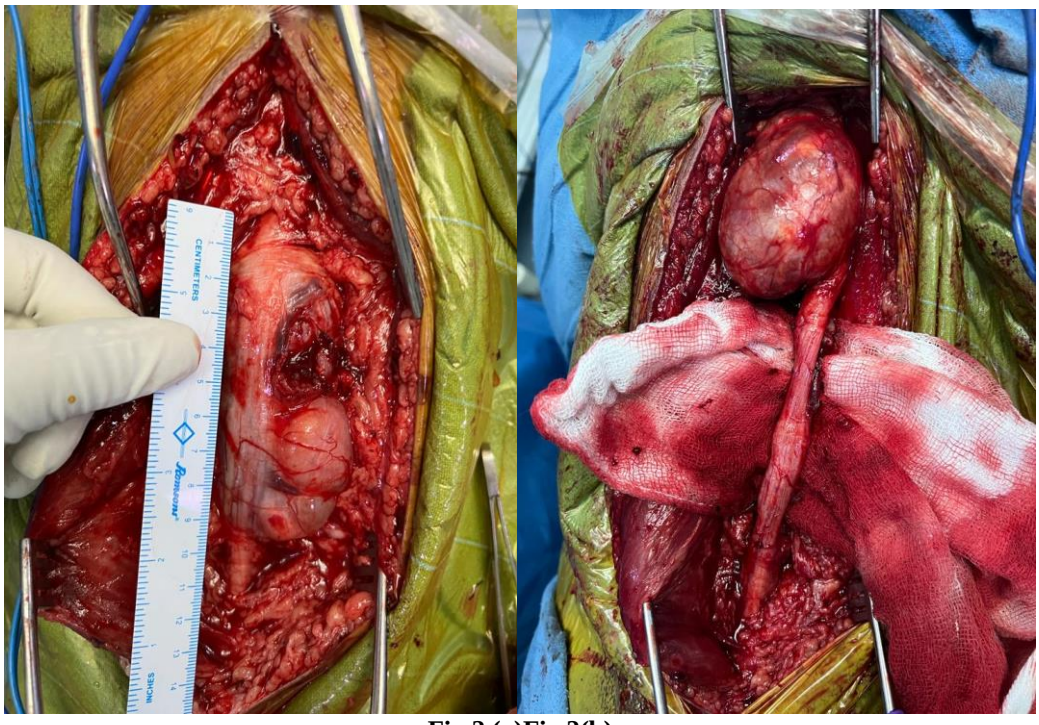


Fig 2 (a)Fig 2(b)

Fig 2.
Sciatic nerve schwannoma right side.
a) Intraoperative picture showing schwannoma
b) Post operative picture of the nerve after partial tumour removal

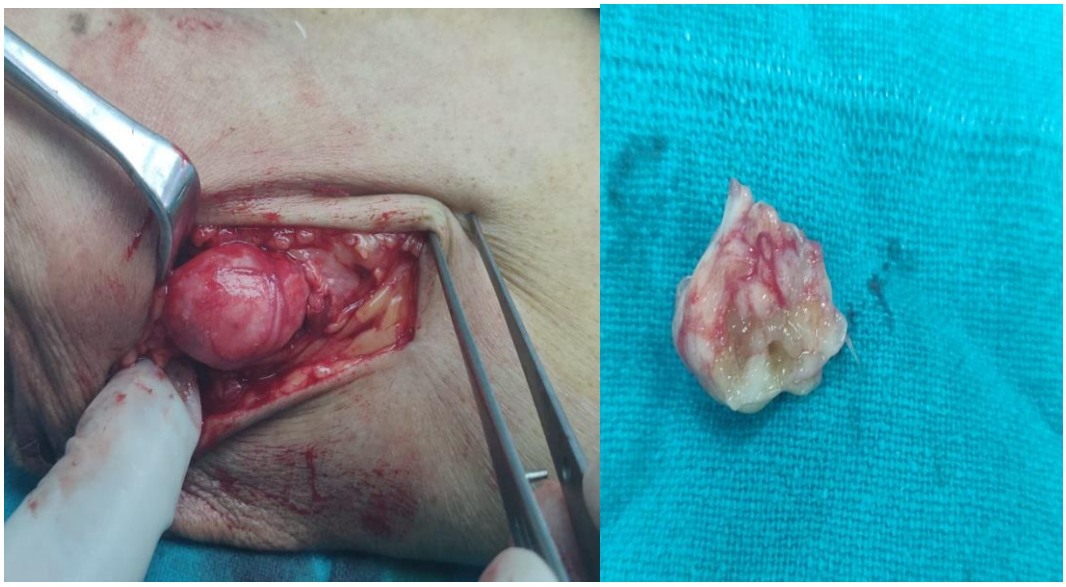


Fig 3 (a)Fig 3 (b)

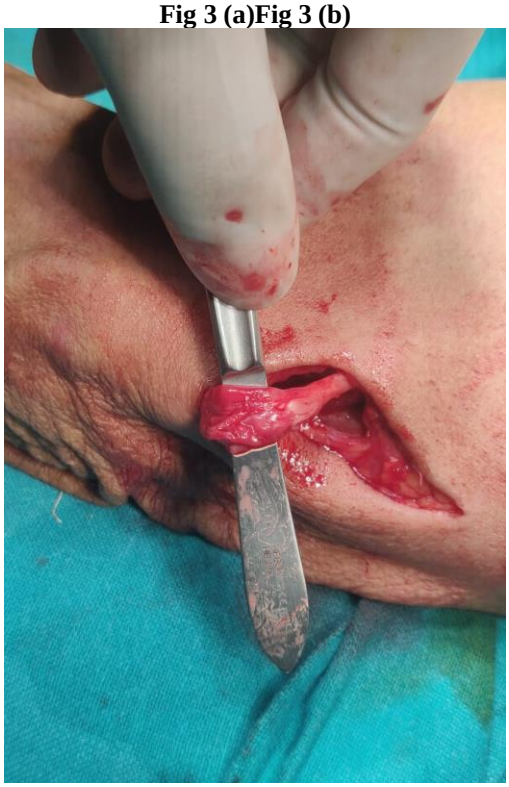


Fig 3 (c)

Fig 3

a) Schwannoma of ulnar nerve left side after exploration
b) Excised tumour
c) Post excision ulnar nerve

DISCUSSION

Peripheral nerve schwannomas are usually seen in early and middle adulthood and there is no apparent sex predilection(3).In some patients, postoperative neurological deficits after excision of schwannoma(4) .However, the clinical course of excision and risk factors associated with post-operative neurological deficits are not well known. Because of fascicles embedded in the tumor, complete excision of the tumor can lead to damage to the parent nerve .In our study, preoperatively sensory defecit was seen in 12 patients and after excision 1 patient,deficit worsened.Oberleal.(5)reported immediate postoperative sensory deficits in six (50%) of 12 patients.Donner et al. (6) also reported that 13% of the 85 patients with schwannomas in their study developed muscle weakness after surgery.Kanget al.(7) reported that neurological deficits were observed in two of 13 patients with schwannomas in the major nerves of the upper extremity, but the deficits had

improved by the last follow-up. In our study, there was no relationship between disease duration or tumour diameter and the occurrence of neurological deficits.Levi et al.(8)reported that neurological deficits were significantly more frequently observed in patients who had undergone a preoperative biopsy (12 of 29 patients) than in those who had not (10 of 58), and they suggested that preoperative fine-needle biopsy causes neurological deficits.The tumour can easily be mobilized from side to side but not along the axis of the located extremity(9).In our study, all patients had recognized a growing tumour before presentation. In addition, the Tinel's sign is characteristically positive over the tumour and shows a significant correlation with neurological complications(10).MRI is capable of revealing the details of these tumours, their capsules and the nerve from which the tumours arise.This central enhancement seems to represent the presence of hypercellularAntoni A type cells in the central part of the tumour and a hypocellularAntoni B type cells in the periphery.[11,12].In our study,Antoni A type was seen in 10 patients ,Antoni B type was seen in 7 patients and mixed type was seen in 4 patients.In the literature, there is debate about the incidence of spontaneous pain with schwannomas. Reported incidences range from 0%–100%.(13)

CONFLICT OF INTEREST

No conflicts declared

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