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Clinical study of Schwannomas of extremities

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AIMS & OBJECTIVES- *BENIGN SCHWANNOMAS ARE the most common tumour of peripheral nerve. we present our experience in operative management of schwannomas involving extremities and analyse results of treatment.*

MATERIALS AND METHODS- *This study involved 10 cases of schwanommas of extremities admitted in Srivenkateswara medical college,Tirupati, over a period of 3 yrs (2015-2019). Criteria for inclusion is the presence of schwanommas of extremity confirmed by imaging.. Assessment was done by assessing functional and cosmetic appearance of the patients. Results: There were five males and six females with a mean age of 37.6 (range: 17–62) years. 7 tumours originated from major peripheral nerves and 3 involved digital nerve branches.2 cases of schwanomma diagnosed in lower extremities involving sciatic nerve. In upper limb, 1 case involved ulnar nerve, 2 median nerve at forearm, 5 involving digital nerves. No recurrences were observed during the follow-up period. No motor and sensory deficits were observed .improvement in pain , paraesthesia,sensory and motor symptoms was seen. All cases were planned under regional Anesthesia.*

CONCLUSION- *Schwannomas involve peripheral nerves,most commonly ulnar ,median and sciatic nerves. Compression neuropathy causing pain ,paraesthesia, sensory and motor symptoms are indications for surgery. Excision of schwanommas with meticulous dissection alleviates symptoms with low risk of new postoperative neurological deficits.*

Keywords: *Neurilemmoma; neuroma; perineural fibroblastoma; peripheral nerve; schwannomas;Regional Anesthesia.*

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I. Introduction:

Schwannomas / neurilemmas was first described by Verocoy in 1908 (1).schwanommas are beningn peripheral tumours(2,3).they usually occur in the third to fifth decades of life, with no racial and gender differences.(2,4).It arises from schwan cells ,although rare, is the most common slow growing, localized, encapsulated benign tumour of the peripheral nerve sheath, comprising 5% of all soft tissue tumours.they most commonly occur on the head and neck, followed by the trunk , and then upper limb and lowerlimbs.(5-11) .schwanommas located in the upper extremity account for 12 to 19 % and in the lower extremity 13,5 to 17.5% of all cases,(8).in the upper extremity the schwanommas are are mostly located on its volar surface (2,12,13,14).The most affected nerves are the ulnar and median nerves in the upper limbs and in lower limbs ,it is found in association with either sciatic nerve (1%) or the posterior tibial nerve.(1,15-17).

They are composed of almost entirely of Schwann cells.(12,18). the tumours are well encapsulated ,with slow growing, non infiltrating pattern causing mass displacement of nerve fascicles.(19,20).Clinical symptoms that develop over time are mainly due to compression of nerve fascicles(12,20).it may persist as painless edema for years before other symptoms such as pain, paresthesia ,hyposthesia, and motor defecit arise due to compression of adjacent structures and absence distensibility of the local tissue (6,11,21-23).On Physical examination, the mass is painful at pressure and movable in transverse axis, but not longitudinally to the limb;the tumour percussion induce painful paraesthesia in the nerve area,positive Tinels sign.(6,22)

MRI is the preferred imaging technique in the diagnosis of tumours of peripheral nervous schwannomas. On imaging scans, it presents as a well defined mass, usually fusiform in shape located within the nerve ,ispintense to surrounding muscles on T 1- weighted images, and hyperintense on T2 –weighted images(24,25).neurogenic tumours usually show signal enhancement after intravenous administration of contrast medium(24).Immunohistochemical analysis is useful in differential diagnosis of peripheral nerve

tumours.It is performed with the use of monoclonal antibodies against proteins:S-100 , CD 31 , CD 34, and GFAP((18)

Two types of tissue can be distinguished under microscopy:Antoni-A and Antoni –B.Type A areas are highly cellular and composed of closely packed spindle cells which form a palisade and produce Verocay bodies.Antonia type B areas are composed of loosely arranged Schwann cells in a mucinous –like matrix().one area is usually predominant over the other in every tumour.other rare variants of schwannoma:cellular , ancient , epitheloid ,melanotic and plexiform.()

Treatment of choice for schwanommas is microsurgical resection(13,14,5,9,20)with aims to remove the tumour and preserve nerve function.Surgery is indicated in symptomatic cases.

II. Patients & Methods:

The study was conducted at department of plastic surgery, SriVenkateswara medical college, TIRUPATI between 2015 -2020.the study includes 10 cases of schwannomas of extremities of both sexes with mean age of . The inclusion criteria were upper and lower limb tumours ,evaluated by physical examination,ultrasound and MRI.The treatment of choice was complete tumour excision using microsurgical technique.

The patients were examined in respect to their complaints like pain, swelling, duration of the complaint , presence of Hofman tinel signs, presence of any sensory or motor deficits of invoved extremity.The swelling was INVESTIGSTED BY ULTRASOUND EXAMINATION OF THE SWELLING AND MRI of the swelling was done in all cases.

All cases operated under regional Anesthesia.

III. Results:

A total of 10 cases of schwanommas involving extremities were operated in our study. Out of 10 patients, 6 were male patients and 4 were female patients.The ages ranged between 25 yr to 50 yrs, the mean age being 36 years.2 cases had schwanomma involving median nerve at distal forearm, 1 case invoving ulnar nerve at the cubital tunnel, 1 at the radial groove of arm, 4 cases invoving digital nerves in palm, out of which 3 cases invoved digital nerve branches of median nerve distribution, 1 case involve ulnar digital nerve. In lower limb,2 cases were involving sciatic nerve.All cases operated under regional anesthesia In all cases, exploration and ennucleation of the tumor was done under loupe magnification, except in 1 case which involve schwanomma of first digital nerve which requird neurotisation to adjacent digital nerve, in all other cases the schwannomas were enucleated. In 1 case of schwannoma involving median nerve at distal forearm, which was explored outside was referred to plastic surgery department anticipating nerve injury, which was reexplored and tumor enucleated.The size of the tumors ranged between 0.2 cm to 4 cm.All the specimens were sent for histopathology examination a nd confirmed.postoperative followup was good. Suture removal was done on day 14. All patients regained their normal sensory and motor power after 1 month and resumed their normal activities.

1.PATIENT DEMOGRAPHIC DATA AND CLINICAL RESULTS OF 10 CASES TREATED SURGICALLY FOR PERIPHERAL NERVE SCHWANNOMAS:

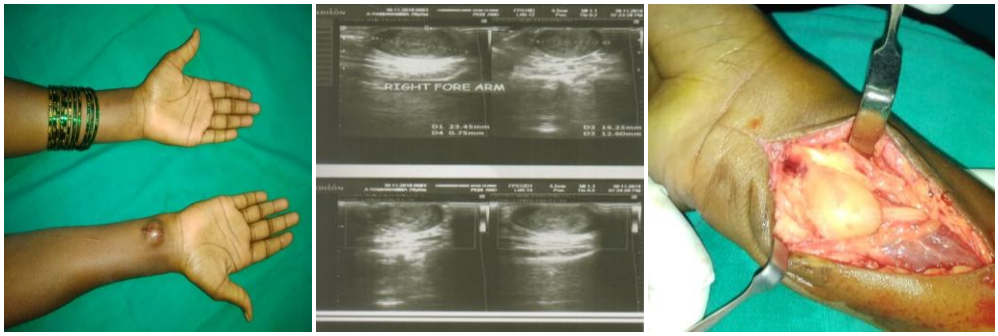
case	age	sex	Duration of symptoms	symptoms	Tinels sign	Previous surgery	Site of schwanomma	Size	Post op recovery
1	25	F	2YEARS	PAIN,SWELLING,paresthesia of medial 3 fingers	+	YES	FOREARM	3X2CM	good
2	30	M	1.5 YR	PAIN	+	-	RT PALM	1.2X1CM	good
3	55	F	8 MONTHS	SWELLING, PAIN	+	-	RT THIGH	3.5x2.5CM	good
4	26	M		Swelling,pain,	+		RT PALM	1.2X1 CM	good
5	28	F	2 YR	SWELLING, PAIN	+	-	LT THIGH	4X3 CM	good
6	30	m	6 months	Swelling, pain, weakness of hand	+		Rt forearm	1x1 cm	Transient hyposthesia
7	40	M	1 YR	PAIN ,SWELLING,paresthesia of middle finger	+	-	Left palm	0.8cmx0.6 cm	recovered
8	50	F	8 MONTHS	swellingRIGHT POSTERIOR ASPECT ARM, pain	+	-	RT ARM	1X1CM	good
9	42	m	6 months	Swelling, pain, paresthesia of thumb, index finger	+		Rt palm	0.6x0.3 cm	Transient paraesthesia
10	34	F	3 months	Swelling, pain,paresthesia of little finger	+		Lt palm	o.2x0.2 cm	Transient paraeshesia

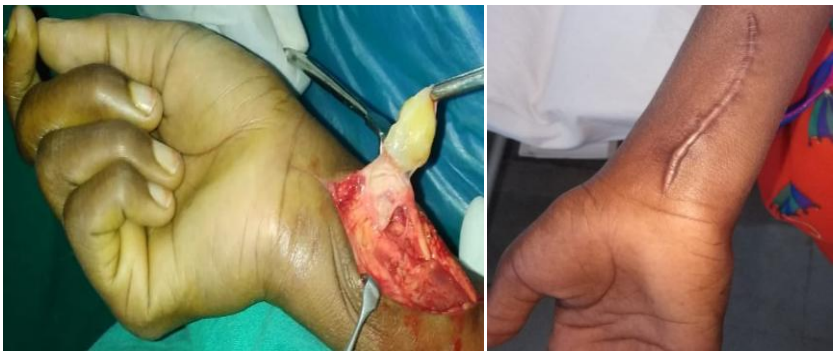
2.Location of schwannomas :

Nerve involved	No. of cases
Median nerve	2
Ulnar	1
Radial nerve	1
Digital nerve	4(3median nerve, 1 ulnar nerve)
Sciatic nerve	2

Regarding postoperative complications, 1 patient had transient hyposthesia ,and 2 patients had paresthesia.No motor deficit was observed in the patient postoperatively. In total 3 cases(30%) had postoperative complication, which were transient and after 6 months none had any sensitivity changes.
No recurrence of cases seen.

Case 1





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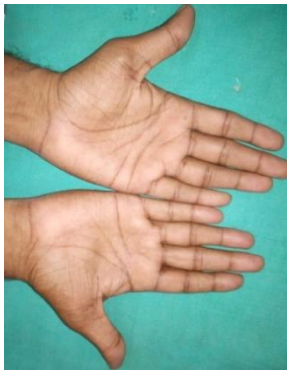
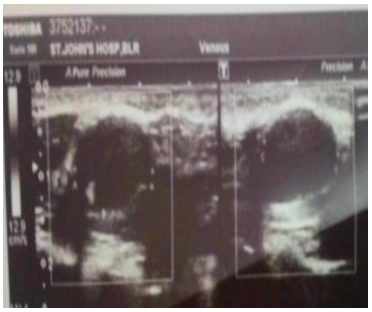

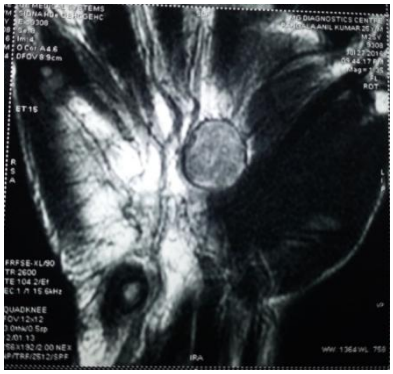
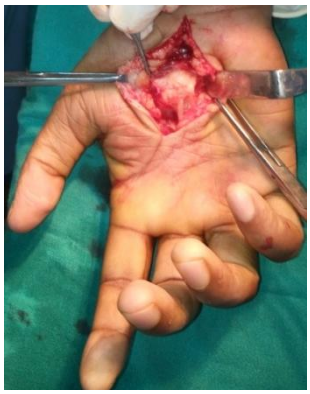
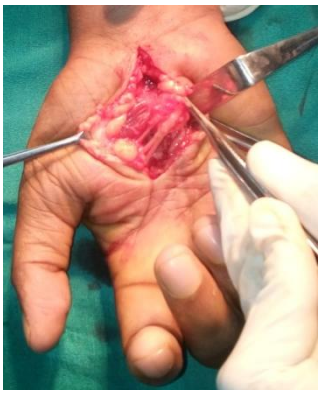
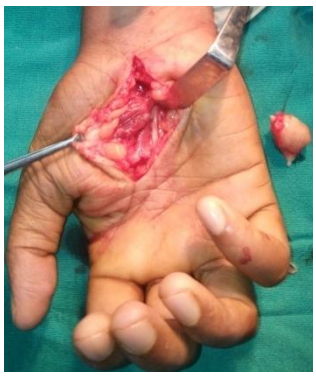
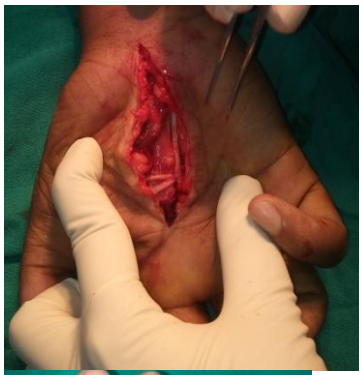


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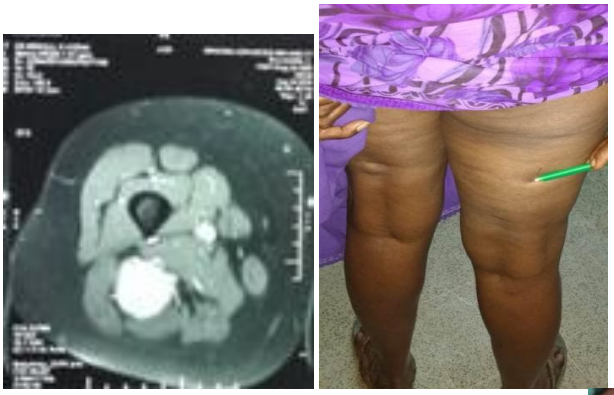

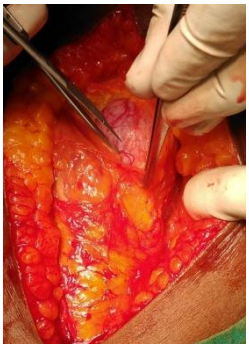
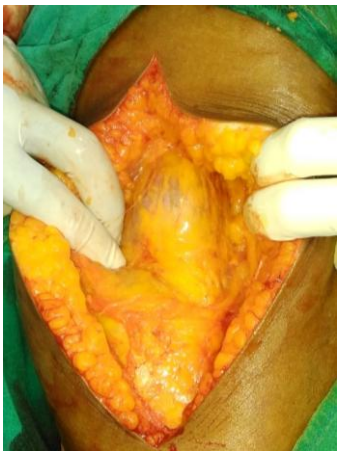
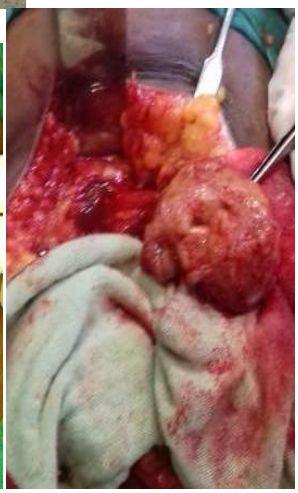


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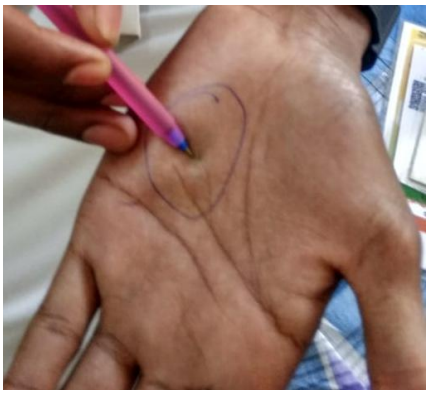
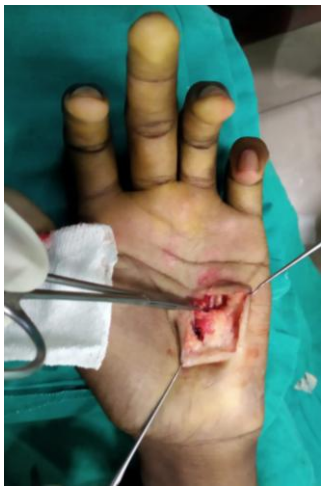

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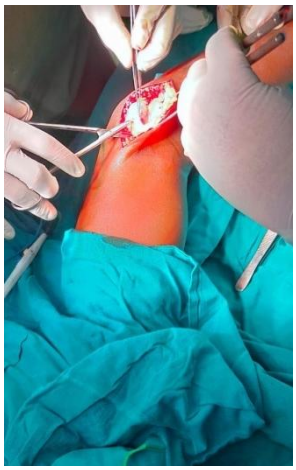

IV. Discussion:

Schwannomas or neurilemmomas are tumours of Schwann cells on the peripheral nerves. Usually being encapsulated and benign in nature,(26),they rarely metastsise. Schwanommas are commonly solitary, multiple schwannomas are seen in schwannomatosis, neurofibromatosis type 1 & type 2(27).Capsule of schwannoma consists of perineurium and deepest layers of epineurium(27) which permits surgeons to resect tumour without damaging the nerve fibres. Uncommonly, plexiform subtypte of schwannomas may invade neural bundles, making excision more difficult than expected.(28)

Schwannomas account for most common tumour of peripheral nerves accounting 5% incidence in adult population(26), affecting ages between 20 and 50 years and I our series mean age was 36 years and most commonly in head and neck region followed by flexor surfaces of upper and lower limbs(29).The most affected nerves are the ulnar and median nerves in the upper limbs, and sciatic and posterior tibial nerves(1,14-15)

Schwannomas present as painful small lumps along the course of peripheral nerves. They rarely reach large size , especially in confined areas ,such as hands & feet. A positive tinels sign is an important finding due to nerve compression and they appear as a hypoechoic encapsulated mass on ultrasound(26).The classic schwannoma triad comprises the presence of tumour, positive Tinels sign, and mobility in the transverse axis of the limb.Clinical picture also include pain, paresthesia, hyposthesia and motor deficit.(7,10,23)Continuity with a nerve on ultrasound is a positive finding for a schwannoma & helps to distinguish from a neurofibroma.(29). A classic image for a schwannoma on T1- weighted MRI sequences is an isointense or mildly hypointense solid mass, whereas they are seen as marked hyperintense masses in T2 weighted MRI sequences.(30).

In our series , 10 cases of schwannomas were found, 8 of which involved upper limb(80%), and 2 on the lower limb(20%).There was predominance of upper limbs over the lower limbs.Females & maleswere equally affected. The mean age was 36 years.all patients had palpable mass, positive Tinels sign and 3 patients had sensory disturbances and 1 patient had motor disturbance.

Large or symptomatic tumours require excision which despite a favourable prognosis commonly presents temporary postoperative complications, such as sensory and /or motor disorders.(9,10).It is extremely important to inform patients of the risks during the procedure.(7).In our study there were only sensory complications, comprising 30 % cases which was transient with complete recovery. In our study ,there was no recurrence.

V. Conclusion:

Schwanommas located in extremities arise predominantly from major peripheral nerves median nerve, sciatic nerve in our series.Compressive neuropathy caused by gradual tumor growth warrants surgical intervention.With meticulous dissection under loupe magnification , most of the schwannomas can be enucleated safely with very low risk of new permanent postoperative neurological deficits & benefits patient from being symptom free with complete recovery with no recurrence.

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