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Case Report

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A Rare Case of Deep Submuscular Giant Lipoma of Proximal Forearm Encasing Radius with Compression of Posterior Interosseous Nerve and Superficial Radial Nerve

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ABSTRACT

A lipomais benign soft tissue tumour of adipose tissue which is mostly covered with a sheath of fibrous capsule and found mostly in subcutaneous tissue plane. A lipoma can be found anywhere where fat is located in the body. Rarely, they can occur deep to subcutaneous tissue and very rarely deep to submuscular plane. Deep submuscular lipomas are large by the time they present clinically and are liable to cause compression of neurovascular structure in the vicinity. In proximal forearm, they can compress the radial nerve where it divides into posterior interosseous nerve (PIN) and superficial radial nerve which may result in weakness of extensor group of muscles of fingers and sensory loss over the dorsoradial aspect of hand. I am presenting a case of large submuscular lipoma, in a 44 years old female, deep to supinator muscle compressing the radial nerve at its division into PIN and superficial radial nerve.

Key Words: *Forearm, Lipoma, Radial nerve, Submuscular Lipoma, Posterior interosseous nerve (PIN), Superficial radial nerve, Supinator muscle*

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INTRODUCTION

Lipomas are popularly known as 'universal tumour' because of their ubiquitous presence in human body[1]. The overall prevalence of lipomas in general population is estimated to be around 1% and its incidence in general population is around 2%[2].Aroundhalf of the soft tissue tumours are lipomas and they are most common benign musculoskeletal tumours[3]. Lipomas mostly occur in subcutaneous plane. Lipomas deep to submuscular planes are very rare and their incidence is 0.3% among all lipomas[4]. Patients with deep lipoma usually do not present with symptomsuntilthey reached a large size or started to compress the nearby local neurovascular structures. Most common location for deep lipoma is lower limbs followed by trunk and upper limbs respectively. I am hereby presenting a rare case ofdeep submuscular giant lipoma of proximal forearm encasing radius on all sides except interosseous border with compression of radial nerve at its division into superficial radial nerve and PIN.

Case presentation:

A female of age 44 years presented to the out-patient department (OPD) with complaints of gradually progressive swelling in the right proximal forearm since last 4 years and pain at the same site since last year. A singles welling of around 7 cm in diameter which was soft and mobile, not attached to underneath bone and not associated with any superficial skin changes, was seen in the proximal forearm (Figure 1). Patient was also complaining of weakness in extending her right hand digits with sensory loss of around 25% over dorsolateral aspect of her right hand. The patient was also exhibitingmild weakness of extension in her right wrist when compared to contralateral wrist.

On X-ray, a radiolucent oval shadow was present (Figure 2). Magnetic resonance imaging (MRI)scan revealed a large, submuscular lipoma covering the proximal radius bone from 3 out of 4 sides, extending from elbow to proximal third of forearm (Figure 3).

Patient was planned accordingly for surgical exploration after routine investigation and anaesthetist clearance. An incision was given over volar aspect of proximal forearm as per Henry's approach. Dissection was done using interval between brachioradialis and flexor carpi radialis muscle, supinator muscle was found after retracting the above two muscles.

On deep dissection, edge of the lipoma was visible along with superficial radial nerve and PIN (Figure 4). The tumour was found deep to supinator muscle in one large segment and it was removed in-toto along with its capsule taking utmost care of PIN and superficial radial nerve to preserve their integrity (Figure 5).

After surgical excision of the lipoma (Figure 6), the surgical site was inspected, hemostasis achieved and closure of the surgical incision done in layers (Figure 7).The postoperative course of this patient was uneventful.

Ongross examination, 7 cm diameter yellow mass (Figure 6) was found which was well circumscribed and encapsulated, clinically consistent with a lipoma. On histopathological examination of the biopsied sample, it was found that tumour had mature adipocytes with minimal vascularity suggestive of benign nature of lipoma.

Discussion:

Lipomamostcommonly occur in the subcutaneous plane. Deep inter-muscular or submuscular lipomas are very rare on comparison with lipomas of subcutaneous plane, and they comprise around 0.3% of all lipomas. They are mostly found in anterior abdominal wall[4].Intermuscular/submuscular lipomas are generally slow growing and they are referred as 'giant lipomas' when their size exceed more than 5cm[3]. Because they are situated deep to muscular plane, they become large by the time they present clinically and are liable to cause compression of neurovascular structures in the vicinity.

On the basis of histology, lipomascan be majorly divided into 3 main categories- Benign lipomas, Atypical Lipomatous tumor & Liposarcoma[5]. Atypical lipomatous tumors are considered as liposarcomas of low grade& mostly found in the limbs, but they can metastasize rarely& they have same radiological and clinical characteristics compared to lipoma[5].

There are very limited case reports available till date of radial nerve compression, where it divides into superficial radial nerve and PIN, due to a deep seated giantlipoma. Non-traumatic causes of PIN palsy include microtrauma (due to repetitive movement of elbow in pronation and supination), space-occupying lesions (like lipoma and ganglion), inflammatory cause (due to rheumatoid synovitis of radio-capitellar articulation) or it can be iatrogenic[6,7,8,9]. There are five potential sites where PIN can be compressed in forearm. These sites are- fibrous tissue between the brachioradialis and brachialis muscle, "leash of Henry" radial artery vessels, edge of extensor carpi radialisbrevis (ECRB) muscle, "arcade of Fröhse" i.e. proximal edge of the superficial portion of the supinator and distal edge of supinator muscle. Out of these, entrapment by the supinator muscle is by far the most common[9].

Patients with deep seated proximal for earmlipoma compressing the PIN will typically present with weakness of extension of fingers of hand which is insidious in onset and many patients also complaint regarding persistent pain with heaviness in the forearm. Detection of these deep seated lipomas usually occurs only when these patients seeks medical care due to pain and discomfort which arises due to compression of the nearby neurovascular structure. Most of the patients do not present with sensory loss; however, very rarely there can be combined involvement of superficial radial nerve and PIN which can result in sensory as well as motor deficit, as was the case with our patient[10].

Diagnosis of lipoma is mainly clinical, however radiology help in correctly locating the tumour. Lipoma can be diagnosed with USG [2]but magnetic resonance imaging (MRI) is preferred as it provides detailed information and accurate anatomical location[2] of soft tissue lesions. Electromyography (EMG) and nerve conduction velocity (NCV) studies can be helpful to identify the location of nerve compression.

There are many surgical approaches for the forearm described. Out of several approaches, 2 approaches are mainly used- one is posterior (Thompson's) approach and another one is anterior (Henry's) approach[11]. In Thompson's approach, the supinator muscle is reached by dissecting between extensor digitorum communis (EDC)and extensor carpi radialis brevis (ECRB), then PIN is exposed by dividing the supinator muscle. Posterior approach is more rapid approach when compared to anterior approach as it involves less depth of tissue dissection but retraction of the PIN is required in this approach which places it at risk of iatrogenic trauma. Henry described the anterior approach in 1973 which makes plane between brachioradialis and flexor carpi radialis muscles[11]. PIN is under direct vision in this approach, that's why most orthopaedic surgeons prefer this approach.

It has been seen that most patients regained finger extensors strength 1 year after the surgery[12]. Therefore, early excision of deep-seated lipomas is recommended to decompress the nerve[12]. Recurrence of the tumour has also been documented, so it is important to completely remove the tumour along with its capsule[13].

Figures:

Fig 1: Clinical picture of proximal forearm swelling due to lipoma.

Fig 2: X-ray showing radiolucent lesion around radius bone.

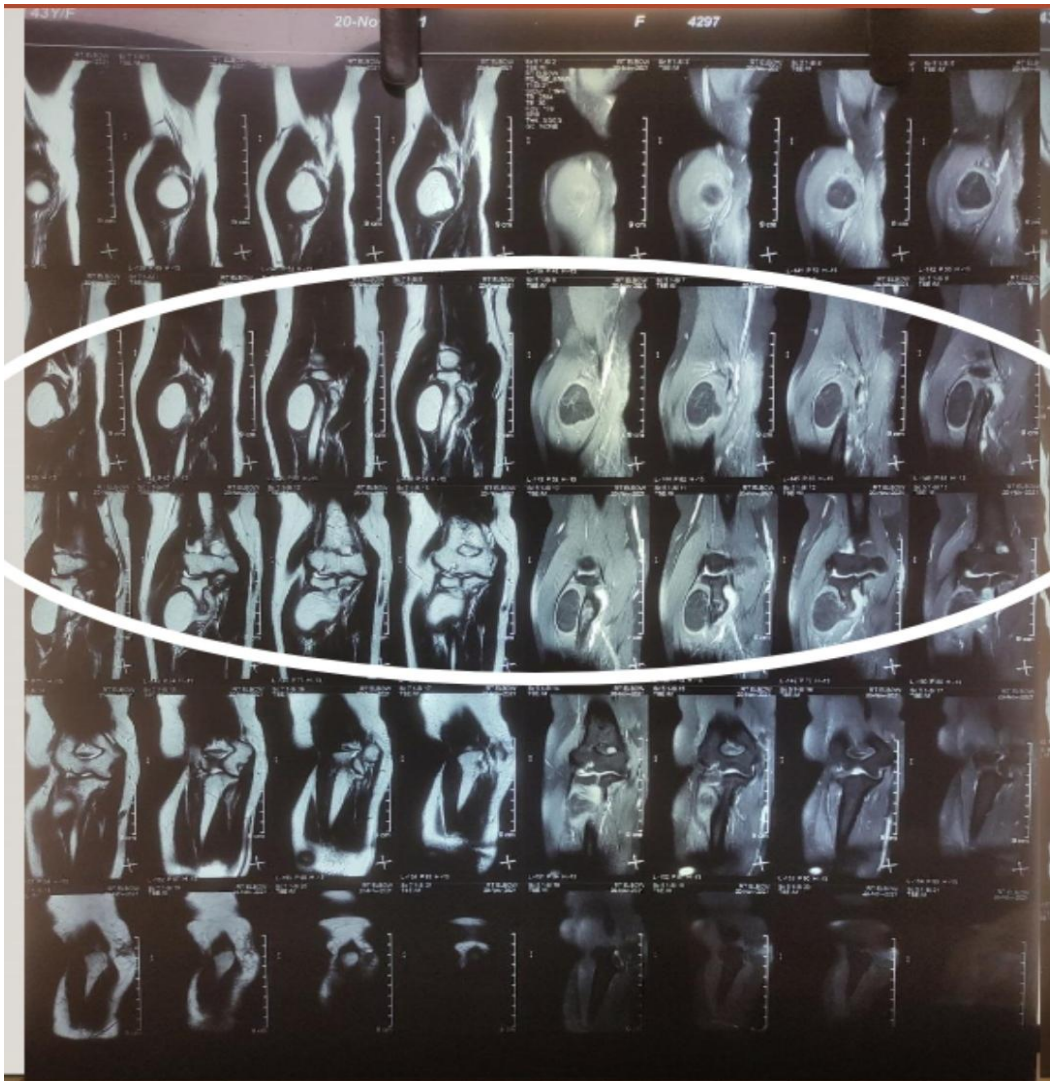

Fig 3: MRI of the proximal forearm showing the lesion encircling the radius bone.

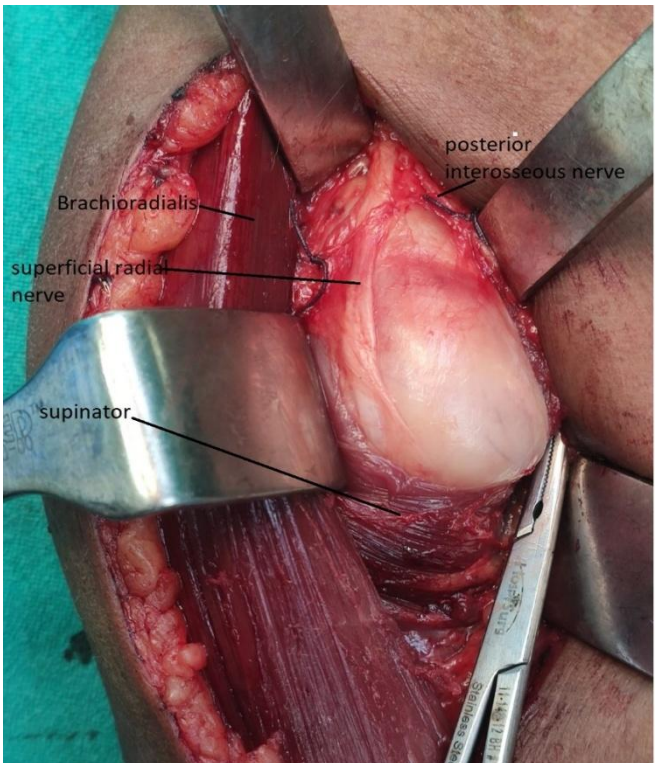

Fig 4: On surgical exposure, lipoma was seen compressing superficial radial nerve and PIN.

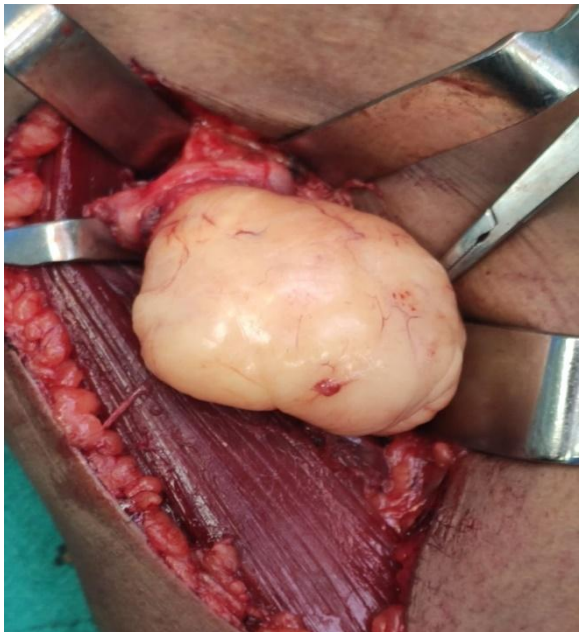

Fig 5: Tumour was removed in-toto from its origin.

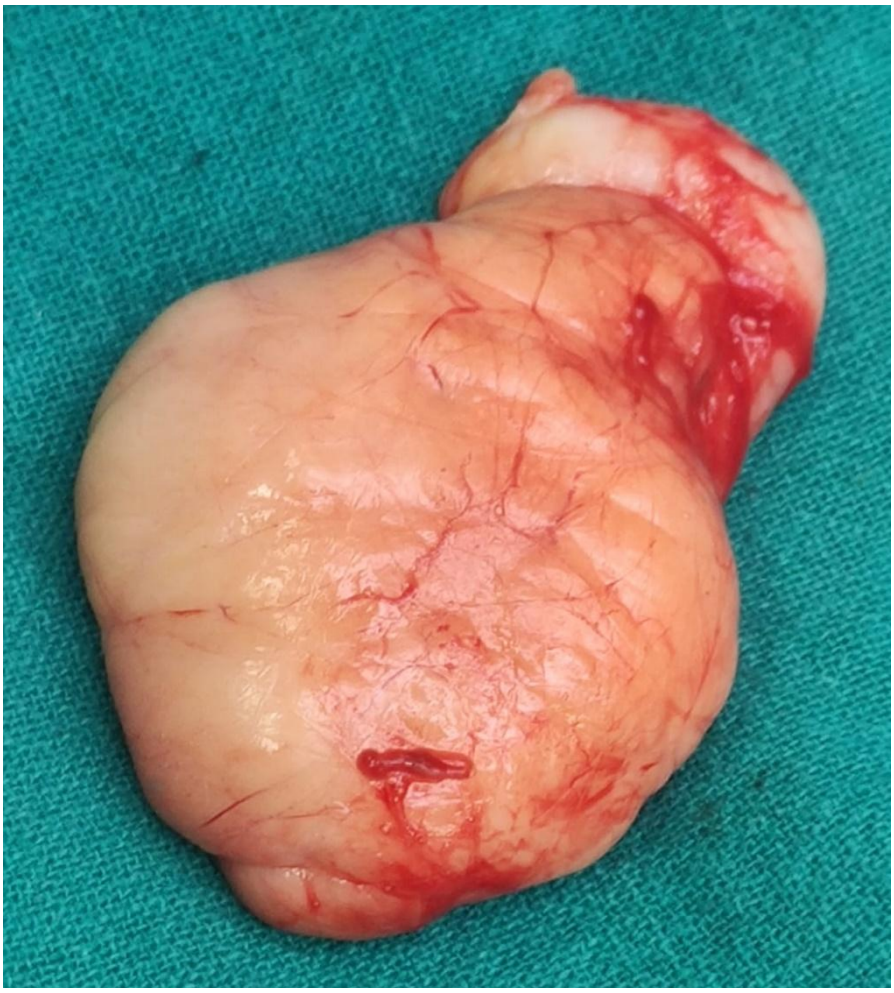

Fig 6: Lipoma after surgical excision.

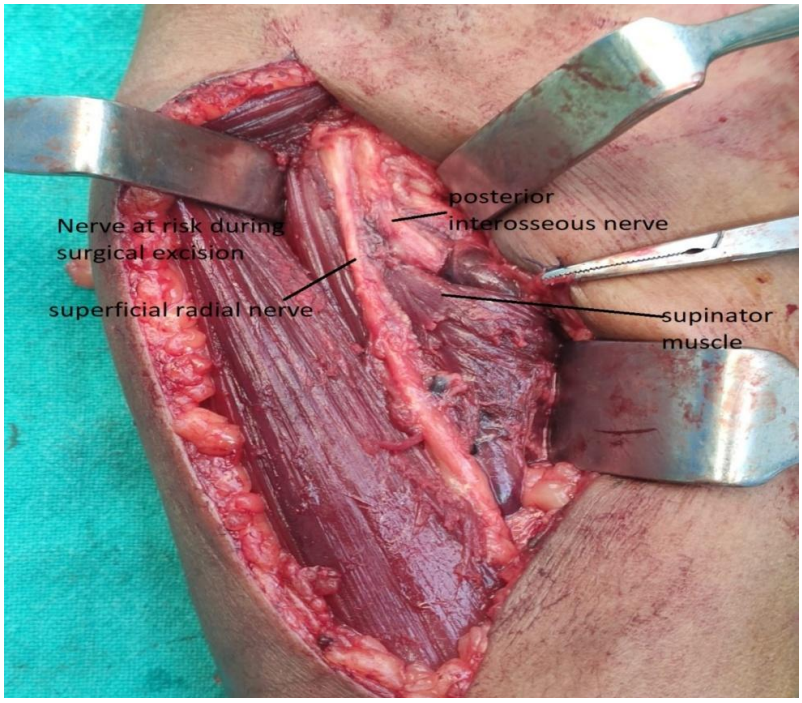

Fig 7: Clinical picture after surgical removal of lipoma.

CONCLUSION:

Therefore, it is pertinent to report a rare case of submuscular giant lipoma deep to supinator muscle in proximal forearm because of its uniqueness in compressing the radial nerve at its division into posterior interosseous and superficial radial nerve and resulting in both motor and sensory symptoms.

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