CASE REPORT

Delayed diagnosed posterior interosseous nerve palsy due to intramuscular myxoma

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SUMMARY

We present a case of posterior interosseous nerve palsy after bowel surgery associated with intramuscular myxoma of the supinator muscle. The initial symptoms of swelling of the forearm made it difficult to distinguish the condition from extravasations after intravenous cannulation. The diagnosis was finally established with nerve conduction studies and MRI 3 months after symptom onset. The patient underwent surgery for removal of the tumour and decompression of the posterior interosseous nerve. The histological examination identified the tumour as intramuscular myxoma and the patient made a full recovery with no recurrence of the lesion until present. Every swelling on the forearm causing neurological disorders is tumour suspected and should be examined clinically as well as electrophysiologically and radiographically. Early surgery and nerve decompression should follow immediately after the diagnosis. In case of intramuscular myxoma, good recovery of function after surgery with low recurrence risk may be expected.

BACKGROUND

Posterior interosseous nerve (PIN) palsy owing to soft tissue is rare, contrary to traumatic nerve lesions or spontaneous entrapment at the level of supinator muscle or the arcade of Frohse.¹

Intramuscular myxoma is a rare benign soft tissue tumour of mesenchymal origin and PIN entrapment owing to intramuscular myxoma varies between 0.10 and 0.13/100 000. The majority of tumours appear between the fourth and sixth decade of life showing a slight female predominance. Predominant location of this solitary slow growing tumour is the thigh and, similar to myxofibrosarcoma, infiltration of the surrounding muscle is common. Multiple locations are very rare.² Also microscopically, the tumour shows low cellular density and avascular zones with myxoid hyperchromatic matrix.^{3–4} Electrophysiological studies are positive in the majority of cases for patients with PIN palsy and may help to determine the level and extend of radial nerve injury.⁵ Imaging studies may be helpful if a mass around the elbow or the proximal part of the forearm is suspected. MRI is the golden standard and helps to show and identify the tumour and its extent before surgery delineates relationship to the surrounding structures.⁶ If MRI is not possible, high-resolution ultrasound may also help to visualise the tumour and differentiate between solid and cystic lesions.⁷ It is not possible to diagnose this tumour prior to histopathological examination.²

CASE PRESENTATION

We present a case of a sudden onset of PIN palsy after bowel surgery. There was no history of trauma concerning the right forearm or hand.

The patient was suffering from Morbus Crohn and underwent partial bowel resection in general anaesthesia. No complication occurred during surgery; but immediately after regaining consciousness postoperatively, the patient noticed a swelling of the right forearm where the intravenous cannula was placed. She was also not able to extend the fingers of the right hand. No neurological consultation took place during the hospitalisation, no splint was applied and the patient was given advice to visit a neurologist if the paresis did not improve. As recommended, she started physiotherapy and cortisone therapy over 1 week, which did not lead to any improvement.

At 1 month after symptom onset, the patient visited a neurologist who diagnosed progressive weakness of the digital extensors and the extensor carpi ulnaris muscle clinically as well as through electrodiagnostic studies. The patient showed wrist drop with weak ability of wrist extension and radial drift, extension lost at the metacarpophalangeal joints of all fingers and the thumb extension and a weak abduction of the thumb without sensory loss.

Radial motor nerve conduction studies demonstrated a reduced amplitude compound motor action potentials from the right radial nerve forearm in the elbow segment and a reduced amplitude compound motor action potential from the abductor pollicis longus muscle after stimulation proximal to the supinator muscle. Electromyography of the extensor carpi ulnaris muscle showed membrane instability with enlarged motor units and polyphasic with increased frequency of recruitment.

The consulting neurologist recommended further radiological studies, an MRI was performed 3 months after symptom onset. The MRI of the right elbow joint and forearm revealed a T2-weighted image, gradient echo T2 MRI hyperintense (figure 1) and a T1-weighted image hypointense tumour approximately 3×2 cm in size infiltrating the M supinator and sheathing the radius and PIN with irregular flimsy mixed cystic and solid contrast enhancement (figure 2).

The patient underwent surgery 3 months after symptom onset. In general anaesthesia and bloodless condition, a curved incision was placed over the supinator muscle. After incision of the fascia and division of the supinator muscle between the superficial and deep heads, the division of the radial nerve into the superficial sensory branch and

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Figure 1 T2-weighted image showing the hyperintense signal change of the right supinator muscle lesion, mimicry of a cystic lesion.

Figure 2 Gadolinium enhanced T1-weighted image with fat suppression image showing heterogeneous enhancement of the lesion.

Figure 3 Tumour exposure.

the deep motor branch was identified—the PIN passing under the arcade of Frohse. Release of the arcade of Frohse and preparation of the tumour with identification of the nerve were performed. The nerve was found alongside the tumour and was flattened against the distal rim of the supinator muscle causing a severe compression of the nerve. The tumour was 2 cm in diameter and had gelatinous consistency and mucoid appearance. Under microsurgical conditions and electrophysiological monitoring, the preparation of deep radial nerve was completed (figure 3) and the tumour completely excised (figure 4).

Histopathological examination showed mesenchymal, hypocellular and hypovascular tumour of bland spindle cells embedded in an avascular myxoid stroma with partially intramuscular growing and was identified as intramuscular myxoma (figure 5). No atypia or pleomorphism was found. Postoperative recovery was uneventful.

DIFFERENTIAL DIAGNOSIS

Soft tissue tumours such as lipomas,⁸ rheumatoid synovitis,⁹ synovial chondromatosis,¹⁰ neurofibromas,¹¹ haemangiomas,¹² intracapsular chondroma¹³ or tumour-like masses such as ganglions,¹⁴ bursitis¹⁵ or even pseudogout¹⁶ can cause PIN palsy.

The differential diagnosis of intramuscular myxoma includes ganglion, neurofibroma and myxoid liposarcoma; it is not possible to diagnose this tumour prior to histopathological examination.²

OUTCOME AND FOLLOW-UP

Excellent regain of neurological function was observed 3 months after surgery. So far, this patient has been free of occurrence at regular follow-up period of 5 years.

Figure 4 Operation field after tumour removal and nerve decompression.

Figure 5 The tumour is composed of spindle-shaped cells and abundant myxoid matrix.

DISCUSSION

Early surgical decompression of the PIN and tumour removal facilitates quick neurological recovery. Diagnostic delay, as described in this case, is common, but still favourable outcome and good recovery of function after surgery might be expected.¹⁷

Early surgery including nerve decompression and tumour removal is indicated for patients with high grade of progressive weakness and the absence of improvement following conservative treatment. In case of tumour compression without neurological disorders, the diagnosis can be achieved with fine needle biopsy as well.²

The surgical approach to the PIN in the forearm may vary depending on the preference of the surgeon. The standard approach preferred at our clinic is the modified Henry's approach—an anterior brachioradialis splitting approach owing to the optimal exposure of the PIN.¹⁸ Small variations in approach may be necessary depending on the tumour location.

Good-to-excellent results with recovery of the function after surgical treatment of PIN may be expected in 90% of cases.¹⁹ A low risk of local recurrence suggests a longer follow-up of the patient.

Learning points

- ▶ Posterior interosseous nerve (PIN) palsy can present with variable symptoms, predominantly occurs in female patients and can be induced by different tumorous masses.
- ▶ Radiological evaluation of intramuscular myxoma can be based on MRI or high-resolution ultrasound.
- ▶ A fine needle biopsy is valuable in unclear cases of tumour masses to provide a preoperative histological diagnosis.
- ▶ The radiological characteristics of intramuscular myxoma are hyperintense tumour in the T2-weighted MRI and hypointense tumour in the T1-weighted images.
- ▶ Final diagnosis of intramuscular myxoma is based on the histological examination.

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Competing interests None.

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REFERENCES

- 1 Cravens G, Kline DG. Posterior interosseous nerve palsies. *Neurosurgery* 1990;27:397–402.
- 2 Schlenz I, Kuzbari R, Holle J, *et al.* Soft tissue tumors with difficult to distinguish boundaries. From myxoma to myxofibrosarcoma: a case report. *Handchir Mikrochir Plast Chir* 2000;32:138–42.
- 3 Wakely PE Jr, Bos GD, Mayerson J. The cytopathology of soft tissue myxomas: ganglia, juxta-articular myxoid lesions, and intramuscular myxoma. *Am J Clin Pathol* 2005;123:858–65.
- 4 Ly JQ, Bau JL, Beall DP. Forearm intramuscular myxoma. *AJR Am J Roentgenol* 2003;181:960.
- 5 Dang AC, Rodner CM. Unusual compression neuropathies of the forearm, part I: radial nerve. *J Hand Surg Am* 2009;34:1906–14.
- 6 Bancroft LW, Kransdorf MJ, Menke DM, *et al.* Intramuscular myxoma: characteristic MR imaging features. *AJR Am J Roentgenol* 2002;178:1255–9.
- 7 Girish G, Jamadar DA, Landry D, *et al.* Sonography of intramuscular myxomas: the bright rim and bright cap signs. *J Ultrasound Med* 2006;25:865–9. quiz 70–1.
- 8 Fitzgerald A, Anderson W, Hooper G. Posterior interosseous nerve palsy due to parosteal lipoma. *J Hand Surg Br* 2002;27:535–7.
- 9 Ishikawa H, Hirohata K. Posterior interosseous nerve syndrome associated with rheumatoid synovial cysts of the elbow joint. *Clin Orthop Relat Res* 1990;254:134–9.
- 10 Jones JR, Evans DM, Kaushik A. Synovial chondromatosis presenting with peripheral nerve compression—a report of two cases. *J Hand Surg Br* 1987;12:25–7.
- 11 Lallemand RC, Weller RO. Intraneural neurofibromas involving the posterior interosseous nerve. *J Neurol Neurosurg Psychiatry* 1973;36:991–6.
- 12 Busa R, Adani R, Marcuzzi A, *et al.* Acute posterior interosseous nerve palsy caused by a synovial haemangioma of the elbow joint. *J Hand Surg Br* 1995;20:652–4.
- 13 Madhavan P, Leslie JJ. Intracapsular chondroma of the elbow producing a posterior interosseous nerve palsy. *J Hand Surg Br* 1998;23:107–8.
- 14 Steiger R, Vogelien E. Compression of the radial nerve caused by an occult ganglion. Three case reports. *J Hand Surg Br* 1998;23:420–1.
- 15 Spinner RJ, Lins RE, Collins AJ, *et al.* Posterior interosseous nerve compression due to an enlarged bicipital bursa confirmed by MRI. *J Hand Surg Br* 1993;18:753–6.
- 16 Taniguchi Y, Yoshida M, Tamaki T. Posterior interosseous nerve syndrome due to pseudogout. *J Hand Surg Br* 1999;24:125–7.
- 17 Werner P, Furtner M, Loscher WN, *et al.* A case of posterior interosseous nerve palsy: good recovery despite diagnostic delay. *J Neurol Neurosurg Psychiatry* 2007;78:1408–9.
- 18 Mekhail AO, Ebraheim NA, Jackson WT, *et al.* Vulnerability of the posterior interosseous nerve during proximal radius exposures. *Clin Orthop Relat Res* 1995;315:199–208.
- 19 Hashizume H, Nishida K, Nanba Y, *et al.* Non-traumatic paralysis of the posterior interosseous nerve. *J Bone Joint Surg Br* 1996;78:771–6.

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