Case Report | Journal of Orthopaedic Case Reports 2025 March:15(3):Page 107-110

Tardy Posterior Interosseous Nerve Palsy as a Complication of Unreduced Monteggia Fracture: A Case Report and Literature Review

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Learning Point of the Article:

Delayed PIN palsy can develop in patients with old, unreduced Monteggia fractures, highlighting the need for a thorough medical history and treatment focused on relieving nerve compression while preserving the patient's adapted function.

Abstract

Introduction: While acute posterior interosseous nerve (PIN) palsy is a recognized complication of Monteggia fractures, delayed or tardy PIN palsy due to persistent radial head dislocation is exceedingly uncommon.

Case Report: We describe a case of tardy PIN palsy 29 years after an unreduced Monteggia fracture, Bado type I.

Conclusion: While rare, delayed PIN palsy can occur in patients with old, unreduced Monteggia fractures. This underscores the need for a thorough medical history to detect potential causes, as long-standing injuries may eventually present symptoms. Treatment should target the underlying compression from the fracture dislocation while preserving the patient's adapted function.

Keywords: Tardy, delayed, posterior interosseus nerve palsy, Monteggia, radial head dislocation.

Introduction

While acute posterior interosseous nerve (PIN) palsy is a recognized complication of Monteggia fractures, delayed or tardy PIN palsy due to persistent radial head dislocation is exceedingly uncommon [1-3]. The initial case of tardy PIN palsy linked to a Monteggia fracture was documented by Lichter and Jacobsen [4], with only a handful of additional cases reported in English literature since then [5-8].

The patient was informed that data concerning the case would be submitted for publication, and she provided consent.

Case Report

A 57-year-old female presented with a 1-year history of progressive right-hand weakness. The patient worked as a seamstress in a textile factory and had recently increased her workload before the onset of symptoms.

Her initial symptom was difficulty extending her fingers while performing routine tasks at home. The patient recalled a right elbow fracture from a car accident approximately 29 years earlier, which had been treated conservatively.

On examination, the patient demonstrated complete loss of extension in her wrist, thumb, and fingers. Her elbow's range of motion was restricted from 30° of extension to 140° of flexion, a condition unchanged since her initial injury. Sensation in the superficial radial nerve distribution remained intact.

Electromyography confirmed PIN palsy. Radiographs showed that the radial head was dislocated anteriorly, consistent with a Bado type I Monteggia fracture (Fig. 1).

Access this article online

Website: www.jocr.co.in

DOI: https://doi.org/10.13107/jocr.2025.v15.i03.5350

Author's Photo Gallery

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Submitted: 03/12/2024; Review: 14/01/2025; Accepted: February 2025; Published: March 2025

DOI: https://doi.org/10.13107/jocr.2025.v15.i03.5350

Figure 1: Lateral radiograph showing an anterior dislocation of the radial head.

A magnetic resonance imaging scan revealed that the dislocated radial head was pressing on the PIN, and a swollen area existed from the compression area to just before the nerve entered the supinator muscle.

We performed a Henry approach on the right elbow. The anterior cutaneous nerve of the forearm was isolated. The interval between the brachioradialis and biceps brachii was developed. A thorough neurolysis was carried out, resulting in the complete release of Frohse's arcade. A neuroma of the PIN was found just anterior to the radial head (Fig. 2). An anterior capsulotomy and radial head excision were performed since the PIN was under tension due to anterior head dislocation and subsequent compression.

Postoperatively, a 2-week immobilization using a plaster cast was performed, and afterward, a dynamic radial nerve splint was used for 4 months. The patient was referred to physical therapy, which was initiated 1 month after the procedure.

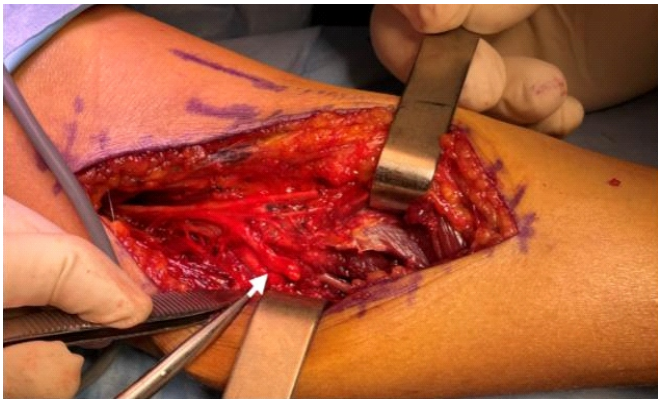

Figure 2: Neuroma of the posterior interosseous nerve (arrow).

At 1 month postoperatively, there was a residual improvement in active finger extension. By 4 months, the patient had regained significant mobility in the fifth to the third finger. At 7 months, she had recovered thumb and index finger mobility. A notable improvement was evident 1 year after the operation, with complete recovery of the thumb, finger, and wrist extensions (Fig. 3). Furthermore, there was a modest improvement regarding elbow mobility, with only the last 10° of extension remaining limited.

Discussion

Non-traumatic PIN palsy can result from supinator muscle compression, benign tumors, rheumatoid arthritis, neuralgic amyotrophy, repetitive motion injuries, or residual radial head dislocation in Monteggia fractures [9-11].

To the authors' knowledge, only six cases of delayed PIN palsy related to an old, unreduced radial head in Monteggia fractures have been reported in the English literature [4-8]. Table 1 summarizes the case presentation.

In all previous reports, Monteggia fractures occurred during childhood, with a mean age of 6 years (range 4–7 years). Our case represents the first occurrence in which the initial fracture occurred in adulthood, at 28 years of age. The patient has no recollection of any other previous upper limb trauma, and she affirms that she had normal elbow mobility before this incident.

Figure 3: Thumb, wrist and elbow extension 1 year postoperative.

	Sex	Age of palsy presentation (years)	Age of Monteggia fracture (years)	Interval (years)	Duration of symptoms (months)	Treatment	Length of postoperative recovery (months)
Litcher and Jacobsen, 1975	Male	46	7	39	12	Excision of the radial head and neurolysis	2.5
Austin, 1976	Male	72	7	65	1	Excision of the radial head and neurolysis	9
Holst-Nielsen and Jensen 1984	Female	46	7	39	9	Neurolysis	4
		34	4	30	24	Neurolysis	
							11
Hashizume et al., 1995	Female	44	5	39	2.5	Excision of the radial head and neurolysis	1.5
Cho et al., 2009	Female	46	6	40	1	Excision of the radial head and neurolysis	8

Table 1: Case reports of tardy PIN palsy associated with radial head dislocation in a Monteggia fracture in English literature.

The average period between the initial fracture and the onset of neurological symptoms in previous cases was 42 years, with a mean age of presentation at 48 years old and an average recovery period after surgery of 6 months. In our case, the PIN palsy manifested at 57 years old, with an interval of 29 years between the initial Monteggia fracture, considerably shorter than previously reported cases. This is likely due to the later occurrence of the initial fracture.

Curiously, symptoms started so many years after the initial injury. We hypothesize that the development of scar tissue or changes in the position of the PIN relative to surrounding structures may have gradually increased the pressure on the nerve over time, leading to the onset of symptoms many years after the original injury. Repeated microtrauma or overuse may also be associated with symptoms onset. Both Litcher and Austin reported lesions involving manual laborer patients. In the two cases reported by Holst–Nielsen, the first patient was a housewife who had just started working as a maid before the onset of symptoms, and the second one was a secretary who had changed to babysitting. In the case reported by Cho et al., the patient was a housewife whose symptoms developed after strenuous work helping her family prepare for a wedding. In our case, the patient reported increased effort in her job-related tasks and household chores. It is possible, thus, that trauma resulting from strenuous physical activity can exacerbate the formation of scar tissue, aggravate degenerative changes, or cause edema in the affected area, which can increase the pressure on the PIN and trigger the onset of symptoms.

For surgical treatment, we opted for radial head excision combined with neurolysis, as the radial head contributed to ongoing nerve compression and deformity. Neurolysis alone may be appropriate when compression arises primarily from soft tissue, as seen in both cases reported by Holst–Nielsen, where the Frohse ligament was the primary cause. In all other reported cases, radial head excision was performed.

Conclusion

Although these lesions are rare, we must be vigilant and maintain a high index of suspicion for the possibility of delayed PIN palsy in patients with old, unreduced Monteggia fractures. It emphasizes the crucial importance of a thorough and accurate medical history to identify potential causes, as injuries that have persisted asymptomatically over the years may manifest symptoms over time.

Clinical Message

The treatment of tardy PIN palsy due to persistent radial head dislocation should address the underlying cause, specifically the compression resulting from an old fracture dislocation, all the while ensuring that the function of a patient who has already adapted to this condition is not compromised.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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Conflict of Interest: Nil
Source of Support: Nil

Consent: The authors confirm that informed consent was obtained from the patient for publication of this case report

How to Cite this Article

Macedo F, Rocha M, Lucas J, Rodrigues LF, Varanda P, Ribeiro E.Tardy Posterior Interosseous Nerve Palsy as a Complication of Unreduced Monteggia Fracture: A Case Report and Literature Review. Journal of Orthopaedic Case Reports 2025 March;15(3): 107-110.