Finger drop sign—Characteristic pattern of distal weakness in Guillain-Barré Syndrome: A case report and review of the literature

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Abstract
Guillain-Barré Syndrome is an acquired acute autoimmune polyradiculoneuropathy that commonly presents with limb weakness and occasional cranial nerve, respiratory and autonomic involvement. Although the classic description of Guillain-Barré Syndrome is that of a demyelinating neuropathy with ascending weakness, predominant bilateral finger drop as presenting feature has rarely been reported. A characteristic pattern of weakness involving the extensor components of the fingers known as “finger drop sign” has been first described to be specific in acute motor axonal neuropathy form of Guillain-Barré Syndrome in the literature. We report a case of acute motor-sensory axonal neuropathy, which showed characteristic pattern of predominant finger extensor weakness, and provide a summary of all reported cases to date. While previous reports suggested that this is a sign that carries good prognosis, our case report suggested otherwise as the patient succumbed to respiratory and autonomic complications. Further studies are needed to evaluate the clinical significance of this peculiar sign.

Keywords
Guillain-Barré Syndrome, peripheral neuropathy, finger drop, acute motor-sensory axonal neuropathy

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Introduction
Guillain-Barré Syndrome (GBS) is an acute immune mediated polyneuropathy with several variant forms. It is thought to result from an immune response from a preceding infection that cross reacts with components of the peripheral nerves due to molecular mimicry. It is further classified based on the electrophysiological findings into demyelinating and axonal forms. They include acute inflammatory demyelinating polyneuropathy (AIDP), acute motor axonal neuropathy (AMAN) and acute motor-sensory axonal neuropathy (AMSAN).⁠¹ Progressive motor weakness and areflexia are considered two essential features to diagnose GBS.⁠³ However, selective weakness of finger extensors, also known as “finger drop sign,” has been reported in the literature as a specific distinguishing feature of AMAN. This pattern consisted of severe finger extensor weakness at the metacarpophalangeal and interphalangeal joints in the presence of a relatively normal power in finger flexion, wrist flexion and wrist extension.⁠³ Despite previous studies that stressed upon this uncommon sign being specific to AMAN and carries favorable prognosis, our encounter shows otherwise with her having a fulminant disease course and eventually succumbed to dysautonomia and infection.

Case
A 49-year-old woman with no known medical illness presented with 1-week history of worsening bilateral lower limb numbness and weakness. It is preceded by a short episode of febrile illness 2 weeks back associated with vomiting. Her condition deteriorated 3 days prior to admission with development of progressive bilateral hand clawing, facial weakness, slurred speech and dysphagia. The pattern of weakness was ascending in nature accompanied by numbness and burning sensation over the extremities.

On examination, she was conscious. Bilateral lower motor neuron facial muscle weakness was noted resulting in mask-like facies. Her speech was slurred with palatal weakness.

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suggestive of bulbar involvement. There was symmetrical upper extremity distal weakness characterized by severe finger extensor weakness (Medical Research Council (MRC) grade 2) in the presence of relatively normal wrist extension, wrist flexion and finger flexion. The weakness is most profound over the metacarpophalangeal and interphalangeal joints. The unopposed finger flexion resulted in a “finger drop” appearance (Figure 1(a) and (b)). On a different note, such pattern of weakness is reversed over the toes. Differential flexor paresis is appreciated with up going of the toes (Figure 2). There is an accompanying mild proximal upper and lower extremity weakness graded as MRC 4. Reflexes over the upper and lower limbs could not be elicited, and plantar responses were bilaterally in flexion. Sensory system examination showed hyperesthesia in the distal parts of the extremities.

Nerve conduction study (NCS; Table 1) was suggestive of AMSAN. A full blood count, renal and liver profile, electrolytes and serum B12 level were well within normal limits. Underlying connective tissue disease was ruled out with a negative antinuclear antibody (ANA). Her cerebrospinal fluid (CSF) examination revealed albumino-cytological dissociation (acellular with protein of 1.53 g/L). Serum anti-ganglioside antibodies (GQ1b, GT1a, GD1a, GM1) were not detected. She was promptly commenced on intravenous immunoglobulin (IVIG; 400mg/kg/day) for 5 days. Unfortunately, she developed autonomic dysfunction with acute fluctuations in blood pressure and heart rate within the first 3 days of admission and soon went into respiratory paralysis requiring mechanical ventilation. Course of hospitalization was complicated with ventilator-associated pneumonia and she unfortunately succumbed to sepsis after 9 days of hospitalization.

Discussion

A characteristic pattern of weakness involving the extensor components of the fingers known as “finger drop sign” has been first described to be specific in AMAN form of GBS in the literature. This pattern consists of finger extensor weakness in the presence of relatively preserved power in finger
flexion, wrist flexion and extension. In a case series of 84 patients with GBS, all 12 patients with AMAN variant were found to have the “finger drop sign.” The authors suggested that this sign is relatively specific for AMAN as all of their patients demonstrated this typical pattern of distal weakness with four of them had clawing of the hand as their presenting complaint. Dubey et al. also reported similar findings in a 9-year-old child with similar electrophysiological findings consistent with AMAN. However, a review of available literature shows that this pattern of distal muscle weakness is not exclusively found in AMAN. Three case reports described “finger drop sign” in AIDP with demonstrable conduction blocks, delayed distal latencies and slowed conduction velocities on electrophysiological studies. Sensory involvement was variable in these case reports. Similar signs were also described in a 14-year-old child with AMSAN variant GBS.

All of the observational studies and case reports mentioned above demonstrated favorable outcomes in all patients, where none of them progressed to respiratory paralysis requiring ventilatory support. All patients were ambulant at follow-up with recovery of extensor weakness in most patients (Table 2). There are no fatalities reported, suggesting that prognosis is favorable in patients who manifest such characteristic physical sign. This is in contrary to our patient who developed fulminant complications by day 10 of illness. Although the severity of hand clawing was not objectively measured in any of the studies, it is postulated that our patient who presented with severe progressive clawing and deformity of the hand had poorer clinical outcome. It is also peculiar to note that this patient exhibited differential weakness over the toes with predominant weakness involving the flexors, an observation that has not been reported before. We also acknowledge that this is the first fatality reported among all case series and the first adult patient with AMSAN who manifested the “finger drop sign.”

**Conclusion**

We have observed the “finger drop sign” in our patient with electrophysiological proven AMSAN variant of GBS.

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**Table 1. NCSs’ results (right side only).**

| Nerve/sites       | Latency (µs) | Amplitude (µV) | Distance (cm) | Velocity (m/s) |
|-------------------|--------------|----------------|---------------|----------------|
| Motor NCS         |              |                |               |                |
| Right median      |              |                |               |                |
| 1. Wrist          | 18.55        | 1.0            | 21            | 44.7           |
| 2. Elbow          | 23.25        | 0.9            |               | 44.7           |
| Right ulnar       |              |                |               |                |
| 1. Wrist          | 4.55         | 3.7            | 21            | 64.1           |
| 2. Elbow          | 8.45         | 0.9            | 25            | 64.1           |
| Right common peroneal |        |                |               |                |
| 1. Ankle          | 8.10         | 1.3            | 36            | 47.1           |
| 2. Fib head       | 15.60        | 1.1            | 30            | 40.0           |
| Right tibial      |              |                |               |                |
| 1. Ankle          | 5.15         | 5.2            | 30            | 40.0           |
| 2. Knee           | 12.80        | 3.5            | 36            | 47.1           |
| Sensory NCS       |              |                |               |                |
| Right sural (lateral malleolus) | 2.8 | 9.9           | 11            | 39.3           |

NCS: nerve conduction study.
Sensory NCS of the upper limb could not be elicited.

**Table 2. Reports of GBS cases presented with selective finger extensor weakness: “finger drop sign.”**

| Author            | Number of cases | GBS variant                        | Mean age | Outcome                      |
|-------------------|-----------------|------------------------------------|----------|------------------------------|
| George et al. 3   | 10              | AMAN                               | 33       | Good with recovery           |
| Dubey et al. 4    | 1               | AMAN                               | 9        | Good with recovery           |
| Paliwal et al. 5  | 2               | AIDP with sensory involvement      | —        | Good with recovery           |
| Tsivgoulis et al. 6 | 1            | AIDP with sensory involvement      | 38       | Good with recovery           |
| Galassi et al. 7  | 5               | AIDP without sensory involvement   | 50       | Good with recovery           |
| Incecik et al. 8  | 1               | AMSAN                              | 9        | Good with recovery           |

GBS: Guillain-Barré Syndrome; AMAN: acute motor axonal neuropathy; AIDP: acute inflammatory demyelinating polyneuropathy; AMSAN: acute motor-sensory axonal neuropathy.
Consistent with other authors, our findings strengthen that this sign is not only specific to AMAN and could not reliably distinguishes the axonal from demyelinating form of GBS. In resource limited setting where electrophysiological study may not be immediately available, such characteristic sign can be useful to diagnose and recognize this common disorder in a timely and appropriate manner. However, further evaluation is needed to ascertain the specificity and sensitivity of this sign.

Declaration of conflicting interests
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Ethics approval
Our institution (Hospital Sultanah Bahiyah) does not require ethical approval for reporting individual cases or case series.

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Informed consent
Written informed consent has been obtained from the patient and her husband prior to her demise. Informed consent has been obtained to publish her information and images throughout the course of her illness. The written informed consent has been archived and stored in our hospital’s record office.

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