

## Introduction

Spinal cord injury has been described in only 2–5% of electrical injuries.<sup>1</sup> Its presentation is often delayed for several days to weeks after the initial injury. Recovery is also variable. Prompted by two recent patients, we sought to review our center’s electrical injury experience.

## Case # 1

- 60 year old male
- Contact with a high voltage line.
- Prolonged extraction up to 40 min,
- Intubated in field for extensive wounds.
- Extensive burns to the left, back, chest, bilateral LE.
- No evidence of fractures or intracranial pathology on CT.
- OR for fasciotomy, escharotomy of the chest and abdomen, and debridement.
- **HD 1:** Extubated, no evidence of neurological deficit.
- Multiple procedures, including left UE amputation
- **HD 7:** Decreased movement in both LE, which progressed to complete paralysis of both LE
- MRI showed changes in the thoracic spine suggestive of delayed spinal cord injury.
- The patient and family decided to continue with comfort care.



Motor Strength (R/L)	
Deltoids	5/-
Triceps	5/-
Biceps	5/-
Wrist Extension	5/-
Finger Extension	5/-
Finger Flexion	5/-
Interossei	5/-
APB	5/-
Hip Flexion	0/0
Hip Extension	0/0
Knee Flexion	0/0
Knee Extension	0/0

## Conclusion

Electrical injury patients with neurologic signs and symptoms should be closely evaluated and followed.

## Methods

- Retrospective study
- Reviewed 260 electrical injury patients admitted to our burn center from 12/2002 to 7/2019.
- Variables: demographics; admission, injury and treatment data; hospital length of stay (LOS); complications, including infection, graft loss and neurologic injury information if any; and mortality.
- Spinal cord injury case reports (n = 2): hospital course and follow up data were collected. Pertinent imaging and neurology consultation were noted.
- Descriptive statistics were obtained using SPSS.

## Case # 2

- 58 year old male
- Electrical injury sustained when electrical power transformer arced to concrete spreader
- Loss of consciousness, cardiac arrest, CPR with ROSC
- 10 % burn injuries to right shoulder, neck, bilateral hands, bilateral lower legs and feet. Immediate fasciotomies of BLE
- No acute pathology on CT scan of brain and C-spine
- **HD 2:** Weakness in his right toes, progressed until he was unable to move both LE. with a stocking pattern sensory loss in both LE.
- MRI showed no abnormal signal; EMG showed intact nerves
- Neurology diagnosis: possible multiple mononeuropathies
- Multiple ORs for bilateral amputations and flap coverage of right shoulder
- **HD 22:** Discharged from the hospital, currently being followed by Rehab and improved, almost full motor strength in his bilateral LE



**Limb Muscles: (R/L)**  
Shoulder abduction 4+ (possibly limited by pain)/5  
Elbow flexion 5/5  
Elbow extension 5/5

**No appreciable movement in lower extremities**

**Sensation:** Intact in arms and upper thighs, impaired in stocking glove distribution below knee  
**Reflexes:** (R/L) Biceps 2+/2+ Brachioradialis 2+/2+ Patellar 2+/2+

## Results

Demographics	Overall population n = 162	
	Mean (SD)	N (%)
Age, y	35.3 ± 15.5	
Male		149 (92)
Caucasian		144 (88.9)
%TBSA	6.1 ± 11.4	
Inhalation Injury		4 (2.5)
ISS	5.7 ± 10.6	
LOS (d)	5.8 ± 8.7	
ICU (d)	5.8 ± 8.8	
Ventilation (d)	4.4 ± 7.1	
Transfer		125 (77.2)
<b>Injury details</b>		
Voltage	high	55 (34)
	Low	55 (34)
	unknown	52 (32)
Cardiac arrest		20 (12.3)
Loss of consciousness		68 (42)
<b>Outcomes</b>		
Arrhythmia		4 (2.5)
Compartment syndrome		11 (6.8)
Amputation		20 (12.3)
Neurological deficit noted in-patients		11 (6.8)
Neurological deficit noted out-patients		12 (7.4)
Delayed spinal cord injury		2 (1.2)
Discharge disposition		
	Home	110 (67.9)
	Home with healthcare	22 (13.6)
	Rehab/ SNF	10 (6.2)
	Acute Care Hospital	3 (1.9)
	Other/unknown	11 (6.8)
Mortality		6 (3.7)

## Significance

- Neurological sequelae after electrical injuries, although uncommon, have very unpredictable courses.<sup>2</sup>
- Both patients and providers have to be educated about the need to report and investigate any symptoms, no matter how minor

## Discussion

- Neurological complications after electrical injuries are rare and vary in presentation and outcomes.
- Complete flaccid paralysis of the lower extremities late after electrical injury is rare and associated with variable degrees of recovery.
- Further studies are warranted to better understand the long term outcomes of electrical injury.

## References

- 1- Shish et al. J Burn Care Res. 2017 Jan/Feb;38(1):e293-e298.
- 2- Radulovic et al. BMJ Open. 2019 May 14;9(5):e025990