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# Injury to the left sciatic and right common peroneal nerves combined with multifocal rhabdomyolysis in a survivor of the Itaewon crowd crush: A case report

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On October 29, 2022, many people poured into the streets in Itaewon, Seoul, Korea to celebrate the Halloween after COVID-19 pandemic sanctions. They surged into a narrow street and the crowd crush killed 158 people and injured 355 people by a domino effect. After the accident, from a medical viewpoint, there were few discussions about the injuries. Not only psychologic trauma but also physiological neurologic sequelae can aggravate the burdens of the survivors. Focal peripheral neuropathy commonly develops by various etiologies, such as prolonged compression, and direct blows. No case of focal neuropathy resulting from a crowd crush has been reported. Herein, we report on a survivor of a crowd crush with the uncommon neurologic deficits of left sciatic and right common peroneal neuropathies.

## Case presentation

A 27-year-old woman presented to the emergency room, complaining of pain from her lower back to whole lower extremities with paraparesis and paresthesia. Her blood test showed marked elevation of creatine kinase and liver enzymes. Her initial physical examination showed muscle strength of hip flexion with a Medical Research Council (MRC) grade of 5/4, hip extension of 5/4, knee flexion of 5/2, ankle dorsiflexion of 1/1, big toe extension of 0/1, and ankle plantar flexion of 4/2 on her right/left sides, respectively. She had decreased sensations over the dorsum of the bilateral foot extending into the lateral calf, with tingling sensations on the left sole. Tinel's sign was observed at the right fibular head. To clarify the diagnosis, the patient underwent Magnetic resonance imaging (MRI) of the pelvis and bilateral knee, including magnetic resonance neurography (MRN). MRN demonstrated injury to the left sciatic and right peroneal nerves (Fig. 1A,C, Fig. 2A,B). MRI revealed multifocal signal changes in the abdominalis and pelvic girdle muscles suggestive of rhabdomyolysis (Fig. 1B,D). High signal intensities were observed in the T2-weighted images in the right peroneal-innervated muscles (Fig. 2C). Electrophysiologic studies also revealed lesions in the left sciatic nerve and right peroneal nerve with conduction block and segmental slowing around the fibular head (Table 1).

After comprehensive rehabilitation for 3 months, her muscle strength improved: ankle dorsiflexion with a MRC grade of 3/4, big toe extension of 2/5, and ankle plantar flexion of 5/4 on her right/left sides, respectively. In addition, follow-up electrophysiologic studies demonstrated improvement of compound muscle action potential amplitude of right peroneal nerve (Table 1).

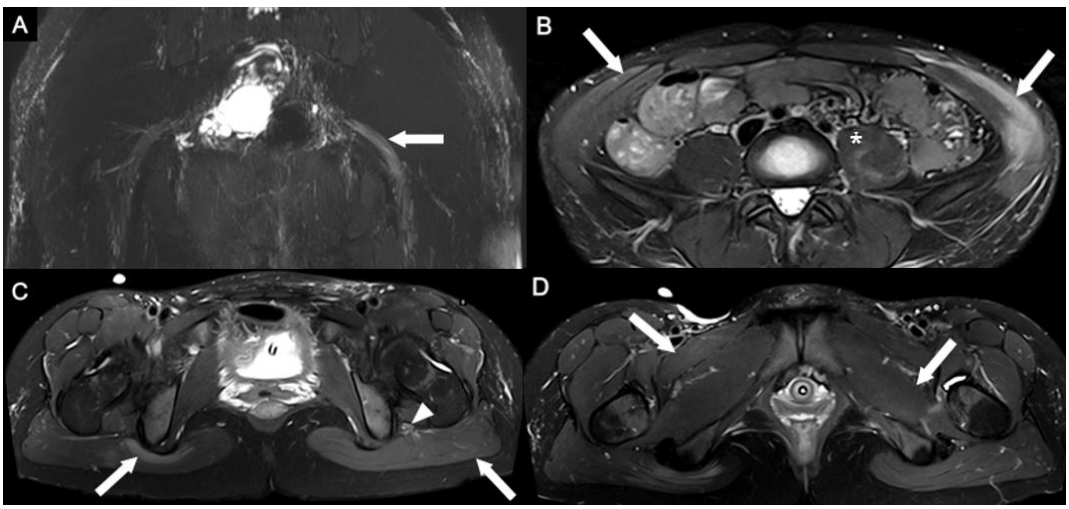


**Figure 1.**
Magnetic resonance imaging of the pelvis (A) Swelling of the left sciatic nerve (white arrow) from the sciatic foramen to the proximal thigh compared with the right sciatic nerve on an MIP image from a coronal reconstructed 3D-STIR SPACE image. (B) Increased signal intensity in the bilateral external/internal oblique abdominis (white arrow) and left psoas muscle (asterisk) on an axial T2-weighted image with TSE fat suppression. (C) Diffuse swelling of the left sciatic nerve (white arrowhead) surrounded by diffuse edema and high signal change in the left gluteal muscle (white arrow) compared with only a focal signal change near the ischial tuberosity of the right gluteal muscle (white arrow) on an axial T2-weighted slice with TSE fat suppression. (D) Increased signal intensity in the right pectineus (white arrow) and left quadratus femoris muscles (white arrow). MIP=maximum intensity projection, 3D=three-dimensional, STIR=short tau inversion recovery, SPACE=sampling perfection with application optimized contrasts with variable flip-angle, TSE=turbo spin echo)

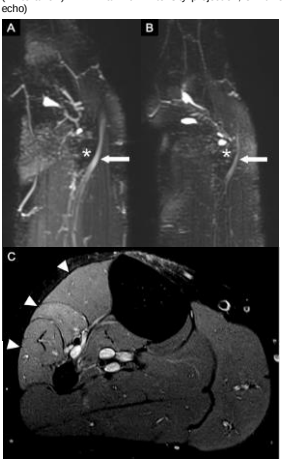


**Table 1.** Results of the nerve conduction study and needle electromyography

| Nerve conduction study | Stimulation site | Recording site | First study (Post-trauma, 2 weeks) Amplitude motor (mV), sensory (μV) | First study (Post-trauma, 2 weeks) Velocity, m/s | Follow-up study (Post-trauma, 3 months) Amplitude motor (mV), sensory (μV) | Follow-up study (Post-trauma, 3 months) Velocity, m/s |
|---|---|---|---|---|---|---|
| **Motor conduction study** | | | | | | |
| R. peroneal | 4cm below FB/ 6cm above FB | TA | 3.7/1.0 | 39.2 | 4.3/2.6 | 46.9 |
| L. peroneal | 4cm below FB/ 6cm above FB | TA | 6.2/6.1 | 66.2 | 6.0/5.9 | 64.1 |
| R. tibial | Ankle / Pop. Fossa | AH | 21.1/19.1 | 47.0 | 20.0/16.5 | 44.4 |
| L. tibial | Ankle / Pop. Fossa | AH | 20.7/17.0 | 46.4 | 20.5/16.8 | 45.2 |
| **Sensory conduction study** | | | | | | |
| R. superficial peroneal | Lower leg | Ankle | 7 | | 7.9 | |
| L. superficial peroneal | Lower leg | Ankle | 23.3 | | 23.4 | |
| R. sural | Lower leg | Ankle | 31.2 | | 30.6 | |
| L. sural | Lower leg | Ankle | 35.7 | | 35.1 | |

| Needle electromyography Muscle | First study (Post-trauma, 2 weeks) Spontaneous Activity Fibs | First study (Post-trauma, 2 weeks) Spontaneous Activity PSWs | First study (Post-trauma, 2 weeks) Interference Pattern | Follow-up study (Post-trauma, 3 months) Spontaneous Activity Fibs | Follow-up study (Post-trauma, 3 months) Spontaneous Activity PSWs | Follow-up study (Post-trauma, 3 months) Interference Pattern |
|---|---|---|---|---|---|---|
| R. Tibialis anterior | 2+ | 2+ | No activity | 2+ | 2+ | Reduced |
| R. Peroneus longus | 2+ | 2+ | No activity | 2+ | 2+ | R/C |
| R. Extensor hallucis longus | 3+ | 3+ | Single | 3+ | 3+ | Single |
| R. Medial gastrocnemius | - | - | Full | - | - | Full |
| R. Vastus medialis | - | - | Full | NT | NT | NT |
| R. Biceps femoris short head | 2+ | 2+ | Reduced | - | - | Full |
| R. L5-S1 paraspinal | - | - | NT | NT | NT | NT |
| L. Tibialis anterior | 3+ | 3+ | Single | 1+ | 1+ | Reduced |
| L. Peroneus longus | 2+ | 2+ | Single | 1+ | 1+ | Reduced |
| L. Extensor hallucis longus | 2+ | 2+ | Single | 2+ | 2+ | Reduced |
| L. Medial gastrocnemius | 1+ | 1+ | Single | 1+ | 1+ | Reduced |
| L. Vastus medialis | - | - | Full | NT | NT | NT |
| L. Biceps femoris short head | 2+ | 2+ | Reduced | 1+ | 1+ | R/C |
| L. L5-S1 paraspinal | 1+ | 1+ | NT | NT | NT | NT |

R: right, L: left, FB: fibular head, Pop.: popliteal, TA: tibialis anterior, AH: abductor hallucis, Fib: fibrillation, PSW: positive sharp wave, R/C: reduced to complete, NT: not tested

**Figure 2.**
Magnetic resonance imaging of the knee (A, B) Swelling with enhancement of the right common peroneal nerve (A, white arrow), which winds around the lateral aspect of the fibular head (asterisk), compared with the left common peroneal nerve (B, white arrow) on an MIP image from a coronal-reconstructed 3D STIR SPACE image. (C) Ill-defined hyper signal intensity changes in right peroneal-innervated muscles (tibialis anterior, extensor digitorum longus, and peroneal longus) (white arrow heads) compared with no signal change in tibial-innervated muscles on the PD axial TSE fat-suppression MR image. MIP=maximum intensity projection, 3D=three-dimensional, STIR=short tau inversion recovery, SPACE=sampling perfection with application optimized contrasts with variable flip-angle evolutions, PD=proton density, TSE=turbo spin echo

## Conclusions

We report an unusual case of compressive neuropathy combined with rhabdomyolysis caused by a crowd crush. It is important for physicians to localize the compressive neuropathy in patients with rhabdomyolysis and neurologic deficits. Careful physical examination, electrophysiologic and imaging studies, such as MRI or regional MRN should be performed to make accurate diagnoses.