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Clinical features, Electrodiagnostic findings, and Treatment for Ischemic Steal Syndrome after Arteriorvenous Graft Formation: A Case Report

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Introduction

- **Arteriorvenous graft** (AVG) and arteriorvenous fistula are the preferred access options for hemodialysis in end-stage renal disease.
- **Ischemic Steal Syndrome** is one of the major complications of AVG .
  - Symptoms : Ipsilateral upper extremity with pain, paresthesia, and weakness
  - Minimally invasive limited ligation endoluminal-assisted revision banding, interval ligation, proximalization of arterial inflow and access ligation are possible surgical procedures.
  - **Therapeutic options for ischemic neuropathy have been limited reported.**
- This report describes the case of a patient with the ischemic median, ulnar, and radial neuropathy presenting pain, motor weakness, paresthesia, and arm edema who respond favorable to be treated with ultrasound guided steroid injection, compression therapy and occupational therapy.

Patient presentation (63/F)

C.C	Left upper extremity pain
Onset	1 day after left AVG ligation
Associated symptom	Left upper extremity weakness, edema and numbness
Past history	Diagnosed with Chronic kidney dysfunction
Past treatment	Medications : acetaminophen Conservative treatment
Physical examination	Left upper extremity hypesthesia below AVF site
Evaluation	Electrodiagnostic study - SNAP absent in left median, ulnar, radial nerve - CMAP absent in left median, ulnar, radial nerve - Needle emg : denervation pattern in left radial, median, ulnar nerve muscle below AVF site.

Musculoskeletal ultrasonography

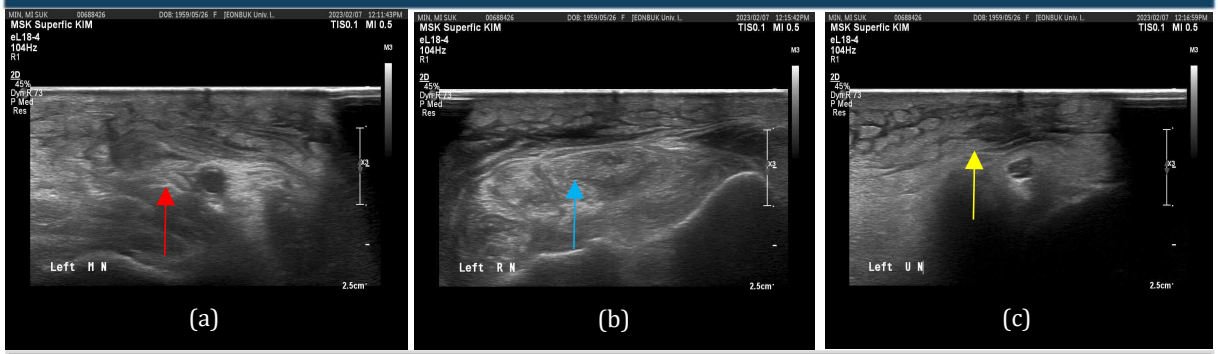

Fig. 1. Ultrasound image. (a) left median nerve (red solid arrow), (b)left radial nerve (blue solid arrow), (c) left ulnar nerve (yellow solid arrow).

Treatment

- Sono-guided perineural injection
  - Location : Left median, ulnar, radial nerve
  - Injectant : 2.5mg dexamethasone + 2cc of 1% lidocaine at each nerve
- Compression therapy, manual lymphatic drainage therapy
- Occupational therapy (Function electrical stimulation, hand function training)
- Exercise (Passive and active-assisted range of motion exercise, upper extremity strengthening training)

Outcome

	Pre	Post
VAS	6	3
MMT		
Wrist flexion	T	P
Wrist extension	T	P-
Finger extension	T	P
Finger flexion	T	P

Fig. 2. Visual analogue scale and Manual muscle tone pre-treatment and post-treatment

	Pre-Treatment			Post-Treatment		
Circumference(mm)	Lt (aff)	Rt (unaff)	Aff-unaff	Lt (aff)	Rt (unaff)	Aff-unaff
MCP	185	185	0	185	185	0
Wrist	170	160	10	170	155	15
10cm distal LE	235	205	30	210	200	10
Elbow	245	240	5	240	240	0
10cm prox LE	250	250	0	250	250	0

Fig. 3. Comparison upper extremity circumference pre-treatment and post-treatment

Conclusion

- Ischemic neuropathy due to Steal syndrome should undergo an electrophysiological study for accurate diagnosis.
- They should receive comprehensive rehabilitation and intervention therapy in the very early stages of treatment.