

Ultrasound diagnosis of post-operative complication of epineural repair in traumatic nerve lesions

C Erra¹, C Fantoni², D Coraci³, L Padua^{1,2}

1. Department of Geriatrics, Neurosciences and Orthopaedics, Università Cattolica del Sacro Cuore, Rome, Italy

2. Don Carlo Gnocchi ONLUS Foundation, Milan, Italy

3. Board of Physical Medicine and Rehabilitation, Department of Orthopaedic Science, "Sapienza" University, Rome, Italy

Introduzione

Peripheral nerves injuries affect 2.8% of trauma patients and result in considerable long-term disability, especially when upper limbs are involvedⁱ. When nerve interruption occurs, surgical therapy is the principal therapeutic option. There are several options for surgical treatment: direct epineural repairⁱⁱ and nerve graftingⁱⁱⁱ. A possible cause of unfavorable surgical outcome is the suture/graft detachment. This complication is hard to diagnose and, to the best of our knowledge, there is not a study that investigates the incidence such condition.

Nerve ultrasound (US) is a valuable tool in traumas: besides being a precious tool to diagnose traumatic nerve injury, it has proven useful in post-operative follow up, especially as it can be useful in diagnosing surgical complication^{iv}.

Case 1

We report a case of a 18 years-old girl who presented median and radial nerve injury after a cut on her arm. A termino-terminal epineural suture of both nerves was performed. After 4 months she showed signs of radial nerve recovery, in absence of improvement of median nerve motor and sensory functions. Nerve US of the median nerve showed median nerve interruption with proximal and distal stump neuromas (Fig 1).

Radial nerve proved in continuity, with a focal enlargement located distally to the spiral groove (Cross Sectional Area 50 mm²).

Case 2

A 49 years-old man who presented a peroneal nerve injury after a cut-wound. The injury caused a complete nerve interruption, diagnosed by US.

The patient underwent surgery and epineural repair was performed. In absence of improvement after six months, nerve US was repeated and it showed a detachment of nerve suture (Fig.2). New surgical treatment with sural graft was performed. Partial recovery of motor function was observed.

Case 3

A 45 year old man presented after gunshot wound with ulnar nerve palsy. US showed interruption of the nerve with proximal and distal stump neuromas. The patient underwent surgery with neuroma resection, anterior transposition and termino-terminal rafia of the two stumps. Anterior transposition was performed to reduce the tension on the raffia. After lack of recovery, US revealed detachment of the stumps with a 4 centimeters gap between them.

Conclusioni

Although surgical repair is the gold standard therapeutic option for traumatic nerve injuries involving partial or complete nerve lesion (partial/complete neurotmesis), sometimes unfavorable outcome is observed. Many factors influence surgical outcome, such as time latency from trauma, patient demographics, vascular involvement, damaged nerve, type of injury. A rare reason for poor outcome is detachment of epineural repair or nerve graft, a condition which prevents recovery and requires reintervention. As described in the forementioned cases, it can be diagnosed by nerve US. Based on our experience and on the cases reported, we recommend to perform nerve ultrasound in post-operative follow up of patients with traumatic nerve lesions, when recovery is not observed.

Bibliografia

ⁱ K. S. Houschyar et al. The Role of Current Techniques and Concepts in Peripheral Nerve Repair, *Plast Surg Int.* 2016; 2016: 4175293. Published online 2016 Jan 20.

ⁱⁱ D. Grinselland et al. Peripheral Nerve Reconstruction after Injury: A Review of Clinical and Experimental Therapies, *BioMed Research International* Volume 2014 (2014), Article ID 698256, 13 pages

ⁱⁱⁱ Justin W et al. Peripheral Nerve Repair and Reconstruction, *J Bone Joint Surg Am.* 2013 Dec 4;95(23):2144-51.

^{iv} Padua L et al. Ultrasound as a useful tool in the diagnosis and management of traumatic nerve lesions. *Clin Neurophysiol.* 2013 Jun;124(6):1237

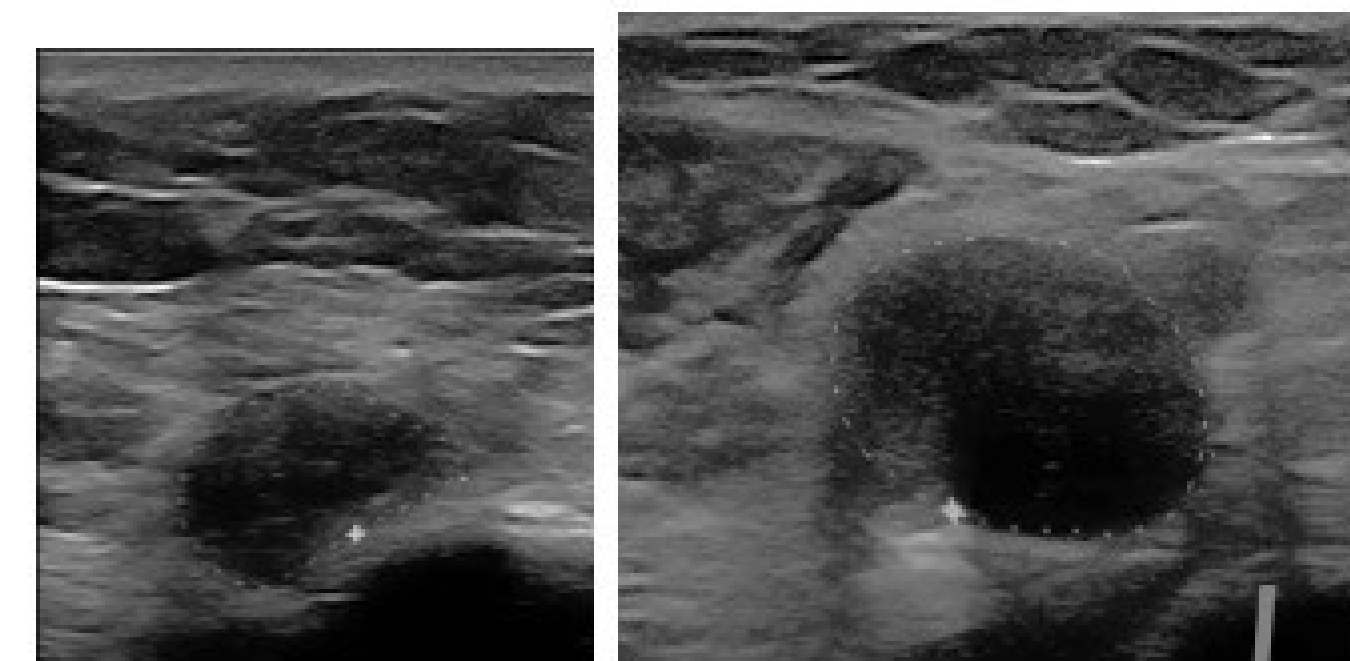


Fig. 1.a

Fig. 1.b



Fig. 1.c

Fig 1.a Post-surgical median nerve ultrasound at arm, transverse scan. The distal neuroma is visible, included in the dashed line (N1).

Fig 1.b Post surgical median nerve ultrasound at arm, transverse scan. The proximal neuroma is visible, included in the dashed line (N2).

Fig 1.c Picture of the arm of the patients. On the skin is indicated the position of the proximal and distal neuromas. The schema indicates the distance between healthy nerve tissues.

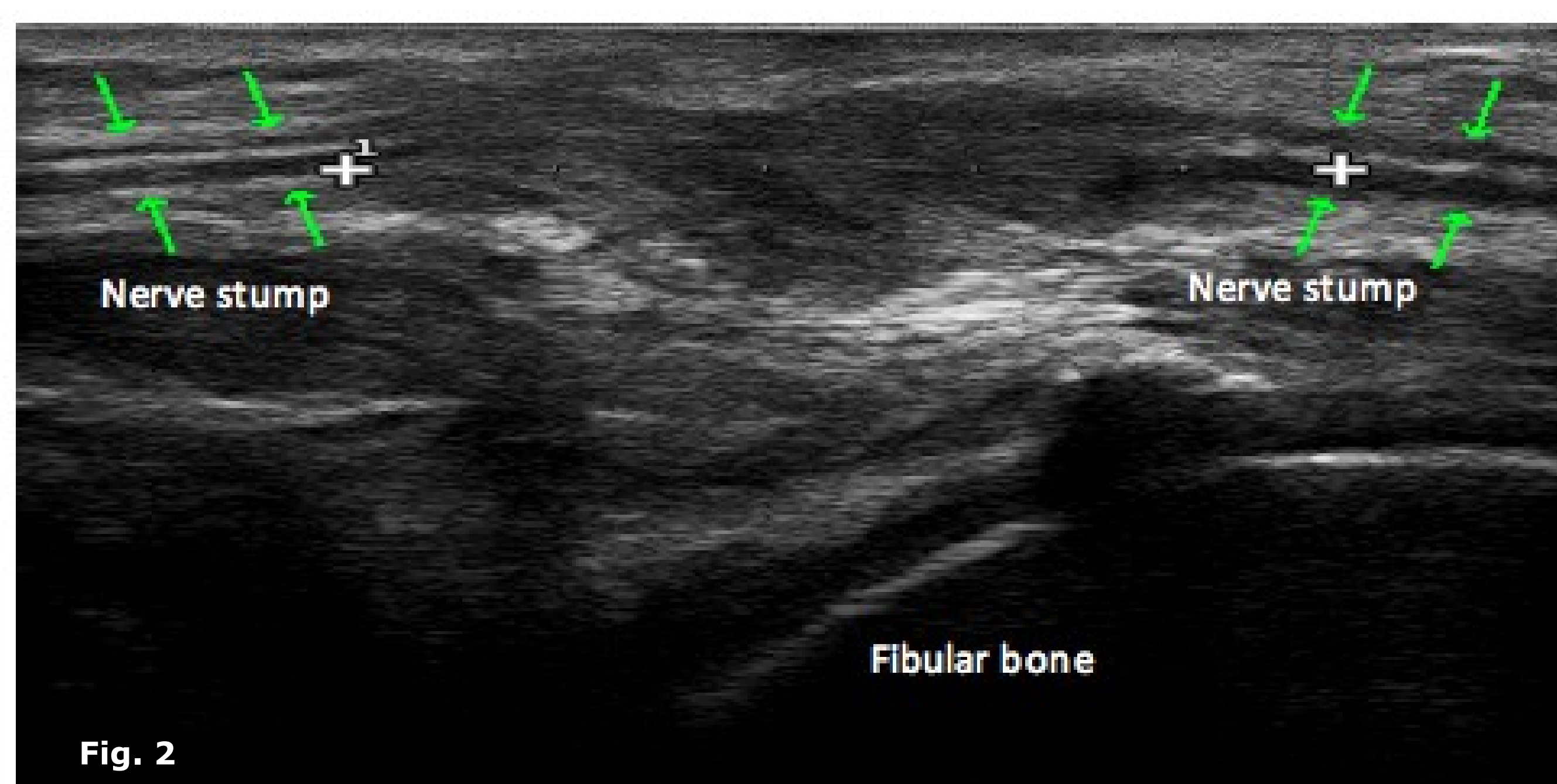


Fig. 2

Fig. 2 Peroneal nerve ultrasound, proximal third of the leg, longitudinal scan. Ultrasound shows complete interruption of the nerve. Neuromas are not present.