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Lésions iatrogènes

40 % des mononeuropathies douleureuses sont causée par interventions médicales
Neuropathic pain is a “Positive” sensory phenomenon

• Careful attention to the pain description and localisation of the symptoms might lead the clinician to the proper diagnosis of neurological disease in spite of a normal objective examination without negative phenomena.

• To improve yield the examination should be tailored to the specific pain complaint i.e. designed to enlighten the evoked symptoms and movement provoking the pain.
Esame delle sensibilità

Esame delle sensibilità

Esame con il rullo di Lindblom

Valutazione delle soglie di sensibilità

Identificazione del territorio di ipoestesia
1. Rami cervicali cutanei
2. Nervo intercostobrachiale
3. Nervo mediano
4. Nevro ileo inguinale
5. Ramo ricorrente rotuleo
6. Nervo safeno
Nervo alveolare inferiore
Lesione del nervo grande auricolare
Rami cutanei del plesso cervicale
Lesione parziale del plesso brachiale
Injury to Infrapatellar Branch of Saphenous Nerve in Arthroscopic Knee Surgery

Hiroshi Mochida, MD; and Shinichi Kikuchi, MD

SELECTIVE DEEP PERONEAL NERVE INJURY ASSOCIATED WITH ARTHROSCOPIC KNEE SURGERY

PETER C. ESSELMAN, MD, MARK A. TOMSKI, MD, LAWRENCE R. ROBINSON, MD, JAMES ZISFEIN, MD, and STEPHEN J. MARKS, MD
Positions of the skin incisions.

*H*, horizontal skin incision for arthroscopy portal; 
*L*, longitudinal skin incision for tendon harvest; 
*P*, patella;  
*Sa*, sartorius muscle;  
*T*, tibial tuberosity

_T. Mochizuki, K. Akita, T. Muneta and T. Sato_:
Anatomical bases for minimizing sensory disturbance after arthroscopically-assisted anterior cruciate ligament reconstruction using medial hamstring tendons
Anatomic Bases of Medical, Radiological and Surgical Techniques.
Published online: 19 June 2003
• Examples of cases of sensory disturbance in 13 legs.
• *Red dots* indicate the skin incision line,
• *green dots* indicate the sensory disturbance region.
• A Four legs (31%);
• B 3 legs (23%);
• C 1 leg (8%);
• D 5 legs (38%).
• *H*, Horizontal skin incision for arthroscopy portal;
• *L*, longitudinal skin incision for tendon harvest
Examples of the distribution of the nerve branches on the fasciae lata and crus.

Nerve branches connect in various ways in the medial infrapatellar region.

Some nerve branches pass through the longitudinal skin incision line.

H, Horizontal skin incision for arthroscopy portal;
L, longitudinal skin incision for tendon harvest;
P, patella; Sa, sartorius muscle covered by fasciae;
Sv, greater saphenous vein
• Four patterns of the distribution of the nerve branches based on findings in 51 legs.
• A Branches of the medial femoral cutaneous nerve are distributed to the anterior leg region (8 legs, 16%).
• B Branches of the medial femoral cutaneous nerve are distributed to the infrapatellar region, and branches of the saphenous nerve are distributed to the anterior leg region (25 legs, 49%).
• C Infrapatellar branch of the saphenous nerve pierces the sartorius muscle and is distributed to the infrapatellar region (16 legs, 31%).
• D Infrapatellar branch of the saphenous nerve emerges from the anterior border of the sartorius muscle, and is distributed to the infrapatellar region (2 legs, 4%).
• In, intermediate femoral cutaneous nerve; Mn, medial femoral cutaneous nerve; Sn, saphenous nerve
Saphenous Nerve Injury Caused by Stripping of the Long Saphenous Vein

S. J. Cox, J. M. Wellwood, A. Martin

THE ANATOMIC RELATIONSHIP BETWEEN THE LONG SAPHENOUS VEIN AND THE SAPHENOUS NERVE
Relevance for Radical Varicose Vein Surgery

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(Submitted for publication April 7, 1988. Accepted after revision September 27, 1988)

Saphenous neuritis following varicose vein surgery

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neuropathic pain in the infraorbitar nerve territory after removal of maxillary sinus carcinoma
neuropathic pain in the great auricular nerve territory after removal of parotid gland carcinoma
Post neck surgery syndrome:
Neck and nuchal pain may arise as a consequence of cutaneous nerve lesions provoked by surgical interventions for othorynolaryngoiatric tumours. Great auricular nerve is usually damaged in near the sternocleidomastoid muscle dissection. Lesser occipital and great occipital nerves, and supraclavicular nerves are frequently involved too. Pain affects almost 50 % of patients, sometimes weeks after neck dissection, 8 % of which rated the pain as “severe”. In half of the patients, pain subsides in a few months, but in the other half, it lasts for years. Neck surgery frequently damages the spinal accessory nerve, particularly in dissection of the posterior cervical triangle. However, lymph node biopsy in the neck is by far the most common cause of injury to the accessory nerve. Iatrogenic injury represents 50 % of all causes responsible for lesion of this nerve.
Pain persists after mastectomy in the majority of patients. Pain occurrence significantly correlates with the surgery extension: is infrequent in lumpectomy, but involves up to 72% of patients submitted to axillary lymph nodes dissection (36). In these cases, pain appearance is positively associated with the number of lymph nodes removed (36). Pain seem also less frequent when careful surgical techniques are used, or when surgeons perform more interventions, as in hospitals experienced in breast surgery (37). In 15 – 20% of patients post mastectomy pain as the quality of a burning, tight sensation and dysesthesia / allodynia in the armpit and medial part of upper arm.

Marchettini P, Formaglio F, Lacerenza M. 
*Iatrogenic painful neuropathic complications of surgery in cancer.*

Intercostobrachial nerve syndrome
Post-thoracotomy pain 1 year after surgery is reported by up to 61% of the patients, 3–5 of which complain of severe pain. Chronic pain development is directly related to postoperative pain severity. This pain may be due to intercostal nerve lesion, or to traction on the brachial plexus. Intercostal rib resection is also one of the causes of brachial plexus injury (40). Persistent chest pain may also be due to complete intercostal nerve transection, sometimes followed by painful neuromas. Severe pain is complained by 70% of the patients after thoracotomy, and subsides in a 2 months period. Worsening of the pain over weeks or months, and a chest pain recurrence following a pain free period, is a significant negative prognostic symptom, suspicious for cancer recurrence (41).

Dolore neuropatico post toracotomia
Painful post thoracotomy neuropathy
False negative diagnosis exclude patients from proper management and may also hamper reimbursement of treatment

- Neuropathic pain criteria should be more suitable to the complexity of clinical conditions to minimize false negative diagnosis
- Diagnostic criteria should include positive symptoms, provocative maneuvers, response to drugs and to somatosensory anesthetic blocks
Reconnaître les lésions fasciculaires
Lésion Fasiculaire


BUMKE AND FOERSTER, 1935
• The pain anticipates the appearance of neurological symptoms and signs

• The condition remains clinically confined to the pain

• Neurological symptoms and signs are present albeit unrelated to the pain i.e. the pain is nociceptive
Analgesia after i.v. Lidocaine as diagnostic criterion of neuropathic pain
In the early stages of Pancoast syndrome, the only symptom might be the pain. Normal neurological examination and normal EMG findings.
Patients devastated by pain in this distribution might have little in the way of muscle weakness or even sensory loss.
ATTIVITÀ NERVOSA ECTOPICA A SCARICHE

Figure 2.

Samples of spontaneous, ongoing, bursting nerve impulse activity recorded on three separate occasions from median nerve fascicles supplying symptomatic skin of the painful hand.

A receptive field for mechanical or thermal stimuli was consistently not found for the bursting units.
ECTOPIC IMPULSE GENERATION AND AUTOEXCITATION IN SINGLE MYELINATED AFFERENT FIBERS IN PATIENTS WITH PERIPHERAL NEUROPATHY AND POSITIVE SENSORY SYMPTOMS

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Accepted 18 April 1998
Spontaneous, Ongoing, Painless Paresthesias in Local (demyelinating) Nerve Injury; Anomalous Bursts of Impulses Recorded Proximally from a Sensory Nerve Fascicle.

Figure 1.

Patient No. D.M. points to level of intrapialcular median nerve recording with Vallbo-Marschall tungsten microelectrode. Escort points to site of trauma and current sign of thumb.

Ongoing abnormal sensations were projected to overall median nerve territory (red hatch). Mild hypoesthesia was present in finger tips (black hatch). No appreciable weakness or atrophy several weeks after injury.

Routine electrophysiology revealed:

a) No signs of motor or sensory axonal degeneration.

b) Mild delay in sensory nerve action potentials from left thumb, index and middle finger, as compared to control side, without drop in amplitude.
Multiple bursts of unitary discharges have been intraneurally recorded in traumatic median nerve injury in spite of normal nerve conduction across the wrist.
• Are the provocative pain evoking maneuvers such as the straight raising leg (Lasègue) or the Spurling objective signs?

• How about progressive worsening of the symptoms due to narrow spinal canal (ischemia of the cauda equina) or other conditions provoked by progressive ischemia of the spinal cord or lumbar plexus, are they objective clinical signs?
Clinical case

Dynamic neuralgia
Lumbar plexus entrapment against the psoas muscle after urether surgery

Pain and allodynia caused by prolonged walking
Esame quantitativo delle sensibilità
Esame quantitativo delle sensibilità II


Cold pain (CP) threshold = 10.5 °C
Heat pain (HP) threshold = 50 °C

Verde = range normale  Rosso > al range normale
Pharmacologic management of neuropathic pain:
Evidence-based recommendations

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Table 1
Stepwise pharmacologic management of neuropathic pain (NP)

\begin{tabular}{|l|}
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\textbf{Step 1} \\
Assess pain and establish the diagnosis of NP [25,20]; if uncertain about the diagnosis, refer to a pain specialist or neurologist. Establish and treat the cause of NP; if uncertain about availability of treatments addressing NP etiology, refer to appropriate specialist. Identify relevant comorbidities (e.g., cardiac, renal, or hepatic disease, depression, gait instability) that might be relieved or exacerbated by NP treatment, or that might require dosage adjustment or additional monitoring of therapy. Explain the diagnosis and treatment plan to the patient, and establish realistic expectations. \\
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\textbf{Step 2} \\
Initiate therapy of the disease causing NP, if applicable. Initiate symptom treatment with one or more of the following: A secondary amine TCA (nortriptyline, desipramine) or an SSNRI (duloxetine, venlafaxine). A calcium channel \(\alpha 2-\delta\) ligand, either gabapentin or pregabalin. For patients with localized peripheral NP: topical lidocaine used alone or in combination with one of the other first-line therapies. For patients with acute neuropathic pain, neuropathic cancer pain, or episodic exacerbations of severe pain, and when prompt pain relief during titration of a first-line medication to an efficacious dosage is required, opioid analgesics or tramadol may be used alone or in combination with one of the first-line therapies. Evaluate patient for non-pharmacologic treatments, and initiate if appropriate. \\
\hline
\textbf{Step 3} \\
Reassess pain and health-related quality of life frequently. If substantial pain relief (e.g., average pain reduced to \(\leq 3/10\)) and tolerable side effects, continue treatment. If partial pain relief (e.g., average pain remains \(\geq 4/10\)) after an adequate trial (see Table 3), add one of the other first-line medications. If no or inadequate pain relief (e.g., < 30% reduction) at target dosage after an adequate trial (see Table 3), switch to an alternative first-line medication. \\
\hline
\textbf{Step 4} \\
If trials of first-line medications alone and in combination fail, consider second- and third-line medications or referral to a pain specialist or multidisciplinary pain center. TCA, tricyclic antidepressant; SSNRI, selective serotonin and norepinephrine reuptake inhibitor. \\
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• Channel blockers, Antiepileptics, Antidepressants are first line
• Minimally invasive procedures: epidural injections, nerve blocks, radiofrequency lesion, neurostimulation should be considered before aggressive strong opioids therapy*
• Or if side effects of first line are unbearable
• Or if there is a potential for major pain relief after surgery
Because of the lack of a specific diagnostic tool for neuropathic pain, a grading system of definite, probable, and possible neuropathic pain is proposed. The grade possible can only be regarded as a working hypothesis, which does not exclude but does not diagnose neuropathic pain. The grades probable and definite require confirmatory evidence from a neurologic examination. This grading system is proposed for clinical and research purposes.
The gap between theory and practice

• The diagnostic criteria do not mirror the complexity of common clinical routine
• The available evidence based therapeutical recommendations separate pharmacological treatments from invasive procedures and do not provide effective working algorithm
• The combination of these limitations exposes pain clinicians to major medico legal responsibilities
• Practical operational guidelines encompassing diagnosis and all available treatments are urgently needed