Electrodiagnosis & Rehabilitation

NEURALGIC AMYOTROPHY (NA) or ACUTE IDIOPATHIC BRACHIAL NEURITIS (AIBN)

by Sri Sundarum, M.D., M.P.H.; editor Edgar S. Steinitz, M.D.

Overview
Although once considered uncommon, Neuralgic Amyotrophy (NA) is a relatively common cause of brachial plexopathy encountered in Electrodiagnostic (EDX) medicine. Despite its prevalence, it is not well known by many practitioners. When the condition arises in temporal proximity to surgery, there are potential medical-legal issues. Accurate diagnosis can be a challenge given spotty involvement and uncertain etiology, but necessitates a thorough history and meticulous EDX evaluation. This disorder has been given many names over the years: Parsonage-Turner Syndrome, Acute Idiopathic Brachial Neuritis, Serratus Palsy, among many others, but the term Neuralgic Amyotrophy (NA) is now the most widely accepted as it describes two cardinal manifestations—pain and muscle atrophy.

Clinical presentation
Most patients present with sudden severe shoulder girdle, especially periscapular, pain lasting 1-2 weeks followed by weakness and wasting. An antecedent viral or respiratory infection is often reported. Patients may also describe recent invasive procedures or trauma (surgery to an unrelated area, strenuous activity, childbirth, MVA). If the condition involves the interosseous or musculocutaneous nerves, arm pain may be the major complaint. Once pain subsides, symptoms are primarily from residual weakness of the affected peripheral nerves. It is common for Long Thoracic neuropathy affecting the Serratus Anterior presenting with scapular winging, Suprascapular neuropathy affecting the Supra/Infraspinatus with shoulder abduction/rotation weakness, Axillary neuropathy affecting the Deltooid with arm abduction weakness, Musculocutaneous neuropathy affecting the Biceps/Brachialis with elbow flexion/supination weakness, Anterior Interosseous neuropathy affecting the Flexor Pollicis Longus and Pronator Quadratus with thumb/index flexion weakness, and Posterior Interosseous neuropathy affecting deep forearm extensors including the Extensor Digitorum and Indicis with finger extension weakness. Sensory symptoms are usually limited to paresthesias because primarily motor nerve fibers are affected.

Pathophysiology
Non-familial, idiopathic form = 97%; familial ≤ 3%. Etiology of NA is probably autoimmune with genetic predisposition. The annual incidence is ~1.64/100,000 typically affecting a single limb of young adult males with asymmetric, spotty involvement. There is a small chance for recurrence in the same or opposite limb in a similar distribution. The 1st pathology is axonal degeneration of proximal branches of the brachial plexus with a predilection for damage to pure motor nerves.

Differential Diagnosis
Primarily unilateral shoulder girdle and/or arm pain with weakness includes:
Musculoskeletal - Adhesive capsulitis, rotator cuff tear/instability, flexor tendon rupture.
Neurological - Cervical radiculopathy, brachial plexopathy, i.e. trauma, radiation, isolated nerve palsy, especially Long Thoracic, Suprascapular, Axillary, Musculocutaneous and Anterior Interosseous neuropathy.

Electrodiagnostic (EDX) Study
EDX is critical for diagnosis of NA. Depending on the timing of study and severity, motor conduction responses may be of small amplitude or unelicitable. Needle EMG examination (NEE) is the most sensitive in assessing extent and severity of axonal loss, but important to complete an extensive screen. Intensity of denervation, changes in motor unit morphology and diminished recruitment pattern help to categorize the acuity, extent and severity of NA.

Rehabilitation
Establish pain control using a combination of medications for neuropathic pain to include short term use of opioids. Long term goals are prevention of contractures and biomechanical maladaptations through therapeutic exercises and therapy combined with patient education. Prognosis for NA is generally favorable with 90% achieving functional recovery over 1-2 years. The severity of the initial axonal involvement and loss dictates the extent of neurological recovery.
Background

Hip fractures are the most significant of the osteoporotic fractures, resulting in markedly ↑ risk morbidity and mortality. In the US, there are > 25,000 hip fractures yearly with this expected to double by 2040. Elderly women are particularly at risk with lifetime risk for a woman = 14%. At 80 years of age, the risk ↑ to 20%, and at 90, to 50%. The economic and personal loss secondary to hip fractures is enormous and estimated to be $20,000 in the first year alone. There are adverse outcomes after hip fractures with only 50% returning home or to independent living. 25% patients die within the first year secondary to complications, and 25% permanently require an assistive device to ambulate at all.

Etiologic Factors

Etiologic factors for hip fractures include direct trauma (usually secondary to a fall), orientation of the body and leg relative to the ground at impact, patients protective responses, the firmness of the surface which is mitigated by shock absorption of clothing worn, and bone strength. ↑ risk for fracture includes age, complicating medical problems, muscle weakness, gait and balance dysfunction, severity of underlying osteoporosis and environmental factors. Patients with osteoporosis having a ‘T’ score of – 1 s.d. results in a 2.4 X ↑ risk which is only magnified with worsening ‘T’ score.

Prevention

Hip fracture prevention is best served by comprehensive multidisciplinary evaluation of all risks with intervention directed at those factors which are modifiable:

- Use of ≥ 4 medications per day
- Problems with dizziness or syncope
- Cognitive impairment, unti
dness
- Low BP, esp. symptomatic sit → stand
- Visual loss; Recent Rx bifocals
- Unsteady, shuffling, uneven steps
- Environmental hazards
- Significant osteoporosis
- Major medical problems
- Advanced arthritis or deformity
- Anorexia, early menopause/hysterectomy – Male hypogonadism

Intervention

Intervention is multidimensional and includes environmental modifications, strengthening exercises, esp. progressive resisted of the lower extremities, balance, neuromuscular coordination and gait training which has been demonstrated to improve functional performance and diminish risk of injury and fall. It’s important to continue with an independent and/or structured program to maintain gains and avoid return to an habitual sedentary lifestyle. Nutritional and vitamin supplements, as well as pharmacologic and non-pharmacologic treatment is important for those with osteoporosis. Studies show that a supervised group program which is accessible minimizing transportation barriers, and well equipped with trained staff, can help frail elderly patients maintain their physical capacity and reduce risk for fall and fracture which carries such a high morbidity and mortality with long-term consequences for so many.

Hip Protectors

Hip protectors can be part of a multifaceted approach to ↓ incidence of hip fracture. Kannus et al performed the largest randomized clinical trial to date in which 1801 nursing home residents were studied. He concluded that use of hip protectors for every 41 patients would prevent 1 hip fracture/year, and overall, the hip fracture risk reduction is 60%. Many studies have confirmed this finding concluding that hip protectors are a simple, cost efficient and efficacious approach to ↓ incidence of fracture. The primary limitation is compliance, although other considerations include the small initial cost outlay and availability. Biomechanical degradation and poor placement of the hip protectors can compromise patients ability to absorb the force of an impact and thus hip fracture may still may occur particularly in those most vulnerable. Compliance can be ↑ by providing instruction in proper use, and training in efficient dressing techniques minimizing impact on other ADL needs, especially toileting. Patients who wear hip protectors benefit from a ↓ likelihood of developing injury and fracture and thus are better able to maintain functional independence with ↓ fear of falling. Candidates include patients at fall risk and with osteoporosis. Strategies to ↑ compliance include positive reinforcement.