

SCIATIC NERVE DAMAGE

1. Nerve injury occurs in 1% to 2% of patients who undergo total hip arthroplasty. Injury to the peroneal division of the sciatic nerve is most common, but the superior gluteal, obturator, and femoral nerves can also be injured.
2. The worst prognosis is seen in patients with complete motor and sensory deficits and in patients with causalgic pain.
3. Prevention is of overriding importance, but use of ankle-foot orthoses and prompt management of pain syndromes can be useful in the treatment of patients with nerve injury.
4. Electrodiagnostic studies hold promise in complex cases;

Relevant anatomy

The sciatic nerve arises from the L4, L5, S1, S2, and S3 nerve roots and is composed of the preaxial anterior tibial and postaxial posterior peroneal divisions. These divisions usually travel together in a single sheath, but in 10% to 30% of cases they are separate as high as the greater sciatic notch.

Separation of peroneal and tibial components occurs below Piriformis in 87% of normal population; in 12% as the nerve passes through Piriformis.

Commonest nerve damage is the Sciatic Nerve in posterior approach and the superior gluteal nerve in Hardinge approach

THA ana Sciatic nerve palsy

THA

The sciatic nerve is the nerve most commonly injured during THA.

It was involved in over 90% of the nerve injury after THA

The incidence of sciatic nerve injury in primary THA: about 1.5%.

Overall rates are elevated by the relatively higher incidence in revisions (3% to 8%) and in patients with developmental dysplasia of the hip (DDH) (5.8%).

In a study utilizing preoperative and postoperative electromyography, 70% of THA patients had subclinical sciatic nerve injury.

The etiology of nerve injury is protean. Direct trauma from scalpel, electrocautery, retractors, wires, reamers, Gigli saw, bone fragments, or cement protrusion; constriction by suture, wire, or cable; heat from the polymerization of cement; compression from dislocation; excessive lengthening; and subfascial hematoma
However, the cause of 50% of all sciatic nerve palsies is unknown.

The peroneal division of the sciatic nerve is more susceptible to injury than the tibial division. Why: 94% Vs 6 %

1. The superficial position of the common peroneal nerve as it wraps around the neck of the fibula makes it vulnerable to compression.
2. The peroneal division may be more susceptible to stretch injuries because it is relatively more fixed between the sciatic notch and the fibular head.
3. Based on morphologic differences between the tightly packed fascicles of the peroneal division and those of the tibial division, which has relatively more connective tissue
4. The fact that the peroneal division is more lateral may also increase its vulnerability to trauma.
5. Edwards et al¹⁵ noted that 6 of 10 patients with nerve palsy had leg lengthening of more than 3 cm. The amount of lengthening as a percentage of the length of the femur and concluded that lengthening of up to 10% was safe.

Incidence <1 %

5% in revision

3% in DDH [limb length: when limb lengthening was between >2 cm]

Facts

Partial sciatic nerve deficit is more common than complete.
Lateral peroneal branch is more involved than posterior tibial nerve.
In most, recovery occurs either complete or partial.

Treatment

Foot drop splint and observe for 20 months
Most of the Neuropraxia recovers by 4 months.

Prognosis [J Am Acad Orthop Surg 1999;7:101-111]

The prognosis of a nerve injury is related to factors specific to the injury and clinical factors related to the patient

a. Clinical Factors in Nerve Injury and Repair

Degree of injury

Edwards found that patients who had palsy of only the peroneal division did well, but that patients with injury to both the tibial and the peroneal divisions had less optimal recovery of function.

Size of zone of injury

Distance of zone of injury from an end-organ

b. Patient factors

Age

Preexisting neuropathies (e.g., those due to diabetes, alcoholism, hypothyroidism, spinal stenosis)

General medical condition (e.g., history of smoking or corticosteroid use)

c. Causalgic pain: Although 80% of patients with nerve injuries have some persistent neurologic dysfunction, causalgic pain most highly predicts major disability.

Patients who recovered neurologic function usually did so by 7 months. No patient with dysesthesias had satisfactory recovery of function.

Treatment

If no specific cause is identified, often no immediate treatment to decrease compression or stretch of the nerve is indicated.

An advancing Tinel sign distal to the site of injury signifies regeneration of axons and at least partial nerve continuity.

Electromyograms and nerve conduction velocity measurements may provide a more objective measure of the level of injury, the degree of injury, and evidence of recovery of motor function.

When transection of the nerve is discovered intra-operatively, an attempt at nerve repair seems warranted.

Prevention

The first step in prevention is to identify the patients at risk:

- i) Hip dysplasia
- ii) Undergo revisions
- iii) Minimizing the amount of leg lengthening
- iv) Careful placement of fixation screws

Use of anterior-quadrant screws predisposes to nerve injury .

Proper placement of components helps minimize dislocations and the need for revisions that put the nerve at increased risk.

High chance of neurovascular damage

