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# Efficacy of retroperitoneal triple neurectomy for refractory neuropathic inguinodynia



Alexandra M. Moore, M.D.<sup>a</sup>, Martin F. Bjurstrom, M.D.<sup>b</sup>,  
Jonathan R. Hiatt, M.D.<sup>a</sup>, Parviz K. Amid, M.D.<sup>a</sup>, David C. Chen, M.D.<sup>a,\*</sup>

<sup>a</sup>Department of Surgery, David Geffen School of Medicine, University of California, 1304 15th Street, Suite 102, Santa Monica, CA 90404, USA; <sup>b</sup>Department of Anesthesiology, David Geffen School of Medicine, University of California, Los Angeles, CA, USA

## KEYWORDS:

Inguinodynia;  
Postinguinal  
herniorrhaphy pain;  
Triple neurectomy

## Abstract

**BACKGROUND:** Refractory neuropathic inguinodynia following inguinal herniorrhaphy is a common and debilitating complication. This prospective study evaluated long-term outcomes associated with laparoscopic retroperitoneal triple neurectomy.

**METHODS:** Sixty-two consecutive patients (51 male; mean age, 47); all failing pain management; prior reoperation in 35, prior neurectomy in 26; average follow-up 681 days (range: 90 days to 3 years). Measured outcomes include numeric pain ratings, dermatomal mapping, histologic confirmation, quantitative sensory testing, complications, narcotic usage, and activity level.

**RESULTS:** Mean numerical pain scores were significantly decreased (baseline, 8.6) at all postoperative time points (POD 1, 3.6;  $P < .001$ ; POD 90, 2.3,  $P < .001$ ) with durable efficacy from POD 90 to 3 years ( $P < .001$ ). Quantitative sensory testing showed marked group-level increases of sensory thresholds. Narcotic dependence decreased in 57/62 and was eliminated in 44/62 and activity level improved in 58/62.

**CONCLUSIONS:** Retroperitoneal triple neurectomy is an effective and durable treatment for refractory neuropathic inguinodynia.

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With the adoption of tension-free inguinal herniorrhaphy as the surgical treatment of choice for inguinal hernia, chronic inguinodynia has become the most common long-term complication, far outnumbering instances of recurrence.<sup>1-3</sup> The prevalence is high with over 20 million

annual inguinal hernia repairs worldwide and a risk of significant chronic pain of 6% to 8%. Chronic inguinodynia affects activities of daily living, social interactions, utilization of health care, and employment with significant personal and societal burden.<sup>3-6</sup>

There is no consensus as to optimal management of chronic groin pain after inguinal surgery. The diagnosis and management is complicated by the overlap of neuropathic, nociceptive, visceral, and somatic causes of chronic inguinodynia. Conservative management including expectant, pharmacologic, behavioral, and interventional therapies should be employed. Although the operative option for patients with refractory neuropathic inguinodynia has traditionally been open selective or triple neurectomy,<sup>6-10</sup> open

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\* Corresponding author. Tel.: +1-310-319-4080; fax: +1-310-395-5205.

E-mail address: [dcchen@mednet.ucla.edu](mailto:dcchen@mednet.ucla.edu)

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neurectomy has various limitations to its use, often stemming from the need to operate in a previously scarred surgical field, the highly variable inguinal neuroanatomy, and the inability to access nerves proximal to the site of damage with prior preperitoneal repair leading to added morbidity and lower efficacy.<sup>11,12</sup> Laparoscopic retroperitoneal triple neurectomy (LRTN) has emerged as an effective treatment for the neuropathic component of inguinodynia.<sup>13,14</sup> Advantages of LRTN as compared with open anterior triple neurectomy include more consistent retroperitoneal anatomy, reliable identification of the nerves, and avoidance of the prior surgical site scarring and mesh resulting in higher efficacy rates of successful neurectomy.<sup>15,16</sup>

Although LRTN has previously been demonstrated to be effective in ameliorating neuropathic pain in patients with refractory neuropathic inguinodynia, studies to date are relatively small and lacking long-term clinical follow-up. The present study was undertaken to examine the technique's effectiveness and to assess durability of outcomes over time.

## Methods

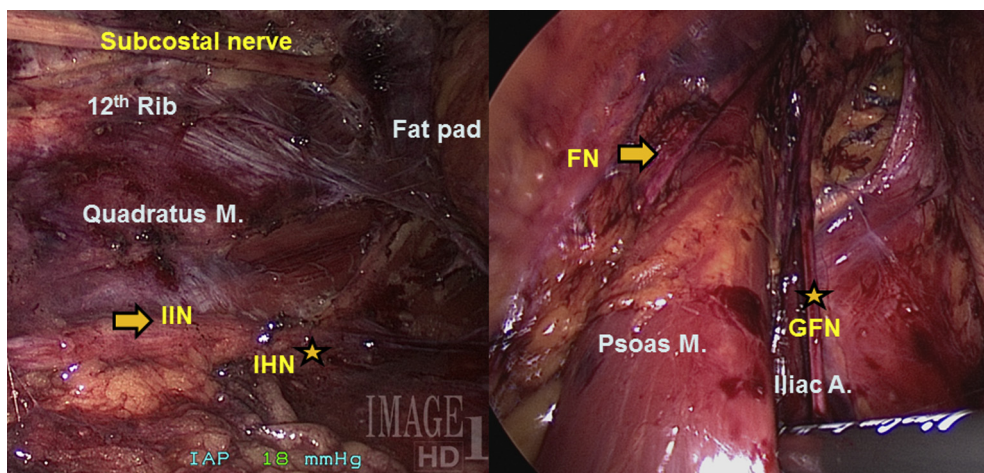
This prospective cohort study conducted at the Lichtenstein Amid Hernia Clinic at the University of California, Los Angeles between January 1, 2012 and October 31, 2015 was open to all patients with refractory chronic inguinodynia. The study was approved by the University of California, Los Angeles Institutional Review Board.

Inclusion criteria included inguinodynia for a minimum of 6 months, significant pain severity with numeric pain score (NPS) of 6 or greater, and impairment of activities of daily living. Pain was primarily neuropathic as determined by clinical history (shooting, stabbing, burning, electrical sensations, hypo/hyperesthesia, and allodynia), physical examination (positive Tinel's sign), and dermatomal sensory mapping. All patients had preoperative ultrasonography or

cross-sectional imaging using computed tomography or magnetic resonance to evaluate for alternative or concurrent etiologies (eg, meshoma, occult recurrence, prostatitis, epididymitis, osteitis, degenerative disk disease, and musculoskeletal or ligamentous injury). All patients underwent multidisciplinary evaluation and treatment with a pain specialist to confirm refractoriness to nonoperative pharmacologic, behavioral, and procedural intervention, and all received regional or paravertebral nerve blockade for diagnostic and therapeutic purposes. Exclusion criteria included comorbidity (American Society of Anesthesiologists [ASA] class 4 or higher), hernia recurrence, predominantly non-neuropathic or meshoma pain, primary orchialgia, pain unrelated to prior surgical intervention, prior retroperitoneal surgery, pain outside the expected distribution of the inguinal nerves, regional pain syndromes, and histologically confirmed prior triple neurectomy.

All operations were performed under general anesthesia using a minimally invasive 1-stage approach for neurectomy of the main trunks of the ilioinguinal nerve (IIN), iliohypogastric nerve (IHN), and genitofemoral nerve (GFN) in the retroperitoneal lumbar plexus as previously described by our group.<sup>14</sup> Balloon-assisted dissection of the retroperitoneum was accomplished in the lateral decubitus position providing laparoscopic exposure of the lumbar plexus including the subcostal nerve along the 12th rib, the IHN and IIN overlying the quadratus muscle, the lateral femoral cutaneous nerve traversing the iliacus muscle, and the genitofemoral trunk overlying the psoas muscle (Fig. 1). Neurectomy of the IHN, IIN, and GFN trunks was performed with histologic confirmation of all resected nerve specimens. Postoperative activity was unrestricted.

A single physician (D.C.C.) collected data on days 0, 1, 90, and at 6-month intervals up to 3 years post intervention. Dermatomal somatosensory mapping described by Álvarez<sup>16</sup> was performed preoperatively, within the first



**Figure 1** (Left pane) Retroperitoneal lumbar plexus (cephalad view). Iliohypogastric (IHN) and ilioinguinal nerve (IIN) trunks over quadratus at L1. (Right pane) Retroperitoneal lumbar plexus (caudad view). Genitofemoral nerve (GFN) trunk over psoas. Femoral nerve (FN) lateral.

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