



## Case Presentation

# Ultrasound-Guided Intercostobrachial Nerve Block for Intercostobrachial Neuralgia in Breast Cancer Patients: A Case Series

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## Abstract

This case series describes 3 cases in which ultrasound-guided intercostobrachial perineural injection was used for intercostobrachial neuralgia, a common cause of postmastectomy pain syndrome. All cases had undergone modified radical mastectomy with axillary lymph node dissection for breast cancer. Two cases developed axillary and unilateral chest wall pain. The third case initially presented with axillary pain and lateral shoulder pain 1 year out from radical mastectomy. After a cervical epidural steroid injection, her lateral shoulder pain resolved, but she continued to have residual chest wall paresthesia. It was at this time, we decided to treat with an intercostobrachial nerve perineural injection. Injury to the intercostobrachial nerve is thought to be a common cause of postmastectomy pain. In our case series, all patients had pain relief after the intercostobrachial perineural injection. There is a relative dearth of published information on the treatment of postmastectomy pain and more specifically intercostobrachial neuralgia. We review the anatomy of the intercostobrachial nerve and its variants, etiologies of intercostobrachial neuralgia, and current indications and methods of an intercostobrachial perineural injection.

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## Introduction

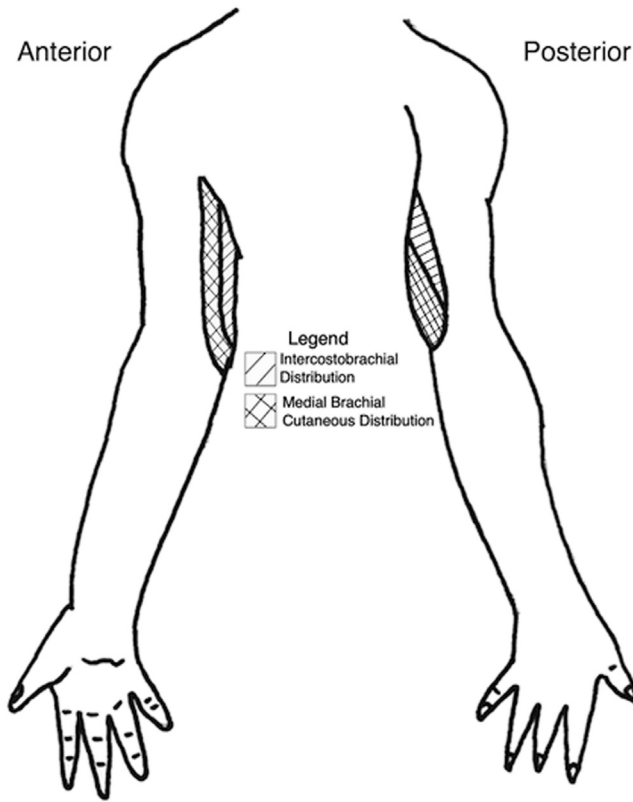
In women who develop breast cancer, many cases are treated surgically by axillary lymph node dissection and primary breast tumor resection [1]. Postmastectomy pain syndrome (PMPS) is a recognized complication of these surgical techniques, with a prevalence rate cited of approximately 43% [1]. It should be noted that there is considerable variation in this incidence in different studies [1,2]. One study evaluating long-term follow-up of breast cancer survivors found that 52% of women diagnosed with PMPS at 4 years out from surgery continued to have PMPS 7-12 years postoperatively [1]. This pain affects quality of life through the combined impact of physical disability and emotional distress.

The intercostobrachial nerve (ICBN) is a cutaneous branch of the intercostal nerves, most commonly the second intercostal nerve, which gives off a lateral cutaneous nerve and does not divide like other intercostal nerves into an anterior and a posterior branch. The ICBN pierces the serratus anterior, crosses the axilla to the medial side of the arm, and joins to the medial

brachial cutaneous nerve (MBCN) [3]. The normal dermatomal innervation pattern usually involves the upper thoracic dermatomes, specifically T1 and T2, and typically is localized to the axilla, medial upper arm, and chest [4]. This may sometimes be difficult to differentiate from the MBCN, which is slightly more anterolateral to the ICBN dermatome (Figure 1) [5]. The ICBN is commonly in the surgical field during axillary lymph node dissections and may be severed during surgery [1,2,4,6]. Even if it is not severed, it may be subject to traction or postsurgical inflammation. In light of this information, intercostobrachial neuralgia can be seen in any patient who has undergone an axillary lymph node dissection, including male breast cancer patients as well as men or women with melanoma.

## Case Presentations

In this case series, 3 patients underwent modified radical mastectomy and axillary lymph node dissection for breast cancer. Since their surgery, they developed axillary pain in the distribution of the cutaneous



**Figure 1.** Contrast of the dermatomal distribution of the intercostobrachial nerve with that of the medial brachial cutaneous nerve. Shown in the figure are both dermatomal distributions in an anterior and posterior layout.

innervation of the ICBN. The pain was characterized as neuropathic (eg, tingling and burning sensation) with diminished or abnormal sensation and allodynia, consistent with intercostobrachial neuralgia. Case 1 is a 63-year-old woman status post-right modified radical mastectomy and axillary lymph node dissection 2 years before initial presentation. Her pain was described as constant aching, not worsened with activity, in the right anterior chest wall, axilla, and lateral chest wall. She reported a 100% improvement 4 months after her first ICBN perineural injection with reported recurrence of symptoms 6 months after the injection.

Case 2 is a 53-year-old woman status post-partial mastectomy with lymph node biopsy 5 years before initial presentation. Her pain described as stiff achy constant pain in the right chest wall and right axilla. ICBN perineural injection was performed. She had follow-up at 4 weeks and reported a 50% improvement in pain severity and required less daily pain medication.

Case 3 is a 69-year-old woman with a left modified radical mastectomy 1 year before initial presentation with axillary pain and lateral shoulder pain. Although lateral shoulder pain is not consistent with typical ICBN dermatomal patterns, this patient had multiple pain generators; 1 month after a cervical epidural steroid injection, her lateral shoulder pain resolved, but she continued to have residual chest wall paresthesia. We then performed an

ICBN perineural injection, which provided immediate relief to her axillary pain. She reported an improvement of 33% at the 2-week follow-up. She received a second injection at this point, and her pain further decreased an overall 66% at 4 weeks after the second injection.

All 3 patients had chronic pain more than 1 year after surgery. Their pain persisted despite physical therapy, neuropathic medications, and opioids. One patient also did not respond to amitriptyline, a topical compounded pain medication, biceps tendon corticosteroid injection, and cervical epidural injection for suspected radicular symptoms. Based on correlation of suspected intercostobrachial distribution of pain and failure to respond to conservative treatments, the patients elected to undergo ultrasound-guided intercostobrachial perineural injection to attempt to decrease their pain. Differential diagnoses of the pain distribution could include an upper thoracic radiculopathy or MBCN distribution, as mentioned previously.

Because all 3 cases had chronic ICBN-distributed pain that continued 1 year after surgery despite other conservative treatment measures and reported improvement of their ICBN distribution pain weeks after an ICBN perineural injection, the authors of this case series believe that the ICBN perineural injection resulted in significant improvement in these symptoms. The subjective improvement in pain is unlikely to be attributed to a natural course of improvement, given the chronicity of the pain in these patients.

## Methods

To properly identify the ICBN, with the shoulder abducted 90° and externally rotated, the probe should be placed over the posteromedial axilla, also called the lateral wall of the axilla (Figure 2). The axillary artery and vein will be visualized and the ICBN will be a small “honeycomb”-appearing structure, just posterior to the vessels and just deep to the superficial fascia (Figure 3). The medial cutaneous nerve of the arm, median nerve, or ulnar nerve could be confused for the ICBN if one places the probe too anteriorly [7].

The ultrasound and transducer used in our case series was a Terason 15L4 Smart Mark, 15–4 MHz (Teratech Corporation, Burlington, MA). While focusing on the ICBN, we advanced a 25-gauge, 1.5-inch needle toward it. Once the needle was in proximity, a solution of 1 mL of 40 mg/mL triamcinolone and 2 mL of 1% lidocaine was injected around the nerve (Figure 3). After the procedure, the patients were allowed to continue their regular regimen of activity and medication. At follow-up visits, the patients’ pain was re-evaluated.

## Discussion

We implemented a novel approach with an ICBN perineural injection to control intercostobrachial neuralgia in

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