Directed neurectomy for treatment of chronic postsurgical neuropathic pain

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Abstract

BACKGROUND: Chronic neurogenic pain after surgery, especially inguinal herniorrhaphy, remains a major cause of morbidity. The traditional treatment of postinguinal herniorrhaphy neuropathic pain has included triple neurectomy with the removal of any mesh. This report describes a directed, minimally invasive surgical neurectomy that provided pain relief in 28 patients with minimal morbidity.

METHODS: After temporary but successful proximal peripheral nerve blockade, the nerve was blocked in the operating room using a small amount of blue dye mixed with the local anesthetic. After confirming pain relief with the dye-anesthetic mixture, the patient was then sedated, and all blue-stained tissue was excised through a small incision, avoiding both the previous surgical scar and mesh.

RESULTS: All but 1 of the 28 patients had complete relief for a minimum of 12 months when discharged from follow-up.

CONCLUSIONS: This simple directed neurectomy method typically provides long-term relief for patients suffering from chronic postsurgical neurogenic pain.

Chronic neurogenic pain causes significant morbidity after many surgical procedures, especially after inguinal herniorrhaphy. Chronic neurogenic pain has been described in 9% to 34% of all patients undergoing inguinal herniorrhaphy.1,2 Many nonoperative measures to control this pain have been described.2,3 Triple neurectomy along with mesh removal, if present, has been advocated to relieve this chronic inguinal pain after herniorrhaphy when nonoperative measures fail.1–3 Others have advocated resection of the main trunk of the genitofemoral nerve in the retroperitoneum for patients who have undergone either open or laparoscopic inguinal hernia repairs.4 This report describes a simple approach of directed surgical excision of the proximal cutaneous nerve causing pain after different types of abdominal operations. This approach avoids unnecessary excision of both uninvolved peripheral nerves and previously placed mesh.

Methods

A series of 28 recently treated patients with chronic neurogenic pain after operation is presented; 2 patients had 2 separate procedures. These patients were accrued over an approximately 10-year period. There were 14 men and 14 women; the average age was 53 years. The prior operations were inguinal herniorrhaphy in 16 patients (including 11 with mesh), cholecystectomy in 4 patients, bilateral abdominal component separation for gigantic incisional hernias in 3 patients, drain site placement incisions in 3 patients, and groin trauma in 2 patients. All patients were evaluated preoperatively when the patients received an outpatient nerve block of the peripheral nerve thought to be causing the pain. A small injection of .5% bupivacaine was

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used. In patients with inguinal pain after inguinal herniorrhaphy, the ilioinguinal nerve or the genitofemoral nerve was anesthetized just inferior and medial to the ipsilateral anterior superior iliac spine (Fig. 1). A common measurement used in our technique was to begin initial nerve blocks 2 cm medial and 2 to 3 cm inferior to the respective anterior superior iliac spine. The anterior superior iliac spine has been shown to be a reliable landmark for these nerves because they travel between the external oblique and internal oblique muscles.4 Sometimes, a second or even a third block is required on subsequent outpatient visits in order to define the exact site where a small volume, usually 1 mL, of anesthetic provides complete temporary relief. Only those patients experiencing complete pain relief after the injection of local anesthetic were considered for surgical excision. The definitive procedure was performed in an operating suite. The patients received no preoperative sedation until the nerve block was administered. This permits accurate assessment to confirm complete pain relief. When preoperative sedation has been inadvertently given, the procedure should be rescheduled for another day.

The definitive nerve blockade was administered with a small amount (approximately 1 mL) of vital blue dye added to 3 to 5 mL of the local anesthetic (Fig. 1). Ideally, 1 mL 0.5% bupivacaine/vital blue dye mixture was used, thus minimizing the amount of blue-stained tissue that was removed. Once complete pain relief was obtained, the patient was sedated appropriately, and a small 2- to 3-cm incision was made over the injection site and extended to the level near the external oblique fascia, which was stained blue. A small amount of dye usually stains the immediate subcutaneous fat (Fig. 2), but the stained tissue that contained the nerve was found posterior to the external oblique fascia. All of this more posterior blue-stained tissue, which was below the subdermal fat, was excised (Fig. 3). The blue-stained tissue, which was removed typically, contained a small amount of deep subcutaneous fat and a portion of the external oblique fascia; there may have been a small portion of the internal oblique muscle. The involved nerve was usually observed in the resected tissue. The wound was closed with absorbable interrupted sutures.

Pathology identified a cutaneous nerve in all the surgical specimens. All but 1 of the 28 patients had complete relief for a minimum of 12 months when discharged from follow-up. This latter patient required the removal of mesh from her right groin. One patient had temporary relief but developed an abscess at the surgical incision that was associated with a return of pain until the abscess was drained. There was no other complication.

**Comments**

Chronic pain along the distribution of a cutaneous nerve is an uncommon but frustrating problem. This morbid condition may follow any surgical procedure but is most commonly seen after inguinal herniorrhaphy with or without mesh placement and after open cholecystectomy. Patients are frequently seen by pain specialists who provide temporary relief by injecting the site of pain but seldom perform a proximal nerve block. Providing total relief with a proximal block guides the performance of a curative proximal neurectomy without dissecting through the old
scar, removing mesh, and inviting hernia recurrence. By performing the peripheral nerve block, and subsequently the neurectomy, at a site near the anterior superior iliac spine, the nerve is transected proximal to its interaction with mesh placed either through an open or laparoscopic approach. In addition, this technique can direct excision of the particular nerve causing the neuropathy and avoid transecting nerves not contributing to the neuropathic pain.5 This technique was also applied to sensory cutaneous nerves in the cases involving postsurgical pain from cholecystectomies, drain placements, component separations, and groin trauma. The procedure is simple, easily taught, and yields uniformly good results. This small series of 30 procedures in 28 patients represents the more recently treated patients whose data could be easily retrieved through electronic medical records.

References


Discussion

Jonathan M. Saxe, M.D. (Dayton, OH): The group in Detroit has once again tackled a gnawing problem for the general surgeon and provided a cogent and simple solution. The procedure is simple and requires only a monitored anesthetic. I have a couple of questions. Over what period of time is this study? What was the learning curve to develop the technique? How does this approach compare in cost with an already described laparoscopic approach? Would the authors recommend neurectomy in all patients undergoing Lichtenstein repairs as advocated by some. Finally, do you think successful nerve block is an indicator for future success because some of your patients had procedures that are atypical for genitofemoral nerve damage, such as cholecystectomy? Finally, why not use neuroablative techniques before the surgical approach, for instance using alcohol?

Craig M. Kline, M.D. (Detroit, MI): This series was performed over a period of about 5 years; these were the patients whose records could be retrieved through electronic medical records. This procedure is fairly easily taught. My learning curve just required me putting as little local anesthetic as possible. The first time I performed this procedure, I injected 5 or 7 mL of dye. You are going to be excising a lot of tissue if you do that, but this is one that we teach to all of our surgical residents who rotate through our clinic, and it is one that is fairly easily taught over several applications of the peripheral nerve blockade. This can be applied to inguinal pain and surgical sites anywhere in the abdomen, so it is not limited to the nerves of the inguinal canal. I do not typically advise excision of the ilioinguinal nerve routinely during inguinal hernia repair. And we do not advocate ablative techniques because when we excise the nerve tissue, we can send that to pathology to document that a 2-mL nerve was excised. I think the cost savings and ease of this procedure have advantages over the previously described techniques of excising inguinal nerves for inguinodynia after an inguinal hernia repair.

Christopher McHenry, M.D. (Cleveland, OH): Congratulations on a great outcome for a vexing problem for patients and surgeons. Now that you have mastered your technique and have reported really excellent outcomes, what is the value of the methylene blue dye?

Dr Kline: The methylene blue dye will guide the excision of the nerve. When you mix the blue dye with a local anesthetic, for the definitive procedure, you inject the dye until the patient on the operating table says, “My pain has gone away.” The peripheral nerve blockades performed in the office preoperatively do not use dye, but for the definitive procedure performed in the operating room, mixing
the blue dye will guide you because any of the local anesthetic that is infiltrated around the nerve will be stained blue. When you excise all the blue dye, because the patient’s pain has gone away, by excising all the blue tissue, you will excise the nerve.

Norman Estes, M.D. (Peoria, IL): You had a variety of different etiologies listed, and so for some of the other ones, which may be more upper abdomen, is there a possibility that the pain was not created by the operation? I have had a very good series of patients who have had pain from the 11th or 12th rib or intercostal area radiating down in the postoperative period; the patient is sitting and leaning, and they actually develop some compression of the nerve. Were all of those surgically created, or are you also seeing “slipped rib syndrome” and so forth?

Dr Kline: None of the patients in our series had intercostal nerve involvement, but your question highlights that patient selection is important for this procedure. Patients whose pain is not completely relieved with the peripheral nerve block are not good patients for this technique.