Pain Physician 2007; 10:771-774 • ISSN 1533-3159

Case Report

Squamous Cell Carcinoma Occurring Within Incision of Recently Implanted Spinal Cord Stimulator

Joseph Atallah, MD, Justin Wainscott, MD, David Sloan, MD, Karabeth Moore, MD, and Brenda Fahy, MD

From: University of Kentucky Chandler Medical Center, Lexington, KY

Dr. Atallah is Director of Pain Management Clinic VAMC, Assistant Professor, Department of Anesthesiology, University of Kentucky Chandler Medical Center, VA Medical Center, Lexington, KY.
Dr. Wainscott is with the Department of Anesthesiology, University of Kentucky Chandler Medical Center, Lexington, KY.
Dr. Sloan is Associate Professor of Surgery, Division of General Surgery, University of Kentucky Chandler Medical Center, Lexington, KY.
Dr. Moore is with the University of Kentucky Chandler Medical Center, Lexington, KY
Dr. Fahy is Professor of Anesthesiology, Department of Anesthesiology, University of Kentucky Chandler Medical Center, Lexington, KY

Address correspondence:
Joseph Atallah, MD
VA Medical Center
1101 Veterans Drive
Lexington, KY 40502
E-mail: jatallah99@yahoo.com

Disclaimer: There was no external funding in the preparation of this manuscript.
Conflict of interest: None.

Manuscript received: 07/02/2007
Revisions received: 08/23/07
Accepted for publication: 09/04/2007

Free full manuscript:
www.painphysicianjournal.com

Spinal Cord Stimulation (SCS) is a treatment option for chronic pain patients. Spinal cord stimulation has been employed in the treatment of chronic pain for more than 30 years. The most common indication for SCS is the failed back syndrome with leg pain. Its indications have expanded beyond back and lower extremities pain to include axial low back pain, CRPS, mesenteric ischemia, peripheral neuropathy, limb ischemia, and refractory angina pectoris. The SCS has become a more versatile form of analgesia.
The number of wound complications will surely rise in conjunction with the increasing number of devices being implanted.

We describe a case of a well-differentiated squamous cell carcinoma occurring within the incision site of a recently implanted spinal cord stimulator early in the postoperative period.

The patient developed a rapidly growing mass within the leads incision. The mass was confirmed to be squamous cell carcinoma by biopsy. The mass was excised under local anesthesia with appropriate margins. It was determined that the carcinoma did not extend below the dermis, and that there was no involvement of the underlying fascia. The device was tested for proper functioning, and the leads were thus left in place.

While the development of skin malignancies in surgical wounds has been described in the literature, to our knowledge there have been no reports of a cutaneous neoplasm developing early in the postoperative period after spinal cord stimulator implantation.

Key words: Spinal cord stimulator, CRPS type 1, squamous cell carcinoma

Pain Physician 2007; 10:771-774

A 59-year-old male first presented to our clinic 5 years ago with complaints of leg and back pain. He had previously been diagnosed with complex regional pain syndrome (CRPS) type I of the left leg after suffering a coal mining accident. His back pain had progressively worsened since the accident. Physical examination and computed tomography imaging of the lumbar spine demonstrated multilevel disc degeneration, spinal stenosis, and facet arthropathy.

The patient's back pain was well-controlled over the next few years with lumbar epidural steroid injections, facet injections, and radiofrequency neurotomy. The patient initially refused to address his CRPS pain because it was a work-related injury. The CRPS symptoms, however, continued to worsen. De-

spite some initial reluctance, the patient agreed to be evaluated for spinal cord stimulator implantation.

After satisfactory psychological evaluation, the patient underwent uneventful implantation of a spinal cord stimulator (Advanced Bionics). A trial period was discussed with the patient preoperatively. The patient expressed a preference of immediate implantation without a trial period if good coverage of pain was achieved during the trial in the operating room. The patient understood and agreed to the risks of the possibility of failed implantation and the risks of implanting the battery. The patient was able to communicate during the procedure and due to the pain relief achieved reiterated his desire not to have a trial period.

Stimulating leads were placed at the level of T12 on the left and T9 in the midline, yielding excellent coverage of his leg and back pain. Preoperative antibiotic coverage of cefazolin 1 g intravenous was given to the patient 1 hour before start of the incision and the patient was discharged with antibiotic coverage consisting of 2 weeks of oral Keflex. At the 2-week follow-up visit, the patient reported excellent relief of his back and leg pain, and also that he had begun to taper his usual dose of oxycodone sustained-release 40 mg every 12 hours.

Inspection of the back incision (site of lead placement) revealed some faint erythema over the upper aspect of the incision. The patient denied any fever or chills. The patient also complained that this area was mildly tender. Although the patient had no constitutional signs and wound infection was not highly suspected, laboratory studies including a white blood cell count and erythrocyte sedimentation rate were drawn. These values returned normal, the sutures were removed, and the patient was sent home with follow-up instructions.

Approximately 3 weeks later, the patient returned to the clinic complaining of a raised area along the upper part of the back incision (same area). The neurosurgical service was consulted and examined the patient. A pea-sized keloid was noted near the upper margin of the incision, with an associated piece of vicryl suture underneath. The surgeon removed this small piece of suture under aseptic technique, and the patient was sent home. There were no signs of infection, and the surgeon did not feel that this small stitch granuloma would compromise healing. The patient was instructed to call if there were any interval changes before his next scheduled clinic visit.

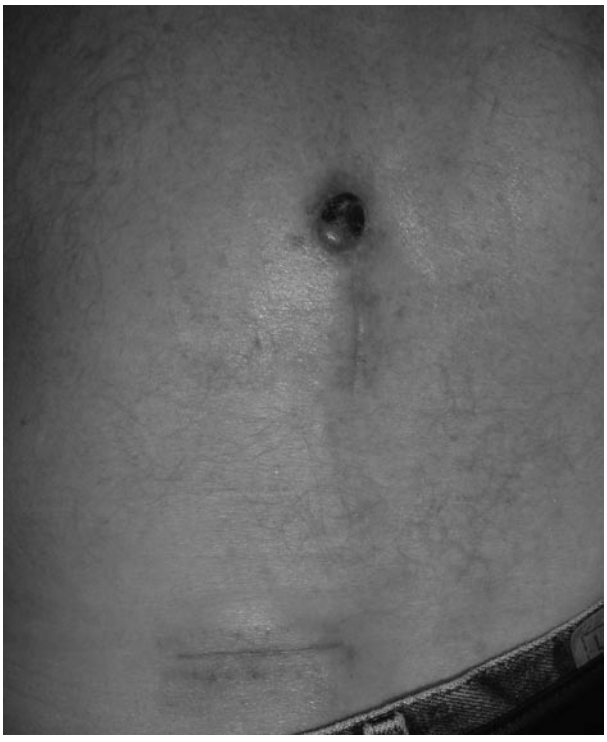

Fig. 1. *Lesion with pigmented crust overlying the surface. This photo was taken after the shaved biopsy was obtained.*

Three weeks later, the patient once again returned to us complaining that the lesion on the upper part of the incision had expanded in size. General surgery service was consulted to examine the patient. The lesion had become increasingly tender to palpation and was measured at 2 x 1.5 cm. There was also a newly developed pigmented crust overlying the surface (Fig. 1). The patient was referred to dermatology where a shave biopsy of the lesion was performed. Biopsy confirmed well-differentiated squamous cell carcinoma.

The plan at this point was for the general surgeons to excise the lesion, and for the device to be removed if there was involvement of the leads. The patient was taken to the operating room and placed in the prone position. Both the lead incision site and the pulse generator site were prepped in the event the lead needed to be disconnected from the generator. It should be noted that there was no extension lead between the electrodes and the generator. The mass was excised under local anesthesia with appropriate margins. It was determined that the carcinoma

did not extend below the dermis, and that there was no involvement of the underlying fascia. The device was tested for proper functioning, and the leads were thus left in place. On completion of the procedure, the patient's pain control remained excellent and he was very satisfied from the stimulator coverage and pain control, and he was discharged home.

With the size of the carcinoma and the surgery revealing no penetration of the lesion through the dermis, the surgical and internist experts' opinion was that this was a primary lesion. Further investigation or further metastatic workup for an occult primary to rule out a metastatic lesion was not required, as squamous cell carcinoma grows locally by expansion and infiltration initially and when it metastasizes it spreads first to local lymph nodes. Plans were made for regular complete skin examination for follow up.

Discussion

A recent systematic review of the literature found the incidence of complication after spinal cord stimulator implantation to be approximately 34% (1). While equipment failure and the need for lead revision make up the majority of these adverse events, wound complications also frequently occur. As in all surgical procedures, infection and dehiscence may plague the early postoperative period. In addition, there is also the rare possibility of epidural hematoma (2), CSF leak (3), allergic reaction to components (4), and epidural abscess (1). Our patient developed a very unusual complication a few weeks after the procedure. The differential diagnosis of skin lesions recently occurring after incisions includes wound infection, hematoma, wound necrosis, stitch granuloma, seroma, or malignancy. Extensive literature search yielded one similar case of a cutaneous malignancy occurring in the surgical incision after a total knee replacement (5). While malignancy within incision sites has been reported in the gynecologic literature, these are generally found to be recurrences of a primary cancer (6,7). Metastatic carcinoma to the skin is uncommon occurring 5% or less of the time (8) with the most common skin metastic histopathologies being adenocarcinoma and undifferentiated carcinoma while squamous cell carcinoma rarely reported (9). Squamous cell carcinoma of the lung (for example) will metastasize to the subcutaneous fat or dermis but this manifests as a subcutaneous or subdermal nodule. In the case under study, the patient's lesion was clinically consistent with a primary skin cancer.

While initially perceived as a stitch granuloma, the rapid change in appearance and the increasing tenderness of the lesion prompted biopsy. Preoperatively, potential options were discussed with the patient including alternate pain modalities for the spinal cord stimulator. The patient desired a spinal cord stimulator because of the pain relief it provided in the past. The patient understood the potential risks of reoccurrence of the lesion and desired to take those risks due to his previous experience with inadequate pain control with other therapies. The plan was removal of the previous leads and re-implantation of new leads in a different location if the area of the lead was involved with the lesion and if, at the time of surgical removal of the carcinoma, the pain physician was in the operating room. The site of the lead and the battery incision sites were prepped for the possibility of removal of the leads. The leads were not found to be involved in the lesion and thus remained in place. The patient was observed in the postoperative period by the surgical team with no signs of recurrence of the lesion.

Conclusion

Spinal cord stimulation has been employed in the treatment of chronic pain for more than 30 years, and its indications have expanded beyond CRPS to include mesenteric ischemia (10), peripheral neuropathy (11), limb ischemia (12), and refractory angina pectoris (13). The number of wound complications will surely rise in conjunction with the increasing number of devices being implanted. Several recent studies in the literature have looked at methods to help avoid both hardware-related and biological complications (14-16).

Although our case is a unique example of an unusual surgical site complication, several lessons can be garnered. One, close observation and communication with the patient postoperatively allowed us the opportunity to intervene promptly. Two, early consultation with our surgical colleagues facilitated both the diagnosis of the cancer and timely excision. Finally, from a technical standpoint, our usual way to anchor the leads deep in the lumbodorsal fascia likely helped avoid subcutaneous involvement of the stimulator leads.

References

1. Turner JA, Loeser JD, Deyo RA, Sanders SB. Spinal cord stimulation for patients with failed back surgery syndrome or complex regional pain syndrome: A systematic review of effectiveness and complications. *Pain* 2004; 108:137-147.
2. Franzini A, Ferroli P, Marras C, Broggi G. Huge epidural hematoma after surgery for spinal cord stimulation. *Acta Neurochirurgica* 2005; 147:565-567.
3. Eldrige J, Weingarten T, Rho R. Management of cerebral spinal fluid leak complicating spinal cord stimulator implantation. *Pain Practice* 2006; 6:285-288.
4. Ochani TD, Almirante J, Siddiqui A, Kaplan R. Allergic reaction to spinal cord stimulator. *The Clinical Journal of Pain* 2000; 16:178-180.
5. Warren SB, Jim DA. Cutaneous neoplasm arising from total knee replacement incision in the early postoperative period. *The Journal of Arthroplasty* 2004; 19:235-237.
6. Bader AA, Bjelic-Radisic V, Tamussino KF, Pristauz G, Winter R. Recurrence in a Schuchardt incision after Schauta-Amreich radical vaginal hysterectomy for cervical cancer. *International Journal of Gynecological Cancer* 2006; 16:1479-1481.
7. Pradhan S, Asthana AK, Sharan GK, Kumar M, Sharma OP. Recurrence of carcinoma cervix in the scar of previous cesarean section: A case report. *International Journal of Gynecological Cancer* 2006; 16:900-904.
8. Brady LW, O'Neil EA, Farber SH. Unusual sites of metastasis. *Seminars in Oncology* 1977; 4:59-64.
9. Brownstein MH, Helwig EB. Patterns of cutaneous metastasis. *Archives of Dermatology* 1972; 105:862-868.
10. Ceballos A, Cabezudo L, Bovaira M, Fenollosa P, Moro B. Spinal cord stimulation: A possible therapeutic alternative for chronic mesenteric ischemia. *Pain* 2000; 87:99-101.
11. Daousi C, Benbow SJ, MacFarlane IA. Electrical spinal cord stimulation in the long-term treatment of chronic painful diabetic neuropathy. *Diabetic Medicine* 2005; 22:393-398.
12. Spincemaille GH, Klomp HM, Steyerberg EW, van Urk H, Habbema JD. Technical data and complications of spinal cord stimulation: Data from a randomized trial on critical limb ischemia. *Stereotactic and Functional Neurosurgery* 2000; 74:63-72.
13. Lee AW, Pilitsis JG. Spinal cord stimulation: Indications and outcomes. *Neurosurgical Focus* 2006; 21:1-6.
14. Kumar K, Buchser E, Linderoth B, Meglio M, Van Buyten J. Avoiding complications from spinal cord stimulation: Practical recommendations from an international panel of experts. *Neuromodulation: Technology at the Neural Interface* 2007; 10:24-33.
15. Rosenow JM, Stanton-Hicks M, Rezai AR, Henderson JM. Failure modes of spinal cord stimulation hardware. Journal of Neurosurgery. *Spine* 2006; 5:183-190.
16. Follett KA, Boortz-Marx RL, Drake JM, DuPen S, Schneider S, Turner MS, Coffey RJ. Prevention and management of intrathecal drug delivery and spinal cord stimulation system infections. *Anesthesiology* 2004; 100:1582-1594.