Capsaicin patch for persistent postoperative pain after thoracoscopic surgery, report of two cases

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Abstract: Effective postoperative pain control after thoracic surgery is a significant clinical issue because it reduces pulmonary complications and accelerates the pace of recovery. Persistent postoperative pain syndrome is a recognized and frequent complication after thoracoscopic surgery. The capsaicin 8% patch contains a high concentration of synthetic capsaicin approved for treatment of peripheral neuropathic pain in adults. Little clinical data exist on the use of capsaicin patch in thoracic persistent postoperative pain syndrome. This report included two patients who were evaluated after receiving capsaicin for thoracic surgery. Satisfactory pain relief was achieved in both cases without side effects.

Keywords: Topical capsaicin; neuropathic pain; video-assisted thoracic surgery (VATS); postoperative pain; chronic pain

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Introduction

Pain is still a major concern in the management of patients undergoing video-assisted thoracoscopic surgery (VATS). It is considered as the main hindrance in fast postoperative recovery because of the increase of postoperative complications and reduction of patients' quality of life (1). Persistent thoracotomy pain syndrome (PTPS) is a common event after thoracic surgery (2) accounting for 22–67% of cases (3). In 5% of these patients, the pain has been described as "severe and disabling" and over 40% of patients may still have some degree of pain even at one year after surgery. The clinical characteristics of PTPS are consistent with dysfunction of sensory nerves causing spontaneous pain, paresthesia, hyperalgesia, allodynia, and decreased physical activity. Pain is usually described as burning, aching, electrical and/or shock-like in quality, the same characteristics as those of recognized neuropathic pain syndromes, such as post-herpetic neuralgia and diabetic peripheral neuropathy. Management of PTPS can be challenging as this disorder is difficult to treat and many strategies have been described to reduce such pain. Common treatments for PTPS include opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), steroids, antidepressants, antiepileptics, physical therapy and topical treatments (4,5). High-concentration capsaicin patch achieved European marketing authorization in 2009 for the treatment of peripheral neuropathic pain in non-diabetic adults and has been approved in the USA by the Food and Drug Administration (FDA) for post-herpetic pain. It is well-established in the treatment of postherpetic neuralgia (PHN) and has recently been approved in the EU for the treatment of peripheral neuropathic pain in adults either alone or in combination with other pain medication. Several studies suggest efficacy of topical capsaicin in the treatment of many chronic pain disorders, including peripheral neuropathy, HIV neuropathy and PHN (6-8). However, few data exist on the capsaicin patch use for persistent pain after thoracic surgery procedures.

We describe in this cases series the use of local administration of capsaicin 8% patch in two patients with

severe refractory PTPS after VATS with a complete response following one administration only.

Materials and methods

Procedure for using the capsaicin 8%

The capsaicin 8% patch is contingent upon a healthcare practitioner during a half-day hospitalization. Capsaicin is volatile and highly irritating. Manipulating the capsaicin 8% patch requires professional training and is reserved for nurses in a pain management center (9). The use of a capsaicin 8% patch requires no washout period. It can be used alone or in combination with other treatments for neuropathic pain. The 14 cm × 20 cm (280 cm^2) patch must cover the zone to be treated and a maximum of four patches can be applied simultaneously for a duration of 60 minutes. Capsaicin must not be applied adjacent to mucous membranes due to its highly irritant property. Mucous membranes were therefore protected by a layer of petroleum jelly covered by a dry compress. No local or systemic pretreatments were routinely administered. However, in order to limit the intense burning sensations induced by capsaicin, anesthetist presence was required during the procedure in order to promptly treat any side-effects.

For both patients written informed consent was obtained before the procedure.

Case report

Patient 1

Patient 1 was a 38 years-old female, her past medical history included Hashimoto's thyroiditis in treatment with levothyroxine.

On December 10, 2015, she underwent thoracoscopic removal a mediastinal cyst. The operation was performed by the use of two small incisions at the level of the VIII intercostal space in mid axillary and posterior axillary line. Postoperative course was uneventful and patient was discharged on postoperative day 2.

During post-operative outpatient clinic evaluations, the patient reported the progressive appearance and worsening of thoracic pain in the right side of the chest at the of the past surgical site with an Numeric Rating Scale (NRS) score of 7. Pain was initially managed with nimesulide and paracetamol + codeine with little benefit. For this reason, a second-line therapy with pregabalin and tramadol twice daily which the patient discontinued after 2 weeks for side effects. On July, 3 months later, she presented with persistent thoracic pain symptoms with a NRS score of 6; the patient underwent a single 60-minute application of 179 mg capsaicin transdermal antalgic drug at the level of the posterior surgical incision without any side effects. At a 1-year follow-up visit, the patient has not experienced any pain since the last capsaicin treatment and reported a mean NRS score of 0.

Patient 2

Patient 2 was a 39-year-old male. His past medical history was significant for migraine headaches and asthma. On July 2015, he underwent thoracoscopic left pulmonary apicectomy and mechanical pleurodesis for recurrent primary spontaneous pneumothorax. The procedure was performed with two incisions at the level of the VIII intercostal space in mid axillary and posterior axillary line.

In the immediate postoperative period, the patient complained severe pain to the left side of the thoracic wall and in left hypochondrium. The pain was qualified as sharp, stabbing, aching and burning, with radiation from the posterior thorax to the midaxillary and anterior chest wall with a NRS score of 9.

Long hospitalization was required in order to perform further anesthesiological and neurological evaluations finalized to the adjustment of the antalgic therapy. The first-line therapy was based on oxycodone + paracetamol and carbamazepine, subsequently replaced by tapentadol and pregabalin 75 mg PO twice daily. During subsequent outpatient visits only a poor relief was found, the persistence of neuropathic pain prevented him from working and doing the usual activities (cycling) with a reported NRS score of 7. Furthermore, the patient described moderate side effects of pain medications.

Therefore, on October 2016 a single 60-minute application capsaicin 179 mg transdermal antalgic drug was performed without complications. Ten months after the treatment, the patient experienced only mild pain with an NRS 2 after intense physical activity.

Discussion

Persistent postoperative pain is one of the most common complications after pulmonary resections different specialists have often to deal with. In literature there is a discrepancy in the overall reported incidence of chronic

postoperative pain: it varies from a reported incidence of 30% in the study of Landreneau *et al.* to 57% in Maguire series (10,11). The causative factors of such a high incidence of PTPS are not completely understood and are thought to include both surgical and nonsurgical factors such as the type of surgical incision, duration of the procedure and the use of intracoastal or paracostal sutures (12) and age, genetic predisposition, psychosocial factors, diagnosis and preexisting chronic pain. The introduction of minimally invasive procedures has revolutionized thoracic patient postoperative course with the reduction hospital stay, analgesic requirements and postoperative pain compared to the conventional thoracotomy. Nevertheless, the prevalence of chronic discomfort following VATS procedures has been reported to range between 4–57% (10,11,13). Despite the constant increase of the numbers of VATS procedures, there is still an ongoing debate concerning its appropriate pain control method (14,15) and many strategies have been proposed to reduce postoperative pain after VATS. Furthermore, it has been demonstrated that an optimal control of pain after thoracic surgery can reduce chronic sequelae, highlighting the importance of using the best pain control way (16). These modalities have included opiates, NSAIDs, epidural and paravertebral infusions of local anesthetics, intercostal and phrenic nerve blockades, and cryotherapy (14,15). The underlying cause of PPTS is considered to be predominantly neuropathic (11). Neuropathic pain is very challenging to manage because of the heterogeneity of aetiologies, symptoms and underlying mechanisms: it is often refractory to conventional therapies (17) based on the use of systemic molecules: tricyclic antidepressants, gabapentin, pregabalin or lidocaine 5% plasters are often recommended as first-line treatments. Second-line of treatments generally include tramadol, and in some cases, nortriptyline, imipramine or duloxetine. Strong opioids, other antiepileptics, other antidepressants, cannabinoids, N-methyl-D-aspartate receptor antagonists, memantine, mexiletine and topical low-concentration capsaicin cream are often third-line options (4). Furthermore, most topical treatments require frequent applications (daily for the lidocaine 5% patch) (5). In last years, many studies reported the increase rate of side effects and deaths related to abuse and misuse of opioids for chronic pain (18). In 2016, The Centers for Disease Control and Prevention (CDC) updated a systematic review on effectiveness and risks of opioids for chronic pain. The first recommendation suggests to prefer non-pharmacological therapy and nonopioid therapy for treatment of chronic pain and to use opioids only when benefits for pain and function are expected to outweigh risks (19). Therefore, it can justify the use of alternative treatments such as capsaicin patches for persistent postoperative pain syndromes. Capsaicin 8% patch has been shown to be effective and safe in the treatment of neuropathic pain in adults by four pivotal multicenter randomized double-blind trials and one long-term open-label safety study in support of the marketing authorization application (6-8). These trials demonstrated a mean 30% reduction in pain intensity and at least 30% improvement for 40% of patients. Few studies in literature reported capsaicin use for postoperative pain after thoracic procedures: in the study of Roberts *et al.* study, a patient of chronic post-thoracotomy pain was successfully treated with 8% capsaicin topically (20). To date, no studies have been published in the literature to describe the use of local application of capsaicin patch for the treatment of pain in minimally invasive thoracic surgery patients. To our knowledge, our study is the first study to document this use of capsaicin. In our case series patients were refractory to medical management comprising drugs (antiepileptics and/or antidepressants, step II analgesics), infiltrations, and physiotherapy. It was found that overall capsaicin patch reduced the perceived severity of pain in both patients. Given the limited number of incisions (two incisions in our study), it helps the application of the patch on the site and a successful pain management. Application of the high-concentration capsaicin patch to the thoracic region was well tolerated in both patients without serious adverse reactions. Despite these encouraging results, we would refrain from drawing overly strong conclusions or recommendations regarding the analgesic properties of capsaicin patch in thoracic surgery patients given the limitations of the current study. Further studies are warranted to confirm its role for patients with pain after thoracic surgery and to measure the safety profile of the drug. Future studies will be necessary to verify the role and cost-effectiveness of capsaicin patch in the management with post-thoracotomy pain, and to identify the patient groups that may benefit most.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest

to declare.

Informed Consent: Written informed consent was obtained from the patients for publication of this manuscript and any accompanying images.

References

1. Tschernko EM, Hofer S, Bieglmayer C, et al. Early postoperative stress: video-assisted wedge resection/ lobectomy vs conventional axillary thoracotomy. Chest 1996;109:1636-42.
2. Kehlet H, Jensen TS, Woolf CJ. Persistent postsurgical pain: risk factors and prevention. Lancet 2006;367:1618-25.
3. Gottschalk A, Cohen SP, Yang S, et al. Preventing and treating pain after thoracic surgery. Anesthesiology 2006;104:594-600.
4. Dworkin RH, O'Connor AB, Backonja M, et al. Pharmacologic management of neuropathic pain: evidence-based recommendations. Pain 2007;132:237-51.
5. Garnock-Jones KP, Keating GM. Lidocaine 5% medicated plaster: a review of its use in postherpetic neuralgia. Drugs 2009;69:2149-65.
6. Backonja M, Wallace MS, Blonsky ER, et al. NGX-4010, a high-concentration capsaicin patch, for the treatment of postherpetic neuralgia: a randomised, double-blind study. Lancet Neurol 2008;7:1106-12.
7. Irving GA, Backonja MM, Dunteman E, et al. A multicenter, randomized, double-blind, controlled study of NGX-4010, a high-concentration capsaicin patch, for the treatment of postherpetic neuralgia. Pain Med 2011;12:99-109.
8. Simpson DM, Brown S, Tobias J, et al. Controlled trial of high-concentration capsaicin patch for treatment of painful HIV neuropathy. Neurology 2008;70:2305-13.
9. England J, Wagner T, Kern KU, et al. The capsaicin 8% patch for peripheral neuropathic pain. Br J Nurs 2011;20:926-31.
10. Landreneau RJ, Mack MJ, Hazelrigg SR, et al. Prevalence of chronic pain after pulmonary resection by thoracotomy or video-assisted thoracic surgery. J Thorac Cardiovasc Surg 1994;107:1079-85; discussion 1085-6.
11. Maguire MF, Ravenscroft A, Beggs D, et al. A questionnaire study investigating the prevalence of the neuropathic component of chronic pain after thoracic surgery. Eur J Cardiothorac Surg 2006;29:800-5.
12. Wildgaard K, Ravn J, Kehlet H. Chronic post-thoracotomy pain: a critical review of pathogenic mechanisms and strategies for prevention. Eur J Cardiothorac Surg 2009;36:170-80.
13. Passlick B, Born C, Sienel W, et al. Incidence of chronic pain after minimal-invasive surgery for spontaneous pneumothorax. Eur J Cardiothorac Surg 2001;19:355-8; discussion 358-9.
14. Yoshioka M, Mori T, Kobayashi H, et al. The efficacy of epidural analgesia after video-assisted thoracoscopic surgery: a randomized control study. Ann Thorac Cardiovasc Surg 2006;12:313-8.
15. Fibla JJ, Molins L, Mier JM, et al. The efficacy of paravertebral block using a catheter technique for postoperative analgesia in thoracoscopic surgery: a randomized trial. Eur J Cardiothorac Surg 2011;40:907-11.
16. Gotoda Y, Kambara N, Sakai T, et al. The morbidity, time course and predictive factors for persistent post-thoracotomy pain. Eur J Pain 2001;5:89-96.
17. Jay GW, Barkin RL. Neuropathic pain: etiology, pathophysiology, mechanisms, and evaluations. Dis Mon 2014;60:6-47.
18. Dart RC, Surratt HL, Cicero TJ, et al. Trends in opioid analgesic abuse and mortality in the United States. N Engl J Med 2015;372:241-8.
19. Dowell D, Haegerich TM, Chou R. CDC Guideline for Prescribing Opioids for Chronic Pain--United States, 2016. JAMA 2016;315:1624-45.
20. Roberts C, Morgan L, Hall K, et al. A Case Study in the Use of Capsaicin in the Treatment of Neuropathic Chest Wall Pain and Post-Thoracotomy Intercostal Neuralgia. Open J Anesthesiol 2012;2:99-101.

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