

Continuous Posterior Transversus Abdominis Plane (TAP) block in the management of chronic postsurgical pain of the abdominal wall

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Abstract : We present the case of a 30-year-old man who developed chronic postsurgical pain (CPSP) after coloproctectomy with terminal ileostomy for severe inflammatory bowel disease refractory to medical treatments. CPSP was severe with negative impact on his quality of life and resistant to high doses of tramadol combined with antidepressants and benzodiazepine. Referred to our pain clinic he was first treated with repeated transversus abdominis plane (TAP) blocks which provided short-lasting pain relief. Because of the temporary effect of the infiltrations a catheter was then indwelled in the TAP under ultrasound guidance and local anesthetic was continuously infused for 10-days. Complete analgesia was reported during the infusion and persisted after removal of the catheter. Twelve months later, pain has markedly decreased, is reported as bearable and amenable with low doses of analgesics. A continuous TAP infusion was repeated twice separated by approximately one year. Thereafter no further infiltration was necessary.

Keywords : locoregional analgesia ; transversus abdominis plane block ; chronic postsurgical pain ; abdominal ; inflammatory bowel disease.

INTRODUCTION

Chronic postsurgical pain (CPSP) is a frequent and underestimated complication after abdominal surgery (1, 2) and abdominal wall surgery (3). CPSP after abdominal surgery, which very often has characteristics of neuropathic pain (1), is sometimes resistant to conventional systemic treatments of chronic pain, and can require local infiltration of local anesthetics.

Administration of local anesthetic into the transversus abdominis plane (TAP), i.e. the fascial plane superficial to the transversus abdominis muscle and deep to the internal oblique muscle, produces unilateral sensory blockade of abdominal wall potentially extending from T7 to L1 depending on the landmark based approach (4, 5). TAP block was reported to be efficient at providing postoperative analgesia after different abdominal procedures (4).

Prolonged nerve blockade using a catheter to infuse local anesthetics is commonly considered to

be superior to repeated short-acting locoregional infiltration to treat chronic pain because it breaks more efficiently the “pain cycle” particularly in case of long-lasting pain (6, 7).

Continuous TAP block has been used successfully to extend the duration of postoperative analgesia (4). Therefore this technique could be useful to treat parietal abdominal CPSP. Few articles reported the use of a TAP catheter to treat chronic pain (7, 8). We describe the case of a patient suffering from inflammatory bowel disease (IBD) who complained of CPSP located in the left lateral abdominal wall more particularly at the level of his ileostomy and was successfully managed by a continuous infusion of ropivacaine in the TAP during ten days. The patient gave his informed consent for this case report.

CASE REPORT

A 30 y.o. man with a BMI of 18.3 kg/m² suffering from severe colonic Crohn’s disease resistant to medical treatments underwent colonic resections in 2000 and 2006. The patient had no other medical problem and was not taking medications except for IBD. During the second surgery the coloanal anastomosis was protected by a lateral ileostomy. Perioperative analgesia consisted of preoperative subarachnoid administration of 0.25 mg morphine, intraoperative intravenous administration of 0.1 mg/kg/h ketamine, and of lidocaine 2.0 mg/kg/h after a bolus injection of 1.5

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mg/kg. Paracetamol 1 g every 6 h and tramadol 50 mg every 6 h were given postoperatively. Quickly after surgery the patient complained of peristomal pain increasing over time.

The patient required subsequently a colectomy in 2008. Thoracic epidural analgesia (T9-10 level) using ropivacaine 0.2 % sufentanil 0.5 µg/ml combined with general anesthesia was initiated before skin incision and prolonged during three days after surgery. Intraoperative ketamine was also used. No precise information about postoperative pain score during and after epidural analgesia were available in the medical record of the patient. Unfortunately the intensity of his chronic pain worsened after surgery. After exclusion of surgical complications and of other causes for his pain, the patient was referred to our pain clinic.

Chronic pain was described as burning, and constant with paroxysms. Hyperalgesia and allodynia were reported in the area of the left lateral abdominal wall and more particularly around the terminal ileostomy. The averaged pain score was greater than 5 on a 0 to 10 cm VAS, with exacerbations during activity reaching 10. CPSP impacted negatively his quality of life. When we met the patient for the first time, he was treated with escalating doses of tramadol reaching more than 1500 mg per day, benzodiazepines (30 mg diazepam per day and 2 mg lorazepam at evening) and antidepressants (200 mg trazodone and 45 mg mirtazapine). His analgesic treatment was then managed by the general practitioner. The dose of tramadol was progressively increased by the patient without the knowledge and approval of his doctor.

Different treatments and approaches were then initiated to better relieve the pain of the patient and reduce dependence and tolerance to his analgesics: patch of lidocaine 5%, clonidine 150 µg tid, and finally repeated posterior TAP blocks using 20 ml ropivacaine 0.2% added with clonidine 150 µg. These blocks, ultrasound guided, were performed at the level of the mid-axillary line where the transversus abdominis muscle gets thinner. They provided satisfactory pain relief (pain less than 2-3 on a 0 to 10 cm VAS), but unfortunately only for a temporary period of time (three weeks). Consequently the blocks had to be repeated monthly during two years. Although each block was effective in alleviating pain, no prolongation in the duration of analgesia was observed over time. Moreover, when the blockade wore off, the severity of recurrent pain was not reduced. After consent of the patient and approval of his psychiatrist, we decided to perform

a continuous infusion of local anesthetic through a catheter indwelled in the TAP for 10-days.

Under ultrasound guidance a catheter was indwelled in the posterior TAP (Contiplex®, B. Braun Melsungen AG, Melsungen, Germany). The probe of the ultrasound was placed transversely to the abdomen above the left iliac crest. The needle was inserted in the plane of the probe to reach the TAP posteriorly where the transversus abdominis muscle gets thinner and ends. Twenty ml of 0.2% ropivacaine was injected to open a space in the TAP. The catheter was then introduced 5 cm backwards in this space (Fig. 1).

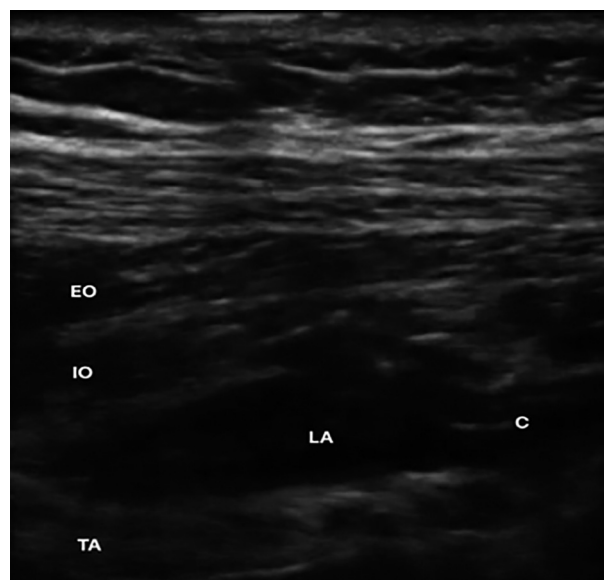


Fig. 1. — Ultrasound image of the postero-lateral area of the abdominal wall after insertion of the catheter (C) in the posterior transversus abdominis plane. EO = external oblique muscle, IO = internal oblique muscle, TA = transversus abdominis muscle, LA = local anesthetic. Front is left and back is right.

An external PCA pump connected to the catheter delivered a continuous infusion of 5 ml/h 0.2 % ropivacaine. The patient was allowed to self-administer on demand one bolus of 2 ml 0.2% ropivacaine every hour. Effective anesthesia of the left abdominal wall was confirmed using cold and puncture tests after the first bolus, but not thereafter. During the 10-days infusion of local anesthetic the patient kept at the hospital reported no pain and did not require bolus injection. Ropivacaine plasma concentration was not measured. 36-hours after removal of the catheter the patient did not complain of recurrent pain.

Thanks to the prolonged pain relief, weaning from tramadol could be started. The patient was discharged from the hospital with tramadol

slow release 100 mg bid and clonidine 75 µg tid. Psychological follow-up and support was provided. Up to 12 months after continuous TAP block, the patient reported a marked reduction of his CPSP, rated at 2. Tramadol weaning was still ongoing. Before the continuous TAP block, the patient reported 3 or 4 acute painful crises every week. Following this continuous infusion, acute attacks were spaced at 3 or 4 per month. Patient's quality of life was greatly improved. The patient was able to perform daily life activities and was highly satisfied with his pain relief. A continuous TAP infusion was repeated twice spaced by approximately one year. Thereafter no further infiltration was necessary.

DISCUSSION

This case provides another example that TAP block can be a useful diagnostic tool and treatment for abdominal chronic pain. Efficiency of TAP block, which affects mainly the innervation of the abdominal wall, for relieving abdominal pain can provide information about its origin; parietal vs. visceral pain. Abdominal chronic pain and particularly abdominal CPSP are not uncommon, but often overlooked and misdiagnosed (1, 2). TAP block can therefore become an interesting technique in the armamentarium for the physicians of pain clinics.

The fact that the duration of pain relief with locoregional anesthesia outlasts the duration of action of the local anesthetic either after one single shot or after a continuous infusion is intriguing, but often observed by anesthesiologists managing chronic pain with locoregional techniques. Inhibition of central sensitization secondary to effective blockage of afferent input is regularly suggested (9).

Continuous neural blockade provides better postoperative analgesia than single-shot perineural block (10). Benefits of continuous peripheral blocks persist after removal of the catheter, however, only for a short period of time. Long-term postoperative functional recovery is not improved after continuous neural blockade as compared to single-shot perineural block (10). In case of chronic pain, however, continuous neural blockades appear superior to repeated single-shot blocks (6). Several potential explanations are proposed: more efficient and prolonged interruption of the "chronic pain vicious circle" responsible for central sensitization, weaning of opiate drugs known to induce hyperalgesia (11), facilitation of rehabilitation medicine which contribute to the recovery of chronic pain patients (6). Furthermore, continuous neural blockade with local anesthetic as

well as TAP block result in significant plasma levels of local anesthetics (12,13). Therefore, systemic effects of local anesthetics (which cannot be excluded particularly after prolonged infusion) may also contribute to this prolonged analgesia. Indeed, intravenously administered local anesthetics have analgesic, anti-inflammatory and antihyperalgesic properties (14, 15) and are effective to relieve chronic neuropathic pain (16).

The sympathetic nervous system plays a pathophysiological role in chronic pain (18), but also in acute postoperative pain (18). Accordingly, Bier blocks with guanethidine were previously used to treat complex regional pain syndrome. Blockade of the peripheral sympathetic nervous system using a continuous brachial plexus block contributes to its efficiency to alleviate complex regional pain syndrome (6). The local anesthetic injected backwards using a posterior approach of TAP spreads along the thoraco-lumbar fascia which contains a network of sympathetic nerves. These nerves could play a nociceptive role (19). Furthermore, this posterior approach can result in some distribution of the local anesthetic solution towards the paravertebral space (4,5). Blockade of the sympathetic nervous system associated with a posterior continuous TAP block can therefore contribute to its analgesic efficiency in case of chronic pain.

Single posterior TAP block with local anesthetic, which can be assimilated to quadratus lumborum block 1, produces a neural blockade lasting between 24 to 48 hours (20). This duration of action being longer than that provided by local infiltration of the abdominal wall is interesting in the management of the chronic pain patient. This locoregional technique is less invasive than other procedures such as epidural technique or coeliac block, which are furthermore contraindicated in some patients. The place of single-shot and continuous TAP block in the armamentarium of the pain clinic is certainly promising and needs to be specified by further studies.

Our patient suffers from Crohn's disease. IBD results in a two- to threefold increase in the risk of developing CPSP after colorectal surgery as compared to other indications (1, 21). Since sensitization of the central nervous system plays a major role in the pathophysiology of CPSP (3, 22), prior inflammation during relapses of IBD, and prior surgeries increase the risk of CPSP for our patient. Finally, our patient is young and presents psychological instability, both known as risk factors of CPSP (22).

CONCLUSION

In conclusion, posterior TAP block with local anesthetic is a useful diagnostic tool for patients with abdominal chronic pain. Continuous TAP block represents a potential efficient therapy when chronic pain is originating in the abdominal wall, which needs to be further assessed.

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