

Effect of Ultrasound-Guided Transversus Abdominis Plane Block Combined with Lornoxicam on Pain and Recovery Quality After Abdominal Surgery in Patients with Drug Addiction

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Abstract: *Objective:* This paper aims to analyze the analgesic effect of ultrasound-guided transversus abdominis plane block (TAPB) combined with non-steroidal anti-inflammatory analgesic drug lornoxicam on abdominal surgery in patients with a history of drug addiction. *Methods:* 32 patients aged 18–60 who underwent lower abdominal surgery in the First People's Hospital of Liangshan Yi Autonomous Prefecture and Butuo County People's Hospital of Liangshan Yi Autonomous Prefecture from January 2022 to March 2023 were selected, the patients must have drug abuse history for more than 1 year, with a history of drug withdrawal and relapse. The patients were divided into observation group and control group by the envelope method, with 16 cases in the observation group and 16 cases in the control group. Two groups of patients underwent ultrasound-guided bilateral transversus abdominis plane block after the operation. The observation group was treated with dexmedetomidine hydrochloride 1µg/kg + 0.25% ropivacaine hydrochloride 40ml, and the control group was treated with 40ml 0.9% sodium chloride injection, the two groups of patients returned to the ward after operation and given intravenous infusion of lornoxicam for relieving the pain. The visual analogue scale (VAS) score of postoperative pain, the times of rescue analgesia, the time of postoperative anal exhaust, the time of ambulation, nausea and vomiting, withdrawal symptoms, related adverse reactions, and hospitalization days were compared between the two groups. *Results:* The VAS score of postoperative pain in the observation group was significantly lower than that in the control group, $P < 0.05$. Patients in the observation group used less postoperative rescue analgesics than those in the control group, $P < 0.05$. For postoperative anal exhaust time, the difference between the two groups of patients was relatively small, and the time in the observation group was shorter, $P > 0.05$. The time to get out of bed and the length of hospital stay were not significantly different between the control group and the observation group, $P > 0.05$. The withdrawal symptoms of the patients in the observation group were better, $P < 0.05$, nausea and vomiting, and other adverse reactions were lower in the control group, $P < 0.05$. *Conclusion:* Ultrasound-guided transversus abdominis plane block combined with lornoxicam can be used to relieve pain in abdominal surgery for patients with drug addiction, which can effectively improve the therapeutic effect of patients and reduce the number of postoperative rescue analgesia. Thus, it has high clinical application value.

Keywords: Ultrasound-guided transversus abdominis plane block; Lornoxicam; Patients with drug addiction; Nursing effect

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1. Introduction

Patients undergoing lower abdominal surgery experience postoperative pain, which can lead to insomnia, limited mobility, slower recovery of organ function, and may even lead to urinary retention and pulmonary complications. Therefore, effective postoperative analgesic measures need to be fully applied^[1]. Compared with opioids, non-steroidal anti-inflammatory drugs have a more prominent role in the treatment of postoperative pain in patients. In addition to reducing the amount of opioids, they can also reduce the possibility of adverse reactions in patients with postoperative pain management. This is an important auxiliary drug in the current postoperative analgesia process. Among them, lornoxicam, as a non-steroidal drug of the oxicam class, has more prominent analgesic and anti-inflammatory effects, and its application in postoperative analgesia is becoming more and more common. During the development of modern medical technology, ultrasound-guided transversus abdominis plane block technique is becoming more and more common in different surgical anesthesia. This kind of anesthesia operation is relatively simple with high safety, and it is widely used in the surgical treatment of lower abdominal patients^[2]. During this analysis, the analgesic effect of ultrasound-guided transversus abdominis plane block combined with lornoxicam was mainly studied for patients with a history of drug addiction in lower abdominal surgery, and the specific effects of muscle plane block intervention and lornoxicam application on postoperative pain in these patients were clarified.

2. Research materials and methods

2.1. Research data

From January 2022 to March 2023, 32 cases of lower abdominal surgery with drug abuse history in the First People's Hospital of Liangshan Yi Autonomous Prefecture and Butuo County People's Hospital of Liangshan Yi Autonomous Prefecture were selected, and they had a history of drug withdrawal and relapse, aged 18–60 years old. The patients were divided into observation group and the control group by the envelope method, including 16 cases in the observation group and 16 cases in the control group. There were 13 males and 3 females in the observation group, the age range was 26–56 years old, the average age was 33.58 ± 2.71 years old, and the detoxification time was 9.27 ± 0.38 months. In the control group, there were 16 cases of male patients, the age range was 28–51 years old, the average age was 34.28 ± 2.47 years old, and the detoxification time was 10.05 ± 0.47 months. Comparing the general information of the two groups of patients, the difference was not statistically significant, $P > 0.05$.

The inclusion criteria for this study are as follows:

- (1) Patients who have a clear history of drug abuse for more than 1 year, and have a history of drug withdrawal and relapse.
- (2) Patients who use drug by smoking or intravenous injection of heroin, methamphetamine, ketamine, etc.
- (3) Patients with different withdrawal symptoms such as yawning, runny nose, irritability, etc.
- (4) Patients who are aware of the details of this study and agree to participate voluntarily.

The exclusion criteria in the study are as follows:

- (1) Patients who do not meet the inclusion criteria of this study.
- (2) Patients who have a history of peptic ulcer.
- (3) Patients who suffer from severe organic disease, severe liver, and kidney damage.
- (4) Patients who suffer from severe mental and neurological disease.

Case drop-out and invalid standards are as follows:

- (1) Cases that are not treated strictly according to the treatment plan of this study were excluded.

- (2) Subjects who have adverse reactions during the study will terminate the treatment, those who terminate the treatment due to irresistible non-treatment factors will be dropped out.

2.2. Research methods

The nurses in the anesthesia recovery room selected the patients in the observation group and the control group by the envelope method, and prepared transversus abdominis plane block drugs. After the operation, experienced anesthesiologists performed ultrasound-guided bilateral transversus abdominis muscles planar block (observation group drug: dexmedetomidine hydrochloride 1 μ g/kg + 0.25% ropivacaine, 40ml in total; control group drug: 0.9% sodium chloride injection, 40ml in total), and intravenous antiemetic granisetron 3mg was given, patients were sent back to the ward after recovery from anesthesia. The patients in the observation group and the control group were given intravenous infusion of lornoxicam 8mg + 0.9% sodium chloride injection (250ml) in the ward, every 12 hours. The blinding was unmasked after the postoperative observation was completed. Rescue analgesic in the study was intramuscular injection of dezocine 5mg.

2.3. Observation indicators

The indicators below were observed for the groups.

- (1) Visual analogue scale (VAS) score for postoperative pain: pain score is carried out by VAS, and the specific evaluation criteria are as follows. 7–10 points are severe pain, 4–6 points are moderate pain, 1–3 points are mild pain, 0 point is no pain.
- (2) Number of rescue analgesia used: the specific standard for using rescue analgesics is that patients have moderate or severe pain.
- (3) Other clinical indicators: the differences in anal exhaust time, ambulation time, and days of hospitalization are mainly compared between the two groups.
- (4) Occurrence of adverse reactions: in postoperative care, if the patient has nausea and vomiting, withdrawal symptoms, etc., they are judged as adverse reactions.

2.4. Statistical methods

In this study, statistical software SPSS26.0 was used to carry out data analysis. The counting data was tested by means of variance, and the measurement data was expressed by mean \pm standard deviation (SD). The comparison of data differences between groups passed the *t*-value test. If $P < 0.05$, it means that the difference is statistically significant.

3. Research results

3.1. VAS score of postoperative pain in the two groups

After operation, the VAS score of the control group was 5.27 ± 0.17 , and the average VAS score of the observation group was 2.68 ± 0.72 . The VAS scores of the patients in the observation group were significantly lower, and below 4 points, which was mild pain. The difference between the two groups was obvious, $P < 0.05$, which was statistically significant.

3.2. Number of postoperative rescue analgesia used by the two groups of patients

For the number of postoperative analgesic rescue drugs, the average number of rescue analgesia of patients in the control group was 1.89 ± 0.29 , and only 2 patients did not use postoperative analgesic rescue drugs. The average number of rescue analgesia of patients in the observation group were 0.63 ± 0.17 times, among which

4 patients used analgesic rescue drugs, with one patient used it twice, and the other patients used it once. The patients in the observation group used less postoperative rescue analgesic drugs than those in the control group, $P < 0.05$, and the difference was statistically significant.

3.3. Other clinical indicators of patients in the two groups

Table 1 shows the analysis of postoperative anal exhaust time, ambulation time, and days of hospitalization of the patients in the two groups.

Table 1. Postoperative anal exhaust time, ambulation time, and days of hospitalization of the two groups of patients

Group	Postoperative anal exhaust time (hours)	Ambulation time (hours)	Days of hospitalization (days)
Control group (16 cases)	29.06 ± 3.18	30.00 ± 3.87	7.16 ± 1.98
Observation group (16 cases)	26.34 ± 3.24	31.75 ± 3.28	8.02 ± 2.13

It can be seen from **Table 1** that among the relevant indicators of the two groups of patients, the difference in the postoperative anal exhaust time between the two groups of patients is relatively small, and the time in the observation group is shorter, $P > 0.05$. The ambulation time and days of hospitalization of patients in the control group were shorter than those in the observation group, but the difference was not significant, $P > 0.05$.

3.4. Adverse reactions

In the control group, there were 3 cases of nausea and vomiting during postoperative analgesic treatment, with an incidence rate of 18.75%, 3 cases (18.75%) of withdrawal symptoms, and 2 cases (12.5%) of related adverse reactions. In the observation group, there were 5 cases (31.25%) of nausea and vomiting, 0 cases of withdrawal symptoms, and 3 cases (18.75%) of related adverse reactions. The withdrawal symptoms of the two groups of patients were better in the observation group, $P < 0.05$. Nausea and vomiting, and other adverse reactions were lower in the control group, $P < 0.05$.

4. Discussion

4.1. Problems and requirements of analgesia in patients with drug addiction

After surgical treatment of lower abdominal patients, the postoperative pain is severe, and many patients cannot bear the pain, which will cause the production of a large amount of inflammatory factors in the patient's body. This will increase the possibility of postoperative adverse reactions in patients, and affect the postoperative recovery effect of the patient, prolong the hospitalization time and treatment cost, and even threaten the life of the patient^[3]. At present, multimodal analgesic methods are increasingly used in the analgesic treatment of patients with lower abdominal surgery. The effective application of multimodal analgesic methods can improve the postoperative analgesic effect of patients, which play a positive role in ensuring the safety of analgesia and reducing the possibility of adverse reactions.

In the process of postoperative analgesia after lower abdominal surgery for patients with drug addiction, in addition to considering the effectiveness of the analgesic mode, attention should also be paid to the safety of the analgesic mode. In the case of global drug abuse, drug abuse will seriously damage the patient's physiology and psychology. Patients with drug addiction have complexity and particularity in the anesthesia and surgery treatment process, and the difficulty and danger of the entire anesthesia and surgery treatment process are higher^[4]. In this study, the actual application effect of non-steroidal anti-inflammatory drug lornoxicam

and ultrasound-guided transversus abdominis plane block anesthesia was mainly analyzed. Compared with opioids, lornoxicam used in this study is safer as a non-steroidal analgesic drug ^[5]. During the treatment of lower abdominal surgery for patients with drug addiction, it is necessary to ensure the safety and reliability of anesthesia methods to prevent opioids from negatively affecting the anesthesia of patients with drug addiction. Opioid dependence is unique in itself to drug addicts. At present, there is no developed and ideal treatment method in the research process. The plasma enkephalin concentration of patients with opioid addiction will change to a certain extent, which is an important basis for severe drug dependence in drug addict patients, and there is a certain relationship between plasma enkephalin concentration and the expression level of plasma adenylate cyclase. During the surgical anesthesia treatment for patients with drug addiction, if opioids are used for analgesic treatment, it may lead to tolerance or cross-resistance to opioids, which may increase the dosage of analgesic drugs or the analgesic effect, thus the effect is relatively poor. In addition, after the surgical treatment is completed, the patient may experience withdrawal symptoms due to the re-use of dependent drugs after detoxification, which makes the patient's condition more complicated and leads to an increase in risk. In addition, the damage to the body of patients with long-term drug abuse is relatively serious and systemic. In addition to the brain, the patient's circulatory system and respiratory system are severely damaged, and symptoms such as toxic cardiomyopathy, increased blood pressure, myocardial ischemia, and atrial fibrillation may occur during treatment. During anesthesia and surgical treatment, the vital signs of drug-addicted patients may fluctuate sharply, posing a serious threat to life. Therefore, in the process of anesthesia and postoperative analgesia for patients with drug addiction, in addition to ensuring the analgesic effect and depth of anesthesia, it is also necessary to effectively prevent and control withdrawal symptoms in order to maximize perioperative safety. General anesthesia is the main method in the process of selecting an anesthesia plan. General anesthesia has a certain inhibitory effect on the cerebral cortex and can play its role in preventing withdrawal symptoms. In addition, when choosing postoperative analgesic drugs, it is best to focus on non-opioid analgesic drugs. At present, non-steroidal anti-inflammatory and analgesic drugs are commonly used clinically, for example, lornoxicam has a prominent effect in the postoperative analgesia of drug-addicted patients.

4.2. Analgesic mechanism of lornoxicam

As a short-acting non-steroidal analgesic drug, lornoxicam can not only inhibit the synthesis of prostaglandins to a certain extent, but also activate the release of endogenous morphine and improve the analgesic effect of the drug. Generally, lornoxicam will take effect within 20 minutes of administration, and its half-life can reach three to five hours. The metabolite 5-hydroxylornoxicam will no longer enter the enterohepatic circulation, thus even patients with renal or liver impairment will not have negative effects from the use of lornoxicam. Compared with opioid analgesics, the analgesic tolerance of lornoxicam is more prominent. A research report ^[6] shows that after oral surgery, the dosage of lornoxicam is only 8mg, but its analgesic effect is more prominent than that of 10mg morphine. At present, lornoxicam plays an important role in the postoperative analgesia process. It has outstanding anti-inflammatory and analgesic effects, and can effectively inhibit the biosynthesis of prostaglandins, thereby reducing the inflammatory response of patients and reducing patient pain. Through the study ^[6], it was found that lornoxicam has a prominent inhibitory effect on cyclooxygenase, especially compared with drugs such as diclofenac, piroxicam, and tenoxicam, the inhibitory effect of lornoxicam on cyclooxygenase (COX) is 20–100 times higher, and its analgesic effect is also significantly higher than that of piroxicam, naproxen, indomethacin, and diclofenac at standard doses. Relevant researchers ^[7] analyzed the inhibitory effect of different types of non-steroidal anti-inflammatory drugs on the activity of COX-1 and COX-2 of human leukocytes. Through research ^[7], it is determined that lornoxicam has the most prominent inhibitory

effect and can effectively inhibit COX-1 and COX-2. From this aspect, lornoxicam can be used as an important inhibitory drug to balance COX, and it can play a role in inhibiting the synthesis of prostaglandins in the spinal cord and peripheral areas, and can reduce the hypersensitivity of the pain state caused by surgical trauma during surgical treatment. The overall analgesic effect of the drug has a positive effect.

4.3. Advantages of ultrasound-guided transversus abdominis plane block analgesia mode

During the treatment of lower abdominal surgery for patients with drug addiction, scientific selection of analgesic methods must be made to improve safety. Ultrasound-guided transversus abdominis plane block can reduce the application of addictive analgesics and prevent withdrawal reactions in patients. Due to the particularity of the physical and physiological factors of drug addict patients, in recent years, the methods of anesthesia should be optimized and improved during clinical surgical treatment. The clinical application effect of transversus abdominis plane block acquisition is more prominent. The anterolateral abdominal wall of the body mainly includes the transverse abdominis, the internal oblique, and the external oblique. The fascia layer exists between the muscles of each layer. The anterior branch of the T6–L1 nerve innervates the pain sensation of the abdominal skin and muscles, and the spinal nerve passes through the fascia layer between the transverse abdominal muscle and the internal oblique muscle in the process of transmitting the impulse to the lateral abdominal wall nerve. The analgesic solution is to inject local anesthetics and adjuvants into the fascia layer of the transversus abdominis and internal oblique muscles to relieve pain on the skin and muscle tissue of the anterior abdominal wall. Therefore, transversus abdominis plane block can achieve good analgesic effect in patients undergoing lower abdominal surgery. In clinical practice, this kind of anesthesia application scheme is relatively common in different abdominal operations such as appendectomy, inguinal hernia repair, and cholecystectomy. However, in clinical research ^[8], it was found that the anesthesia effect of transversus abdominis plane block is relatively greatly affected by the success rate of puncture. During the puncture process, it is easy to mistakenly puncture blood vessels and the abdominal cavity, resulting in a series of complications. Therefore, it is necessary to effectively combine it with ultrasound technology to form an analgesic mode of ultrasound-guided transversus abdominis plane block. Ultrasound diagnosis is widely used in clinical setting. During the application process, it can detect the lesions of organs and tissues, and can also use images to display the location of lesions. It plays a vital role in the diagnosis of different diseases. Ultrasonic diagnostic technology can play an auxiliary role in transversus abdominis plane block. By observing the patient's abdomen and tissues with clear images, it can help to understand the myofascial hierarchy, assist in the appropriate selection of needle puncture sites, and ensure the success rate of puncture. During the dynamic puncture detection process, the diffusion of anesthetic drugs can be observed to further ensure the analgesic effect of anesthesia. Ultrasound-guided transversus abdominis plane block is simpler, safer, and more convenient, which improves the feasibility of transversus abdominis plane block to a certain extent. In this study, analgesia through ultrasound-guided transverse abdominal muscle plane block can effectively reduce the use of opioids and promote postoperative recovery of patients.

4.4. Advantages and nursing points of combined analgesic program

At present, the analgesic drugs used in surgical treatment are generally opioids. Although this type of drugs can exert an analgesic effect, there are certain adverse reactions and relatively large clinical restrictions. With the development of advanced medical technology, the application of postoperative analgesia is not limited to opioids, and the application of non-steroidal anti-inflammatory drugs and local anesthetics is becoming more and more common. However, in the actual clinical anesthesia process, using only one anesthetic drug may

result in poor anesthesia. At present, two or more anesthetic drugs are used in the clinical anesthesia process, and the combination scheme can effectively improve the postoperative analgesic effect.

Clinically, if the analgesic effect of lornoxicam alone has a capping effect, it cannot fully relieve the pain of patients in the early postoperative period. The application of lornoxicam and ultrasound-guided transverse abdominal muscle block anesthesia can not only reduce the frequency and dosage of rescue analgesic drugs, but also improve the analgesic effect. In addition to appropriate selection of anesthesia methods and analgesic drugs in clinical practice, attention should also be paid to the postoperative pain care of patients, which can improve the postoperative care effect of patients.

4.5. Research summary analysis

In this study, the VAS score of postoperative pain and the number of postoperative rescue analgesia were significantly lower in the observation group when compared with the control group, the difference was prominent, $P < 0.05$. For postoperative anal exhaust time, the difference between the two groups was relatively small, $P > 0.05$. While the ambulation time and the length of hospital stay were shorter in the control group, the difference was not significant, $P > 0.05$. The withdrawal symptoms of the patients were better in the observation group, $P < 0.05$, while nausea and vomiting, and other adverse reactions were lower in the control group, $P < 0.05$.

To sum up, in the clinical analgesic treatment of lower abdominal surgery for patients with drug addiction, it is necessary to scientifically select analgesic drugs and analgesic methods to reduce the drug withdrawal symptoms of patients while ensuring the analgesic effect. Through this study, the application effect of ultrasound-guided transversus abdominal muscle plane block and lornoxicam combined with analgesia is more prominent, which can reduce the postoperative pain score of patients, reduce the number of rescue analgesia used, and improve the clinical effects of drug addiction patients. The analgesic effect after abdominal surgery has important practical significance.

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Disclosure statement

The authors declare no conflict of interest.

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