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Case Report

Perioperative Analgesia Management for a Chinese Patient with Multiple Traumatic Injuries: A Case Report

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Abstract

Trauma is a leading global health burden, contributing to substantial morbidity, mortality, and healthcare costs. Polytrauma patients frequently endure severe acute pain, which disrupts physiological recovery, delays rehabilitation, and diminishes quality of life. Effective perioperative analgesia is critical for optimizing outcomes, with anesthesiologists playing a central role in developing individualized, multimodal pain management strategies. This case report details the perioperative care of a patient with multiple injuries—including fractures, pulmonary contusion, hemothorax, and soft tissue trauma—following a motor vehicle accident. The analgesic regimen integrated intravenous opioids, regional nerve block, and non-steroidal anti-inflammatory drugs (NSAIDs) to minimize opioid-related adverse effects, mitigate pulmonary complications, and enhance pain control. Multimodal analgesia has become the cornerstone of perioperative pain management in trauma care. During emergency debridement surgery, this approach facilitated hemodynamic stability and adequate analgesia. Following pulmonary recovery, the patient underwent definitive fracture fixation, with continuation of the multimodal strategy. Postoperatively, the patient experienced no opioid-related complications such as respiratory depression, nausea), reported high satisfaction, and achieved early mobilization. This case highlights the clinical benefits of structured, patient-centered analgesia in trauma care, including improved recovery trajectories, reduced healthcare costs, and enhanced safety. Anesthesiologists' expertise in balancing analgesic efficacy with safety is indispensable in optimizing perioperative outcomes for polytrauma patients.

Keywords

Traumatic, Perioperative Analgesia, Regional Nerve Block, Regional Anesthesia, Ultrasound-guided

1. Introduction

Trauma is one of the leading causes of death and disability worldwide [1-3]. Patients with multiple traumatic injuries often face complex pathophysiological changes and severe pain issues. Acute pain not only brings great suffering to patients but may also affect the postoperative rehabilitation process, increase hospitalization costs, and reduce patient satisfaction during hospitalization [4, 5]. Therefore, perioperative analgesia management is of utmost importance in the treatment of patients with multiple traumatic injuries, and anesthesiologists play a key role in this regard [6, 7]. This article reports the treatment process of a patient with multiple traumatic injuries caused by a car accident, with a focus on discussing the strategies and effects of perioperative analgesia management.

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2. Case Report

A 64-year-old female was admitted to the emergency department after experiencing left chest pain due to a car accident. The patient hit her left shoulder on the ground after the car accident, accompanied by right chest pain. She experienced transient confusion for about several minutes after the injury, without limb convulsions, projectile vomiting, or hematemesis. There was left eyelid ecchymosis, left clavicular area ecchymosis with slight swelling, local tenderness, partial restriction of left shoulder joint movement, positive chest compression sign, tachypnea, and a wound visible at the lower segment of the left tibia. After admission, an emergency head-neck-chest examination was performed. The results indicated left frontoparietal and periorbital soft tissue swelling with subcutaneous hematoma formation, slightly increased density in some right frontoparietal sulci, suspected of a small amount of subarachnoid hemorrhage; a linear low-density shadow was seen on the left zygomatic arch, suspected of a fracture; possible pulmonary inflammation with contusion; a small amount of left pneumothorax, hydrothorax, and hemothorax; multiple left rib fractures with some fracture ends separated and displaced; possible incomplete fracture with discontinuous cortical bone at the right 4th anterior rib; left scapular comminuted fracture, linear fracture of the left acromial end of the clavicle and manubrium; right inguinal hernia with abdominal fat as the hernia content. The preliminary diagnoses were: 1. Left scapular fracture, 2. Left clavicle fracture, 3. Manubrium fracture, 4. Left lower leg and knee skin and soft tissue lacerations, 5. Bilateral pulmonary contusions, 6. Left hemopneumothorax, 7. Multiple left rib fractures, 8. Right inguinal hernia, 9. Suspected subarachnoid hemorrhage. The patient had left hemopneumothorax, tachypnea and had undergone closed thoracic drainage. During diagnosis and treatment, the patient presented with extensive soft tissue injuries to the left lower extremity, including an 8 cm laceration in the distal left tibial region, multiple scattered lacerations in the lower leg, and a 3 cm laceration anterior to the left knee joint. The wounds were irregular, with exposed tendons and mild active bleeding. Considering the patient's compromised pulmonary status (secondary to bilateral pulmonary contusions, left hemopneumothorax, and multiple rib fractures), emergency debridement and primary suture repair of the left lower limb wounds were prioritized to mitigate infection risk and stabilize her hemodynamic and respiratory status before proceeding with definitive orthopedic interventions. When entering the operating room, the patient had a painful expression, was in a forced position, unable to lie flat, had bloody secretions from the left closed thoracic drainage, and complained of unbearable pain throughout the body with a visual analog scale (VAS) score of 8. Her pulse oxygen saturation (SpO2) was only 83% with nasal cannula oxygen at 6 L/min. Following a comprehensive assessment aimed at mitigating further pulmonary compromise, we employed a regional anesthesia protocol integrated with low-dose sedation and analgesia to optimize surgical conditions. Before surgery, we administered 4 μg sufentanil and 1 mg midazolam to relieve anxiety under breathing pure oxygen through the mask, and then carefully performed ultrasound-guided sciatic, femoral, and obturator nerve block to meet the needs of the procedure. We performed left serratus anterior plane block (SAPB) postoperatively to relieve the pain caused by the patient's fractured ribs and to facilitate pulmonary rehabilitation. The VAS score was reduced to 4 by the time the patient left the operating room, and non-steroidal anti-inflammatory drugs (NSAIDs) were used to facilitate further recovery in the ward. After 1 week, the patient's respiratory status and pulmonary function improved, the patient underwent left scapular fracture open reduction and internal fixation + left clavicle fracture open reduction and internal fixation under general anesthesia combined with ultrasound-guided brachial plexus block. Postoperative analgesia with PCIA and NSAIDs were used, and patients had VAS scores of 2 to 3. the patient recovered well and was discharged smoothly on postoperative day (POD) 3.

3. Discussion

Patients with multiple traumatic injuries often have tissue damage in multiple areas, with a wide range of pain sources, including fractures, soft tissue injuries, and visceral injuries. This pain is usually severe and lasts for a long time [8, 9]. Acute pain can cause stress reactions in patients, such as increased heart rate, elevated blood pressure, and tachypnea, increasing the body's oxygen consumption and having adverse effects on the patient's respiratory and circulatory systems. Ultrasound-guided serratus anterior plane block (SAPB) is an established fascial plane block technique that provides effective analgesia for traumatic pain associated with sustain multiple rib fractures (MRFs) [10, 11]. SAPB specifically targets the lateral cutaneous branches of the thoracic intercostal nerves, which originate from the ventral rami of the thoracic spinal nerves (T2-T9). These nerves pass through the internal intercostal, external intercostal, and serratus anterior (SA) muscles, providing sensory innervation to the anterolateral thoracic wall musculature and skin. Brachial plexus blockade is a well-established regional anesthesia technique frequently utilized for patients undergoing distal radial fracture repair, which ranks among the most commonly performed orthopedic procedures worldwide [12]. The technique's versatility allows for various approaches (interscalene, supraclavicular, or axillary) to be tailored to individual patient anatomy and surgical requirements. With the development of visualization technology, ultrasound-guided nerve block can display the structure of nerves and surrounding tissues in real-time, enabling anesthesiologists to accurately locate the target nerves, improving the success rate and accuracy of the block [13]. In this case, due

to multiple fractures and soft tissue injuries, the patient experienced severe pain with a VAS score as high as 8, which seriously affected the patient's comfort and surgical tolerance. the ultrasound-guided nerve block technique provided reliable analgesia guarantee for the patient's surgery and postoperative rehabilitation.

Effective perioperative analgesia management is crucial for the treatment of patients with multiple traumatic injuries. Firstly, good analgesia can reduce the patient's pain and improve the patient's comfort and satisfaction. Secondly, analgesia helps to reduce the patient's stress reaction, maintain the stability of the internal environment, and reduce the occurrence of complications. Anesthesiologists play a central role in perioperative analgesia management. Before surgery, anesthesiologists need to comprehensively assess the patient's pain situation and formulate a personalized analgesia plan. In this case, based on the patient's injury sites and pain characteristics, the anesthesiologist selected various ultrasound-guided nerve block techniques to accurately block the conduction of pain signals, achieving good analgesic effects. During the surgery, anesthesiologists need to closely monitor the patient's vital signs and pain reactions and adjust the dose and type of analgesic drugs in a timely manner. After the surgery, anesthesiologists also need to continue to monitor the patient's pain situation and collaborate with ward medical staff to ensure the continuous and effective implementation of the analgesia plan.

4. Conclusion

This case shows that for patients with multiple traumatic injuries, paying attention to perioperative analgesia management, giving full play to the professional role of anesthesiologists, and using reasonable analgesia techniques and drugs can effectively relieve the patient's pain, improve the patient's surgical tolerance and postoperative rehabilitation quality. Multimodal analgesia has become the cornerstone of modern perioperative pain management, with regional anesthesia techniques playing a pivotal role. Ultrasound guidance has revolutionized regional anesthesia practice, offering significant advantages in precision, safety, and efficacy.

Abbreviations

VAS	Visual Analog Scale
SPO2	Pulse Oxygen Saturation
PCIA	Patient-Controlled Intravenous Analgesia
POD	Postoperative Day
SAPB	Serratus Anterior Plane Block
NSAIDs	Non-Steroidal Anti-inflammatory Drugs
MRFs	Sustain Multiple Rib Fractures
SA	Serratus Anterior

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Hwang, B., Jeong, T., & Jo, J. Relationships between trauma death, disability, and geographic factors: a systematic review. Clinical and experimental emergency medicine. 2023, 10(4), 426-437. https://doi.org/10.15441/ceem.23.009

[2] Kwon, J., Lee, M., Moon, J., Huh, Y., Song, S., Kim, S., Lee, S. J., Lim, B., Kim, H. J., Kim, Y., Il Kim, H., Yun, J. H., Yu, B., Lee, G. J., Kim, J. H., Kim, O. H., Choi, W. J., Jung, M., & Jung, K. National Follow-up Survey of Preventable Trauma Death Rate in Korea. J Korean Med Sci. 2022; 37(50): e349. https://doi.org/10.3346/jkms.2022.37.e349

[3] Hisamune R, Kobayashi M, Nakasato K, Yamazaki T, Ushio N, Mochizuki K, Takasu A, Yamakawa K. A meta-analysis and trial sequential analysis of randomised controlled trials comparing nonoperative and operative management of chest trauma with multiple rib fractures. World J Emerg Surg. 2024 Mar 19; 19(1): 11. https://doi.org/10.1186/s13017-024-00540-z

[4] Zanza C, Romenskaya T, Zuliani M, Piccolella F, Bottinelli M, Caputo G, Rocca E, Maconi A, Savioli G, Longhitano Y. Acute Traumatic Pain in the Emergency Department. Diseases. 2023 Mar 3; 11(1): 45. https://doi.org/10.3390/diseases11010045

[5] Blondonnet R, Begard M, Jabaudon M, et al. Blunt Chest Trauma and Regional Anesthesia for Analgesia of Multitrauma Patients in French Intensive Care Units: A National Survey. Anesth Analg. 2021; 133(3): 723-730. https://doi.org/10.1213/ANE.0000000000005442

[6] Chin KJ, Versyck B, Pawa A. Ultrasound-guided fascial plane blocks of the chest wall: a state-of-the-art review. Anaesthesia. 2021 Jan; 76 Suppl 1: 110-126. https://doi.org/10.1111/anae.15276

[7] Patel KM, de Guzman KD, Cronin K, van Helmond N, Krishnan S, Mitrev L, Trivedi KC, Desai RG. Pectoralis I and Serratus Anterior Plane Block Analgesia for Bilateral Mastectomy: A Case Series. Pain Physician. 2024 Dec; 27(10): E1117-E1122.

[8] Farley, P., Griffin, R. L., Jansen, J. O., & Bosarge, P. L. Quantifying Pain Associated With Rib Fractures. *The Journal of surgical research. 2020*, *246*, 476-481. https://doi.org/10.1016/j.jss.2019.09.032

[9] Saranteas, T., Koliantzaki, I., Savvidou, O., Tsoumpa, M., Eustathiou, G., Kontogeorgakos, V., & Souvatzoglou, R. Acute pain management in trauma: anatomy, ultrasound-guided peripheral nerve blocks and special considerations. *Minerva anestesiologica. 2019*, *85*(7), 763-773. https://doi.org/10.23736/S0375-9393.19.13145-8

[10] Nair, A., & Diwan, S. Efficacy of Ultrasound-Guided Serratus Anterior Plane Block for Managing Pain Due to Multiple Rib Fractures: A Scoping Review. *Cureus. 2022*, *14*(1), e21322. https://doi.org/10.7759/cureus.21322

[11] Serra, S., Santonastaso, D. P., Romano, G., Riccardi, A., Nigra, S. G., Russo, E., Angelini, M., Agnoletti, V., Guarino, M., Cimmino, C. S., Spampinato, M. D., Francesconi, R., & Iaco, F. Efficacy and safety of the serratus anterior plane block (SAP block) for pain management in patients with multiple rib fractures in the emergency department: a retrospective study. *European journal of trauma and emergency surgery, 2024: official publication of the European Trauma Society*, *50*(6), 3177-3188. https://doi.org/10.1007/s00068-024-02597-6

[12] Chan, T. C. W., Wong, J. S. H., Wang, F., Fang, C. X., Yung, C. S., Chan, M. T. H., Chan, W. S. H., & Wong, S. S. C. Addition of Liposomal Bupivacaine to Standard Bupivacaine versus Standard Bupivacaine Alone in the Supraclavicular Brachial Plexus Block: A Randomized Controlled Trial. *Anesthesiology. 2024*, *141*(4), 732-744. https://doi.org/10.1097/ALN.0000000000005035

[13] Martin, D. A., Ashworth, H., & Nagdev, A. Ultrasound-Guided Nerve Blocks. Emergency medicine clinics of North America. 2024, 42(4), 905-926. https://doi.org/10.1016/j.emc.2024.05.013

Biography

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