Challenge Journal of Perioperative Medicine

Research Article

A comprehensive retrospective analysis of interfascial plane blocks and peripheral nerve blocks at a tertiary research hospital: Single center experience

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ABSTRACT

Aim: This study aimed to analyze regional anesthesia practices at a tertiary research hospital as a single center during a one-year period (January 2022 to January 2023).

Materials: Data on over 2,000 nerve blocks were retrospectively reviewed, including: type of nerve block performed (peripheral nerve vs. fascial plane, location of block (upper vs. lower extremity), purpose of block (anesthesia or analgesia) and outcomes.

Method: Data was analyzed to assess trends in block utilization, identify preferred block types and locations, and compare the use of peripheral nerve blocks versus fascial plane blocks for anesthesia and analgesia. Additionally, the potential opioid-sparing benefits of fascial plane blocks were evaluated.

Results: The analysis revealed a notable shift towards fascial plane blocks (61%) compared to peripheral nerve blocks (39%). Lower extremity blocks were more common (56%), with sciatic, saphenous, and femoral nerve blocks being the most frequently used. In the upper extremity (44%), infraclavicular and interscalene brachial plexus blocks dominated. Interestingly, fascial plane blocks were primarily employed for analgesia, while peripheral nerve blocks served both anesthetic and analgesic purposes. The study identified opioid-sparing advantages associated with fascial plane blocks, highlighting their potential role in multimodal pain management strategies.

Conclusions: Based on these findings, areas for improvement in regional anesthesia practices were identified. Educational programs will be adjusted accordingly. Future research will delve deeper into patient characteristics, block selection rationale, and incorporate patient-reported outcomes alongside opioid consumption and pain scores. This study serves as a foundation for future enhancements in regional anesthesia practices, aiming to optimize patient care and outcomes.

ARTICLE INFO

Article history:
Received 12 November 2023
Revised 19 December 2023
Accepted 5 January 2024

Keywords:
Interfascial plane blocks
Peripheral nerve blocks
Analgesia
Anesthesia

1. Introduction

Within the realm of anesthesia, a discernible evolution is taking place, marked by the transition from traditional neuraxial techniques to the more sophisticated landscapes of peripheral nerve blocks and fascial plane blocks. This practice shift is underpinned by the confluence of technological strides, particularly in ultrasound, and an enriched comprehension of anatomical nuances [1]. The primary objective is to reduce the general anes-

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ISSN: 2980-292X / DOI: https://doi.org/10.20528/cjpm.2024.01.004

thesia complications, especially in high-risk patients, while effectively managing postoperative pain, leading to reduced complications and shorter hospital stays [2]. Thus, peripheral nerve blocks and plane blocks have emerged as integral components not only in surgical anesthesia but also as fundamental elements of multimodal pain management strategies [3]. One of the primary objectives of the multimodal anesthesia strategy is to make it possible to perform anesthesia without the use of opioids. Regional anesthesia is one of the cornerstones of this strategy [4].

As a high-volume surgical centre, our institution often necessitates the judicious application of regional anesthesia for both perioperative care and postoperative analgesia. The primary goal is to enhance patient comfort after surgery, reduce the length of hospital stays, and minimize the range of pain-related problems. This aligns seamlessly with the evolving global trends in modern anesthesia practices.

2. Material and Method

After Atatürk University Faculty of Medicine Clinical Research Ethics Committee approval. We conducted a review of regional anesthesia procedures from January 1, 2022, to January 1, 2023. The primary goal was to thoroughly assess our compliance with current standards, identifying nuanced areas that required refinement and enhancement.

A retrospective evaluation was conducted on the demographic data of the patients, the regional anesthetic method administered to them, and the distribution of regional anesthesia techniques based on surgical branches.

3. Statistical Method

The data are presented descriptively, and statistical analysis was performed with Microsoft Office Excel 365. All the information is stated as descriptive date and showed as bar and pie chart. In pie charts distributions are stated as percentages and in bar charts as the exact number of blocks performed.

4. Results

Distribution of nerve blocks performed, classified as peripheral nerve and fascial plane blocks are provided in Table 1.

Table 1. Distribution of nerve blocks performed, classified as peripheral nerve and fascial plane blocks.

Peripheral Nerve Blocks (*n*=794)		Fascial Plane Blocks (*n*=1257)	
Sciatic N. Block	198	Serratus Plane Block	203
Ankle Block	35	Transversalis Fascia Plane Block	176
Femoral N. Block	41	Suprainguinal Fascia Iliaca Block	122
Lumbar Plexus Block	15	Superficial Cervical Block	113
Saphenous N. Block	143	Transversus Abdominis Plane Block	109
Obturator N. Block	15	Erector Spinae Plane Block	105
Interscalene Block	75	Parasternal Block	78
Supraclavicular Block	27	Quadratus Lumborum Block	78
Infraclavicular Block	198	Transversus Thoracic Muscle Plane Block	73
Axillary Block	47	Paravertebral Block	53
		Pectoralis Nerve Block	49
		Thoracolumbar Interfascial Plane Block	42
		External Oblique Plane Block	42
		Pericapsular Nerve Group (PENG) Block	14

The data obtained from our thorough investigation revealed a significant record of 2051 peripheral nerve blocks and plane blocks conducted over the specified study period. The plane blocks covered a wide range of anatomical regions, such as serratus, pectoral, parasternal, superficial cervical, erector spinae, transverse thoracic, paravertebral, external oblique, transversus abdominis, transversalis fascia, and thoracolumbar interfascial plane blocks. Concurrently, peripheral nerve blocks encompassed a range of procedures, including sciatic, lumbar plexus, obturator, ankle, femoral, interscalene, supraclavicular, costoclavicular, infraclavicular, and axillary nerve blocks.

Based on the data analysed at our clinic, 61% of the regional blocks conducted over the specified time period are fascial plane blocks, while the remaining 39% are peripheral nerve blocks (Fig. 1). The frequent utilisation of fascial plane blocks in various surgical procedures can be attributed to their efficacy as a component of multimodal analgesia, hence surpassing the usage of peripheral nerve blocks. Despite our center's size, the restriction of peripheral nerve blocks to orthopaedic surgery theatres highlights the disparity in usage rates. Nevertheless, the disparity is minimal.

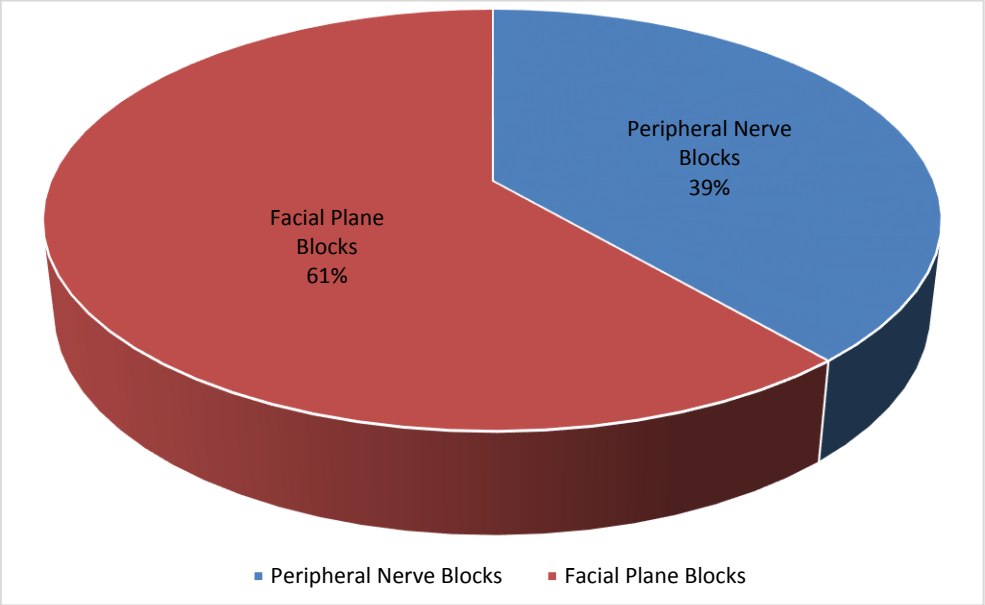

Fig. 1. Distribution of regional anesthetic techniques among peripheral nerve blocks and fascial plane blocks.

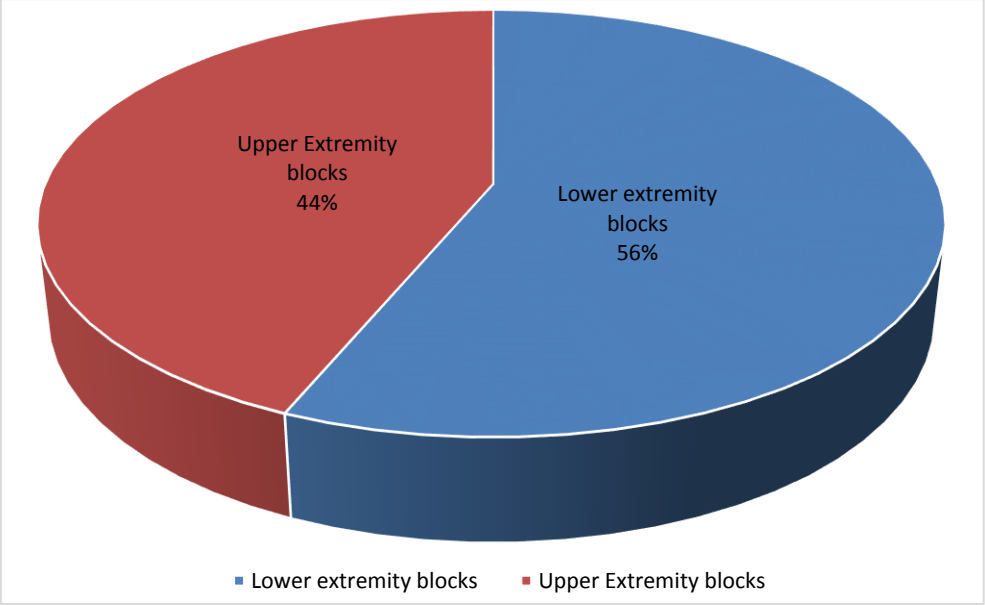

Fig. 2. Regional anesthetic techniques for upper extremities and lower extremities.

Upon examination of peripheral nerve blocks, it is evident that the majority of these blocks mostly involve lower extremity blocks. The incidence of lower extremity blocks is 56%, while the rate of upper extremity blocks is 44% (Fig. 2). The distribution frequency determines the inclusion of sciatic nerve, saphenous nerve, and femoral nerve blocks in the category of lower extremity blocks (Fig. 3a). When analyzing the upper extremity blocks, it becomes apparent that the infraclavicular brachial plexus block is the most frequently executed, with the interscalene brachial plexus block being the second most common (Fig. 3b). Upon analyzing the blocks executed in both the upper and lower extremities, a notable distinction arises in terms of their intended function, revealing that these blocks are predominantly carried out for the goal of anesthesia (Fig. 4).

5. Discussion

Fascial plane blocks, which are prioritized for their opioid-sparing effects as part of multimodal analgesia, are an integral component of our standard analgesic strategy in our clinic [5]. It has been seen that implementing plane blocks, along with non-steroidal analgesics and patient-controlled analgesia [PCA], in the management of postoperative pain following major surgery, leads to a decrease in opioid usage [6]. Upon closer examination of fascial plane blocks, it becomes evident that the Transversus Thoracic Muscle Plane Block [TTMP] is particularly favoured for alleviating sternotomy pain in cardiac surgery [7]. On the other hand, the paravertebral block is commonly chosen as an alternative to thoracic epidural in thoracic surgery cases [8]. In oncological

breast surgery cases, the PECS block is frequently selected (9). The literature data also supports the utilisation of these blocks in these specific orientations. Furthermore, it is known that the preferences for specific surgical plans are altered when there are port site infiltrations in laparoscopic surgeries. The external oblique plane block appears to be the best method, particularly for laparoscopic gallbladder surgeries.

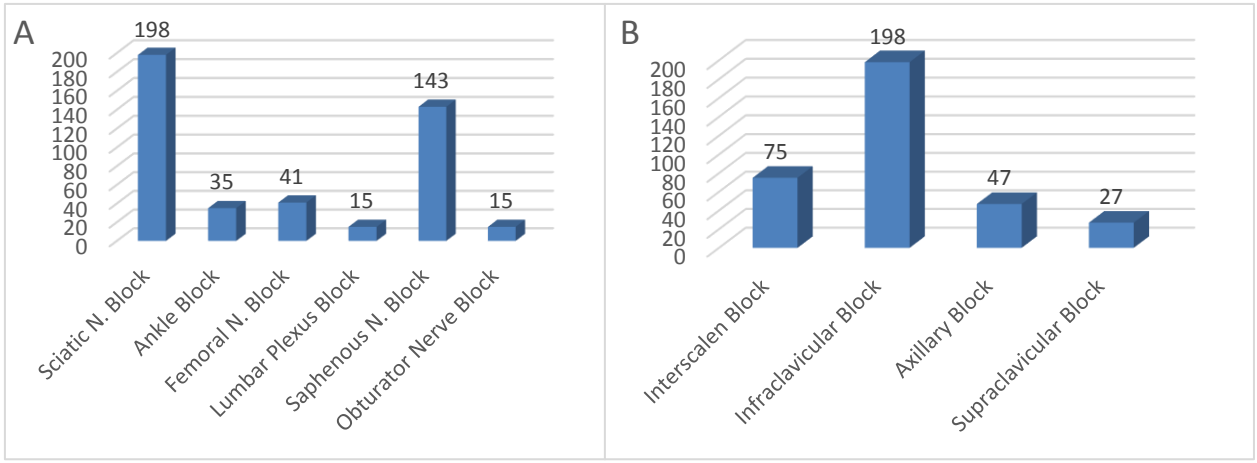

Fig. 3. Distribution of regional anesthesia methods according to blocks in the lower and upper extremities: (a) Lower extremity regional techniques; (b) Upper extremity regional techniques.

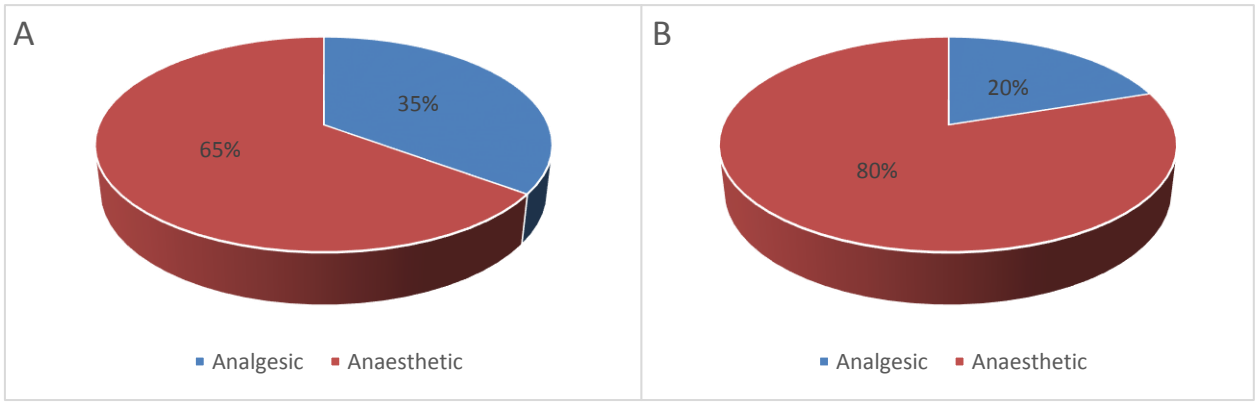

Fig. 4. Distribution of regional anesthesia methods as anaesthetic and analgesic according to blocks in the lower and upper extremities: a) Distribution for lower extremity regional anesthetic techniques; b) Distribution for upper extremity regional anesthetic techniques.

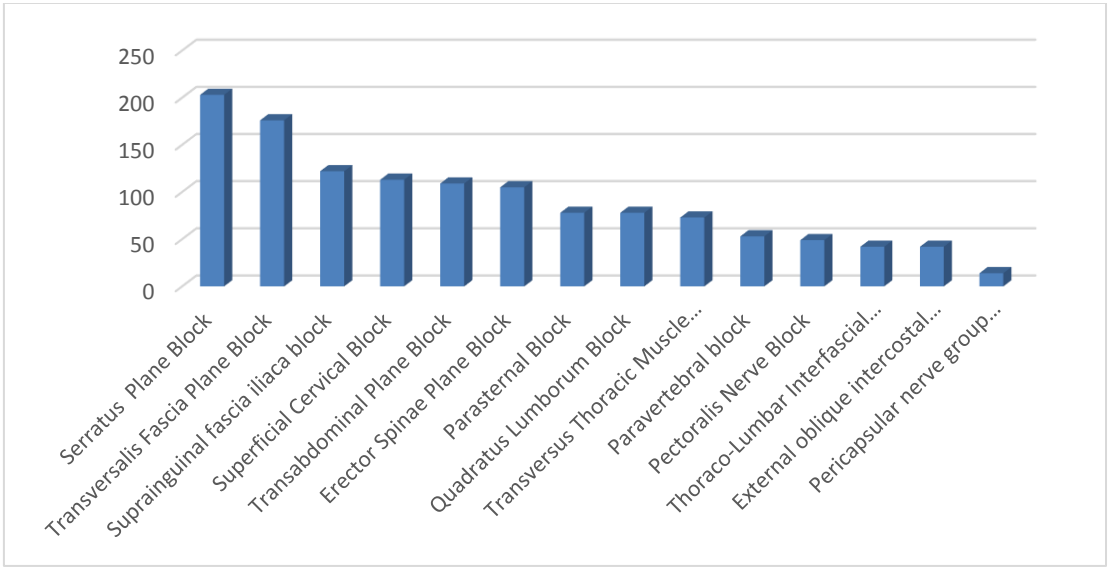

Fig. 5. Distribution of fascial plane blocks.

Upon analyzing the fascial plane blocks, it becomes evident that nearly all of them are designed for analgesic purposes. The constant emergence of novel techniques in fascial plane blocks, along with their potential for further advancement, poses challenges in keeping up with the latest literature. However, an article published in 2020 introduced the concept of "Plane A" blocks, specifically highlighting the erector spinae plane block for the thorax as a prominent example [10,11]. This technique gained widespread popularity and found application as an anaesthetic technique. Its usage has also become prevalent. At our clinic, we utilise the serratus anterior plane block, specifically the erector spinae plane (ESP) block, for targeted procedures as a means of providing anaesthesia.

The strategic use of regional anesthesia techniques not only enhances the patient experience but also aligns with a broader paradigm shift towards patient-centred care. Effective pain treatment beyond the immediate perioperative period has a positive impact on postoperative outcomes, leading to shortened recovery durations and an overall improvement in the patient's quality of life [12].

Although our institution performs a significant number of regional anesthetic treatments each year, this first comprehensive examination of statistical data will prompt us to make adjustments to our educational and training programs. By thoroughly examining the detailed complexities of our practice, we want to enhance our protocols and promote a constant cycle of progress in providing regional anesthetic treatments.

This retrospective analysis acts as a catalyst for future research. The extensive dataset collected during this analysis could be further examined to study trends and patterns in patient characteristics, coexisting medical conditions, and how they influence the selection and effectiveness of particular regional anesthetic methods. These efforts not only enhance the knowledge within the institution but also benefit the broader scientific community by expanding our comprehension of regional anesthesia in various patient groups.

Additionally, incorporating patient-reported outcomes and satisfaction questionnaires in future analyses can offer valuable insights into the comprehensive effects of regional anesthetic on the patient's experience. Gaining insight into the viewpoints, choices, and contentment levels of patients can provide valuable information for developing customized strategies in anesthetic care, promoting a patient-focused model that extends beyond clinical effectiveness.

6. Conclusions

When the findings of the study are analyzed, it appears that it is feasible to assert that our medical facility adheres to the most recent regional anesthesia techniques as well as the requirements that are currently in place in our nation.

Our study has some limitations because it is based on retrospective screening data. Since the patients' postoperative opioid consumption amounts and visual analog scores were not among the scanned data, these data could not be included. Although there is a pain team in our clinic and these data are recorded and patient follow-ups are carried out, previous data recording inadequacies caused that limitation.

To summarize, our retrospective analysis offers a comprehensive overview of the complex network of regional anesthesia procedures at Atatürk University Research Hospital. In our ongoing exploration of the ever-changing field of anesthesia, this reflective analysis acts as a guide for future enhancements, highlighting the intricate relationship between clinical practice, education, and the quest for exceptional patient care.

Acknowledgements

None declared.

Funding

The authors received no financial support for the research, authorship, and/or publication of this manuscript.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this manuscript.

Author Contributions

All of the authors made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; were involved in drafting the manuscript or revising it critically for important intellectual content; and gave final approval of the version to be published.

Data Availability

The datasets created and/or analyzed during the current study are not publicly available, but are available from the corresponding author upon reasonable request.

Ethics Approval and Consent to Participate

This study was approved by the ethics committee of Atatürk University Faculty of Medicine Clinical Research Ethics Committee. All methods were performed in accordance with relevant guidelines and regulations.

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