https://journal.utripoli.edu.ly/index.php/Alqalam/index eISSN 2707-7179

8th Libyan International Conference on Medical, Applied, and Social Sciences

المؤتمر الدولي الليبي الثامن للعلوم الطبية والتطبيقية والانسانية

تحت شعار: التطورات التكنولوجية والاتجاهات الحديثة في التعليم

Original article

Changes in Blood Electrolytes Induced by Anesthesia

Kaothar Abuokraa*, Enas Al-Mahdi, Nofal Abu Shaala, Retaj Alkikly

Department of Anesthesia and Intensive Care, Faculty of Medical Technology, University of Zawia, Zawia, Libya

ARTICLE INFO

Corresponding Email. *k.abuokraa@zu.edu.ly*

Received: *26-04-2024*
Accepted: *21-05-2024*
Published: *26-06-2024*

Keywords. *Electrolytes, disturbance, impact, Anaesthesia, Preoperative and Postoperative.*

ABSTRACT

Electrolyte imbalances can significantly impact anaesthesia management, potentially leading to complications during procedures. Hyponatremia, hyperkalemia, and metabolic acidosis can disrupt crucial physiological processes required for safe anaesthesia, affecting nerve transmission and heart function. Maintaining the proper fluid and electrolyte balance is essential for the body to function normally, emphasizing the importance of monitoring electrolytes during anaesthesia to prevent complications. To investigate the effects of anaesthesia on blood electrolytes, a prospective Cross-sectional design; An observational study was conducted in four hospitals from May to September 2023, involving 50 patients. The study utilized statistical analysis with SPSS, using the Wilcoxon signed-rank test to assess electrolyte levels before and after anaesthesia. A significance level of $p<0.05$ was considered significant in the analysis. The study sample comprised 50 individuals, with 66% females and 34% males, the majority of them were within the 18-60 age range, with the highest proportion in the 20-29 category. Blood tests conducted pre- and post-anaesthesia showed varying distributions: 58% under general anaesthesia, 34% under spinal anaesthesia, and 8% under local anaesthesia. The Wilcoxon signed-rank test results indicated no statistically significant differences in electrolyte means immediately after anaesthesia, suggesting that anaesthesia did not directly impact electrolyte levels. Maintaining correct electrolyte balance is crucial during anaesthesia to ensure normal physiological function and prevent complications that could influence patient outcomes. By recognising the significance of electrolytes, addressing imbalances, and leveraging advancements in research and technology, patient safety and surgical outcomes can be enhanced.

Cite this article. *Abuokraa K, Al-Mahdi E, Abu Shaala N, Alkikly R. Changes in Blood Electrolytes Induced by Anesthesia. Alq J Med App Sci. 2024;7(Supp2):80-87. https://doi.org/10.54361/ajmas.2472212*

INTRODUCTION

Anaesthetic drugs produce unconsciousness by interfering with coordinated neuronal activities in the central nervous system. The interferences with neuronal controls become more extensive with increasing dosages, ending in death by failing one of the basic life processes. Despite their stimulating characteristics, anaesthetics have traditionally been categorized as general CNS depressants. During induction, diethyl ether causes delirium. Anaesthesia and electrolytes are closely linked, as electrolyte imbalances can have significant implications for anaesthesia management. These imbalances, such as hyponatremia, hyperkalemia, and metabolic acidosis, can affect various body processes including cardiac function and nerve conduction, which are essential for safe and effective anaesthesia. Maintaining proper fluid

and electrolyte balance is crucial for normal physiological functions, and any imbalance can lead to complications during anaesthesia. Therefore, it is essential to correct any electrolyte disturbances before administering anaesthesia to minimize the risk of adverse outcomes [1]. An electrolyte imbalance happens when the mineral levels in the body are either too high or too low. This can harm essential physiological systems. For the body to operate correctly, electrolytes must be evenly balanced. Severe electrolyte imbalances can result in life-threatening complications such as coma, seizures, cardiac arrest even death [2].

In general, significant metabolic and electrolyte imbalances occur related to anaesthesia and vary based on the patient's baseline condition and clinical symptoms. It is argued that hypotension, hypothermia, irregular heart rate (e.g., Brady arrhythmia, tachyarrhythmia), hypoventilation, and difficult recovery (e.g., prolonged duration, dysphoria, pain) are five common anaesthetic consequences. The best outcome comes from being prepared to manage anaesthesia problems [3]. This raises several questions, including: How does the anaesthetic technique influence a patient's electrolyte levels? What are the possible causes of changes in electrolyte levels after anaesthesia and surgical procedures? However, this study concentrates on the impact of anaesthetic medication on blood electrolyte levels and will answer these mentioned inquiries.

Fluid and electrolyte control is critical to the surgical patient's treatment. Changes in fluid volume and electrolyte composition occur before, during, and after surgery, as well as in reaction to trauma and sepsis. The next sections go over typical bodily fluid anatomy, electrolyte composition and concentration anomalies and treatments, common metabolic derangements, and alternative resuscitative fluids. These ideas are then presented about the therapy of specific surgical patients with common fluid and electrolyte imbalances [2]. Postoperative surgery patients are prone to electrolyte derangements related to the loss of blood and bodily fluids, the stress response to surgery, intravenous fluid administration, blood transfusion, and the underlying surgical disease [4].

Changes caused by anaesthesia in the blood electrolytes; electrolyte balance and clinical implications; The most important response to anaesthesia and surgery in the perioperative period is sodium and water retention. Sodium (Na+) and potassium (K+) disorders are among the most prevalent metabolic abnormalities recognized by anaesthetists. They can be caused by a wide range of clinical diseases and, if left untreated, can soon become fatal. Although the fundamentals of assessment and treatment are straightforward, basic physiology is frequently misunderstood. Management errors are widespread and can exacerbate underlying issues [5]. The sodium, potassium, calcium, and magnesium concentrations in Pheretima communissima blood and coelomic fluid were measured under various types of anaesthesia or in the un anaesthetised condition. All electrolyte contents in ethanol-anesthetized earthworms were not significantly different from those in un-anesthetised earthworms. Thermal (warming or cooling) anaesthesia, urethane, and chlorine all cause changes in electrolyte concentrations in the blood or coelomic fluid. However, not all electrolytes reacted to anaesthesia in the same way [5].

During anaesthesia and surgery, the body undergoes significant stress, leading to biochemical changes that disrupt the balance of electrolytes in the blood, leading to potential complications such as hypokalemia, hyponatremia, hypokalemia, and hyperkalemia. These imbalances can disrupt normal carbohydrate, protein, and fat metabolism, leading to abnormal blood glucose levels, ketone body accumulation, and abnormal levels of stress hormones. If left untreated, these electrolyte imbalances can result in severe complications, including metabolic acidosis and acute kidney injury. Patients awakening from anaesthesia are affected by a variety of variables. Based on their occurrence, these criteria must be considered while evaluating individuals with delayed awakening problems. The typical therapy measures did not work for our two patients. The patients were retained in the intensive care unit, and further extensive laboratory examinations were performed. The study discovered that hyperventilation-induced hypokalemia or the bidirectional effects of general anaesthesia and electrolyte levels were at work and that their persistence after surgery was the reason for our patients' delay in regaining consciousness. In cases of delayed awakening after anaesthesia, serum potassium testing is advised [6].

Proper management of electrolyte imbalances post-anaesthesia is crucial to prevent complications and ensure patient safety. Factors such as the administration of catabolic hormones and the inhibition of insulin secretion also play a significant role in the metabolic stress response during anaesthesia and surgery. The severity of electrolyte imbalances during anaesthesia can vary from mild diarrhoea to severe complications [7]. Postoperative surgery patients are disposed to electrolyte derangements related to the loss of blood and bodily fluids, stress response to surgery, intravenous fluid administration, blood transfusion, and the underlying surgical disease. Proper management of fluid and electrolytes facilitates crucial homeostasis that allows cardiovascular perfusion, organ system function, and cellular mechanisms to

respond to surgical illness [4]. Electrolyte imbalances are especially common in cancer patients, affecting variations in serum sodium, potassium, calcium, and magnesium levels [8]. The study aimed to investigate the impact of anaesthesia on electrolyte levels, focusing on potassium (K+), sodium (Na+), magnesium (Mg), and chloride (Cl-).

METHODS

Data from 50 patients before and after anaesthesia were collected across four hospitals in Zawia: Zawia Medical Centre (ZMC), Tripoli Central Hospital (TCH), Libyan Foreign Medical Centre (LFMC), and Jasmine Clinic from May to September 2023. The methodology involved gathering patient information, medication history, and vital signs using observational sheets. Blood tests were conducted before and after anaesthesia, with samples analyzed using the Easy Lyte electrolyte analyzer system. Statistical analysis was performed using SPSS version 21, presenting categorical data as frequency and proportion, and quantitative data as mean and median. The Wilcoxon signed-rank test, a non-parametric test, was utilized to compare ranked population averages, with a significance level set at $p < 0.05$ due to the data's non-normal distribution. Overall, the study design provided a comprehensive approach to examining the effects of anaesthesia on electrolyte levels in the study population.

RESULTS

The total number of samples in the study was 50. This includes samples before and after the operation. The majority were females at a rate of (66%), while the male was a rate (34%) as shown in figure 1. According to the type of Anaesthesia used; 29 cases underwent general Anaesthesia, 17 cases underwent regional anaesthesia, and 4 cases underwent local anaesthesia, these cases were from different departments including the general surgery department and gynaecology and orthopaedics department, these cases were from various hospitals and clinics. The distribution of cases according to age the largest percentage of 30% (20-29) 20% (30-39) & (40-49) almost the same percentage and the smallest percentage of 2% (10-19) And 14% (30-39) & (60 - and most).

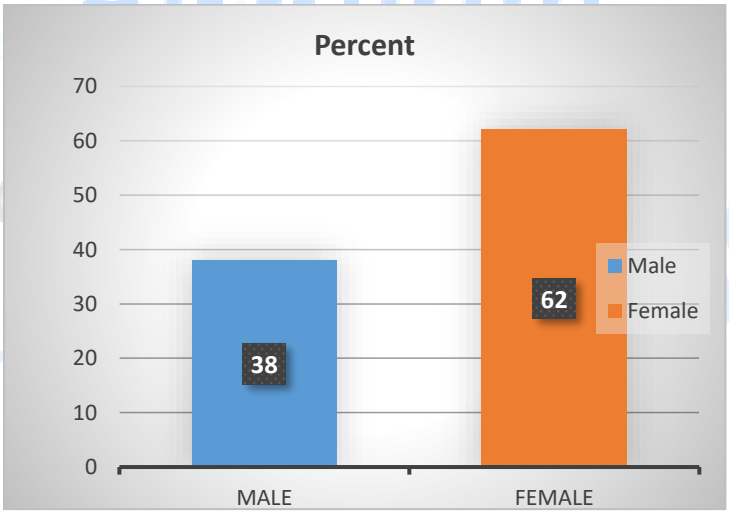

Figure 1. The distribution of cases According to Gender

Table 1 indicates the distribution of cases according to the type of operation the largest per cent 24% for c/s with some 12 cases, the smallest per cent 2% for hysterectomy and prostatectomy and lumpectomy with one case, and cholecystectomy and catheterization and para-thyroidectomy almost the same per cent, which is 8%. While orthopaedic 10% and laparotomy 12%, appendectomy 6%, CA breast 14%, Excision 4%.

Table 1. The distribution of cases according to the type of operation.

Type Operation	Frequency	Per cent	Valid Percent	Cumulative Percent
Orthopedic	5	10.0	10.0	10.0
Laparotomy	6	12.0	12.0	22.0
Hysterectomy	1	2.0	2.0	24.0
Cholecystectomy	4	8.0	8.0	32.0
C/S	12	24.0	24.0	56.0
prostatectomy	1	2.0	2.0	58.0
Catheterization	4	8.0	8.0	66.0
Appendectomy	3	6.0	6.0	72.0
Para-thyroidectomy	4	8.0	8.0	80.0
CA Breast	7	14.0	14.0	94.0
Excision	2	4.0	4.0	98.0
Lumpectomy	1	2.0	2.0	100.0
Total	**50**	**100.0**	**100.0**	

Table 2. The distribution of cases according to health status.

Health status ASA	Frequency	Per cent
ASA I	13	26.0
ASA II	32	64.0
ASA III	5	10.0
Total	50	100.0

Table 2 indicates the distribution of cases according to health status the largest percent 64% in ASA ii with 32 cases and the smallest percent 10% in ASA with 5 cases and ASA it was his percent 26% with 13 cases.

Table 3. Wilcoxon Signed Ranks Test GA

Test Statistics [c]	NA-POST - NA-PRE	K-POST - K-PRE	CL-POST - CL-PRE	Mg- POST - Mg-PRE
Z	-.171[a]	-1.876[b]	-.191[b]	-.297[a]
Sig. (2-tailed)	.864	.061	.849	.766
a. Based on positive ranks. *b. Based on negative ranks.* *c. Wilcoxon Signed Ranks Test*				

Table 3 displayed a Wilcoxon signed-rank test that was performed to determine if there was a statistically significant difference in the mean of electrolytes (Na, K, cl, Mag) before and after General Anaesthesia (GA) immediately. The test concluded that there were no statistically significant differences in mean electrolyte levels before and after anaesthesia. These results indicate that anaesthesia had no significant effect on electrolyte levels

Table 4. Descriptive Statistics for spinal Anesthesia cases.

Test Statistics [c]	Na post - Na- pre	k post - k-pre	cl post - Cl-pre	mg post - Mg-pre
Z	-1.826[a]	-.388[a]	-.966[b]	-1.762[a]
P Sig. (2-tailed)	.068	.698	.334	.078
a. Based on positive ranks. *b. Based on negative ranks.* *c. Wilcoxon Signed Ranks Test*				

Table 4 shows Wilcoxon signed-rank test was performed to determine if there was a statistically significant difference in the mean of electrolytes (Na, K, cl, Mag) before and after Spinal anaesthesia immediately. The test concluded that there were no statistically significant differences in mean electrolyte levels before and after spinal anaesthesia. These results indicate that anaesthesia had no significant effect on electrolyte levels.

Table 5 shows Descriptive Statistics for local Anesthesia cases.

Test Statistics [c]	NA POST - NA PRE	K POST - K PRE	CL POST - Cl-pre	MG POST - Mg-pre
Z	-1.826[a]	-.730[a]	-.921[b]	-.736[b]
P Sig. (2-tailed)	.068	.465	.357	.461
a. Based on negative ranks. *b. Based on positive ranks.* *c. Wilcoxon Signed Ranks Test*				

A Wilcoxon signed rank test for local anaesthesia; the test concluded that there were no statistically significant differences in mean electrolyte levels before and after local anaesthesia These results indicate that anaesthesia had no significant effect on electrolyte levels. As shown in table 5.

DISCUSSION

This observational study was conducted to evaluate the effect of anaesthesia on electrolyte levels. The overall number of anaesthetized cases observed was (50), all participants were surgical department patients of both genders and various ages. However, different types of anaesthesia were used. The majority of the cases were general anaesthesia presented as (29) and spinal 17) cases and local only (4) cases. These cases are distributed according to operation type in the general surgery department. There was a variety of procedures some of them cancer excision cases.

Our finding showed that anaesthesia had no significant effect on electrolyte levels according to blood investigations taken for the patient before and after anaesthesia. Results demonstrate that this is not necessarily true. Contrary to these findings, Previous studies indicated that during anaesthesia, the most important change in blood electrolytes is sodium retention and water imbalance. This can lead to imbalances in other electrolytes such as potassium and disruptions in the normal metabolism of carbohydrates, proteins, and fats Proper management of electrolyte imbalances post-anaesthesia is crucial to prevent complications and ensure patient safety [3]. General anaesthesia has an impact on blood electrolytes due to several factors, including the following: Changes in circulation and vascular function caused by the administration of general anaesthesia drugs can affect the levels of sodium, potassium, calcium, magnesium, and other essential electrolytes.

The use of intravenous fluids during or after surgery can also lead to changes in blood electrolyte concentrations as different fluid components are metabolized differently by the body. Also, loss of appetite associated with recovery from general anaesthesia may reduce dietary intake which can result in lower blood serum levels for various electrolytes such as zinc and magnesium. As well as the redistribution of fluids throughout the body which is stimulated during surgical procedures under general anaesthesia can have an effect on overall hydration states which impacts electrolyte balance along with liquid retention or depletion within major organs like kidneys and intestines [6].

Research has shown that anaesthesia can have a significant impact on blood electrolytes. This is due to some factors, including the following: firstly, Anesthetic drugs often cause dehydration, which can lead to an imbalance in electrolyte levels. Secondly, the amount and type of inhalation agents used during anaesthesia can also affect electrolyte balance by directly affecting gastrointestinal motility or absorption function. Thirdly, during surgery, urine output may be reduced as a result of decreased kidney perfusion caused by hypotension during anaesthesia leading to imbalances in sodium and potassium concentrations. Finally, pain medications used before and after surgery may alter neuroendocrine responses resulting in increased release of hormones that further disrupt normal metabolic reactions necessary for ionic equilibrium [9]. Therefore, different factors might have an impact on electrolyte levels with anaesthesia impact, such as duration of operation, type of operation, hypovolemia, and other medication-related patient health status [10]. The results show that during prolonged surgery, chloride and calcium enter the wounded cells, generating serum hypocalcemia, and potassium departs the skeletal muscle, causing hyperkalemia, which can produce dysrhythmias and possible cardiac arrest. Phosphate also exits the cells, causing hyperphosphatemia (AHA.,2005). Moreover, Major surgery and excessive blood loss Patients who have experienced significant blood loss require replacement with crystalloids or colloids, including blood products. Another study argued that during surgery, pain, stress, sympathetic stimulation, catecholamine release and subsequent -stimulation, certain medications, and respiratory alkalosis owing to hyperventilation can all cause an abrupt shift of potassium into the cells, which is exacerbated in patients with preoperative hypokalemia [6]. Hypokalemia impairs consciousness and promotes muscular relaxation, both of which have an impact on patient awakening. In cases of delayed emergence from anaesthesia, serum potassium testing is advised.

Another research indicated that Sodium (Na+) and potassium (K+) disorders are among the most prevalent metabolic

anomalies recognized by anaesthetists. They can be caused by a wide range of clinical diseases and, if left untreated, can soon become fatal. Although the fundamentals of assessment and treatment are straightforward, basic physiology is frequently misunderstood. Management errors are widespread and can exacerbate the underlying problem.

Different research argued that fasting, anaesthesia, and surgery all have an impact on the body's physiological capacity to control not just its exterior fluid and electrolyte balance, but also the internal balance of the numerous body fluid compartments. Fluid and electrolyte imbalance, on the other hand, may harm organ function and surgical results. Perioperative fluid therapy has a direct impact on outcomes, and prescriptions should be customized to the patient's specific needs. In the elective setting, the goal of fluid therapy is to maintain efficient circulatory volume while preventing interstitial fluid excess if possible. Loss of weight in elective surgery patients should be kept to a minimum to reach "zero fluid balance status." These patients, on the other hand, should arrive in the anaesthetic chamber in a normal fluid state [9,10].

Electrolyte imbalances are common in postoperative surgery patients due to blood and bodily fluid loss, the stress response to surgery, intravenous fluid administration, blood transfusion, and the underlying surgical condition. Alternatively, it could simply mean that appropriate fluid therapy is critical in the perioperative period to protect organ function. Although the physiological principles of fluid and electrolyte control are well documented, there remains a knowledge-clinical practice mismatch. It is argued that the stress response to surgery and hypovolemia with fluid loss has a great effect and leads to electrolyte abnormalities [6].

Others have shown that it is essential that patients receive adequate fluids and electrolytes during and after surgery. This is due to several factors, including the following: Fluids help to maintain blood pressure, which can be decreased as a result of anesthesia, or an infection associated with the surgical process. Also, Electrolyte replacement helps to restore fluid balance in vital organs such as heart and kidney functions that are otherwise compromised by the dehydration caused by pre-operative fasting before surgery [11]. Fluid loss through drainage tubes from certain types of surgeries requires additional fluid intake for optimal healing and tissue recovery processes post-surgery, while electrolyte levels must remain within acceptable norms for cells to continue functioning normally even when they have been deprived of their natural environment or extracellular water losses occur due to excretion channels being obstructed. As well as Poor hydration increases the risk of wound complications such as infection after operation, so fluids mustn't be just replaced but replenished too at regular intervals during long procedures or earlier if there has already been significant dampening down on predisposing elements before any intervention takes place preoperatively speaking – all together helping foster better outcomes way beyond what was initially expected out [7,11]. However, Ensuring Patient Safety is Utilizing advanced patient monitoring technology aids in the early detection of electrolyte imbalances and allows for immediate corrective actions, also Collaborative Healthcare Team is an interdisciplinary approach, involving anesthesiologists, nurses, and other healthcare professionals, ensures comprehensive patient care and safety, and Nutritional Support Providing patients with a well-balanced diet leading up to surgery helps optimize their electrolyte levels and promotes overall health and well-being [12,13]. Consequently, it is important to closely monitor and manage electrolyte imbalances during anaesthesia to prevent complications and improve patient safety [13]. In summary sodium retention and water imbalance are the most important changes in blood electrolytes during anaesthesia. Therefore, the lack of understanding of the aetiology and baseline values made establishing the endpoint of electrolyte correction problematic. Electrolytes are required for basic life functions such as cell electrical neutrality and the generation and transmission of action potentials in neurons and muscles. Sodium, potassium, chloride, magnesium, calcium, phosphate, and bicarbonates are all important electrolytes. Electrolytes are derived from our meals and bodily fluids. These electrolytes can become unbalanced, resulting in either high or low levels which impair normal biological activities and can lead to life-threatening issues. However, anaesthesia can disrupt the delicate equilibrium of electrolytes in the body, leading to potential complications. Understanding and evaluating these imbalances is crucial for safe anaesthesia administration. This study aimed to investigate how anaesthetic affects blood electrolytes and the alterations it creates. Ongoing research and advancements in monitoring technologies aim to further improve our understanding of anaesthesia-induced electrolyte imbalances and enhance patient outcomes. Discover the crucial role of maintaining electrolyte balance during anaesthesia and the impact of anaesthetic medication on sodium, potassium, calcium, and magnesium levels. Electrolyte balance during anaesthesia is a critical aspect of patient care. One concern about the findings was the small sample size different types of operations and variety of ASA health statutes. Another constraint was that several patients were in critical condition after surgery and were admitted to postsurgical Intensive Care Units, so we were unable to collect blood samples from them. Due to the study's limitations, the results could not be generalized.

CONCLUSION

To conclude, according to blood tests performed on patients before and after anaesthesia, our findings revealed that anaesthesia had no significant influence on electrolyte levels. Therefore, proper electrolyte balance is crucial during anaesthesia to ensure optimal physiological function. Imbalances can lead to complications and impact patient outcomes. By understanding the role of electrolytes, addressing imbalances, and embracing advancements in research and technology, we can enhance patient safety and optimize surgical outcomes.

Acknowledgements

We intend to express our gratitude to everyone who helped with any part of our study, from guidance and expertise to manuscript preparation.

Conflicts of Interest

The authors declare no conflicts of interest

REFERENCES

1. Jitpakdee T, Mandee S. Strategies for preventing side effects of systemic opioid in postoperative pediatric patients. Pediatr Anesth. 2014 Jun;24(6):561-8.
2. Nickless G, Hindley B. Electrolyte disturbances: causes and management. Pharm J. 2022 Aug 26;309(7964).
3. Rassam SS, Counsell DJ. Perioperative electrolyte and fluid balance. Contin Educ Anaesth Crit Care Pain. 2005 Oct 1;5(5):157-60.
4. Razavi M, Bameshki A, Gilani T. Delayed awakening from anaesthesia following electrolyte and acid-base disorders, two cases. J Patient Saf Qual Improv. 2014;2(1):65-68.
5. Siparsky N, Sterns RH. Overview of postoperative electrolyte abnormalities. In: Post TW, editor. UpToDate. Waltham (MA): UpToDate; 2020.
6. Siparsky N, Sterns RH. Overview of postoperative fluid therapy in adults. [Internet]. 2017 [cited 2024 May 21]. Available from: https://www.uptodate.com/contents/overview-of-postoperative-fluid-therapy-in-adults
7. Scott MJ, Baldini G, Fearon KC, Feldheiser A, Feldman LS, Gan TJ, et al. Enhanced Recovery After Surgery (ERAS) for gastrointestinal surgery, part 1: pathophysiological considerations. Acta Anaesthesiol Scand. 2015;59(10):1212-31.
8. Rosner M, Dalkin A. Electrolyte disorders associated with cancer. Adv Chronic Kidney Dis. 2014;21(1):7-17.
9. Lobo D, Macafee D, Allison S. How perioperative fluid balance influences postoperative outcomes. Best Pract Res Clin Anaesthesia. 2006;20(3):439-55.
10. Shrimanker I, Bhattarai S. Electrolytes. [Internet]. 2019 [cited 2024 May 21]. Available from: https://europepmc.org/article/med/2019
11. Metheny N. Fluid and electrolyte balance. Sudbury (MA): Jones & Bartlett Publishers; 2012
12. Chen Y, Gong Y. Teamwork and patient safety in intensive care units: challenges and opportunities. Stud Health Technol Inform. 2022 Jun 6; 290:469.
13. Duke G, Harley I. Fluids and Electrolytes. In: Anaesthesia: An Introduction. 2012:52. Available from: https://catalogue.nla.gov.au/catalog/6004237

التغيرات في إلكتروليتات الدم الناتجة عن التخدير

كوثر أبوكراع [1]*، إيناس المهدي، نوفل أبو شعالة، رتاج الككلي

قسم التخدير والعناية الفائقة، كلية التقنية الطبية، جامعة الزاوية، الزاوية، ليبيا

المستخلص

يمكن أن تؤثر اختلالات توازن الإلكتروليات بشكل كبير على إدارة التخدير، مما قد يؤدي إلى مضاعفات أثناء العمليات الجراحية. نقص صوديوم الدم، فرط بوتاسيوم الدم، والحماض الأيضي. يمكن أن يعطل العمليات الفسيولوجية الهامة المطلوبة للتخدير الآمن، مما يؤثر على انتقال الأعصاب ووظيفة القلب. يعد الحفاظ على التوازن المناسب للسوائل والكتروليتات أمرًا ضروريًا لكي يعمل الجسم بشكل طبيعي، مع التركيز على أهمية مراقبة الشوارد الكهربائية أثناء التخدير لمنع حدوث مضاعفات. للتحقيق في آثار التخدير على الشوارد في الدم؛ أُجريت دراسة رصدية في أربعة مستشفيات في الفترة من مايو إلى سبتمبر 2023، وشملت 50 مريضًا. استخدمت الدراسة التحليل الإحصائي باستخدام برنامجSPSS ، وذلك باستخدام اختبار رتبة موقعة ويلكوكسون لتقييم مستويات الكتروليتات قبل وبعد التخدير. تم اعتبار مستوى الأهمية P <0.05 مهمًا في التحليل. تكونت عينة الدراسة من 50 فرداً، 66% إناث و34% ذكور، غالبيتهم من الفئة العمرية 18-60، وكانت أعلى نسبة في الفئة 20-29. أظهرت فحوصات الدم التي أجريت قبل وبعد التخدير توزيعات متفاوتة: 58% تحت التخدير العام، 34% تحت التخدير الشوكي، و8% تحت التخدير الموضعي. أشارت نتائج اختبار رتبة موقعة ويلكوكسون إلى عدم وجود فروق ذات دلالة إحصائية في وسائل الإلكتروليتات مباشرة بعد التخدير، مما يشير إلى أن التخدير لم يؤثر بشكل مباشر على مستويات الإلكتروليتات. يعد الحفاظ على توازن السوائل والالكتروليتات الصحيح أمرًا بالغ الأهمية أثناء التخدير لضمان الوظيفة الفسيولوجية الطبيعية ومنع المضاعفات التي قد تؤثر على نتائج المريض. ومن خلال إدراك أهمية الشوارد، ومعالجة الاختلالات، والاستفادة من التقدم في البحث والتكنولوجيا، يمكن تعزيز سلامة المرضى والنتائج الجراحية.

الكلمات الدالة. الشوارد الكهربائية، الاضطراب، التأثير، التخدير، قبل الجراحة وبعدها