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Are Routine Postoperative Laboratory Tests Justified in All Patients Who Undergo Total Hip Arthroplasty?

Luis Angel Montero Furelos *, María Concepción Suárez Sanjuás, Santiago Cons Lamas, Renzo Junior Chavez Reyes, Francisco Borja Sánchez Sierra

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Are Routine Postoperative Laboratory Tests Justified in All Patients Who Undergo Total Hip Arthroplasty?

Montero Furelos LA *, Suárez Sanjuás MC, Cons Lamas S, Chavez Reyes R and Sánchez Sierra B.

Departament of Orthopaedic Surgery, Hip Unit. University Hospital Complex of Santiago de Compostela Santiago de Compostela, La Coruña, Spain

* Correspondence: luismonty@hotmail.com

Abstract: Introduction: Post-surgical laboratory testing is commonly performed in patients after hip arthroplasty. Considering recent trends towards reduced transfusion rates, is it still necessary? **Materials and Methods:** We conducted clinical-laboratory follow-up on patients undergoing primary hip arthroplasty. We collected demographic data (sex, age, comorbidities, and risk factors for postoperative laboratory abnormalities), laboratory tests (hemoglobin (Hb), creatinine (Cr), sodium (Na)), pre-anesthetic assessment (ASA), surgical details (side, surgical approach, operative time, use tranexamic acid, intraoperative complications), laboratory results at 24 and 48 hours post-surgery, and changes in medical therapy based on laboratory findings. **Results:** 125 patients (73 women, 52 men), mean age 66.9 years. Preoperative laboratory: Hb 14.12 g/dL, Cr 0.84 mg/dL, Na 140.8 mEq/L. ASA classification: I (n=3), II (n=79), III (n=36), IV (n=2). Surgical approaches: posterior (n=74), anterolateral (n=51). Mean operative time: 76 minutes. Postoperative laboratory at 24 hours: Hb 11.69 g/dL (no differences between approaches, age, sex, IBM and operative time), Cr 0.94 mg/dL, Na 138.86 mEq/L. At 48 hours: Hb 11.07 g/dL. Tranexamic acid (TXA) was not used in 11.5% of patients, which was associated with a 13.9% transfusion rate, 0% in those who received TXA (p=0.046, Fisher's test). Medical complications in 16% of patients. The most frequent therapy adjustment was transfusion, in 7% of patients (2.5% ASA II, 17% ASA III), though not statistically significant (Chi-square). No statistically significant associations with analyzed parameters were observed. **Conclusions:** Routine laboratory tests do not provide clinical benefit for most patients. Postoperative Hb testing should be reserved for those with additional indications, ASA III or higher patients in whom blood-saving strategies cannot be fully implemented.

Keywords: blood loss; tranexamic acid; complications; laboratory tests; outcomes; total hip arthroplasty

1. Introduction

Total hip arthroplasty (THA) is one of the most common and effective elective orthopedic surgeries performed worldwide. It serves as a definitive treatment for patients suffering from degenerative hip diseases, including osteoarthritis, rheumatoid arthritis, avascular necrosis, and hip fractures. As medical advancements continue to refine surgical techniques and perioperative care, the focus of healthcare providers has shifted toward optimizing recovery protocols to enhance patient outcomes and reduce hospitalization times. One aspect under scrutiny is the necessity of routine preoperative and postoperative laboratory tests. Given the growing emphasis on cost-effective healthcare and accelerated recovery pathways, it is crucial to assess whether both pre- and postoperative laboratory evaluations are essential for all patients undergoing THA.

Preoperative laboratory testing has long been a standard practice to identify potential health risks that may impact surgical outcomes. A key goal of preoperative evaluation is to detect and correct any abnormalities that could increase perioperative morbidity and mortality. A study by

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Ondeck et al[1] analyzed data from 92,093 THA patients between 2011 and 2015, highlighting that abnormal preoperative creatinine and hyponatremia levels were significantly associated with adverse postoperative outcomes. However, they found no significant association between hypernatremia and surgical complications. Another retrospective analysis of the ACS-NSQIP database (2011–2017) demonstrated that both hyponatremia and hypernatremia are predictive of adverse outcomes, with hypernatremia linked to prolonged ventilation, cardiac complications, and increased mortality rates[2]. These findings reinforce the importance of targeted preoperative assessments to stratify risk and optimize patient health before surgery.

Among the routine preoperative tests, hemoglobin (Hb) measurement plays a crucial role in assessing a patient's anemic status and determining the need for preoperative optimization. Anemia is a well-recognized risk factor for perioperative complications, including increased transfusion rates, prolonged hospital stays, and higher rates of postoperative infections[3,4]. The primary goal of preoperative optimization is to minimize perioperative anemia and, consequently, the need for blood transfusion. Although transfusions remain the standard intervention for perioperative anemia, they are not without risks. Studies have suggested that allogeneic blood transfusions can lead to immunomodulatory effects, increasing the risk of infections and delaying recovery. Additionally, excessive reliance on blood transfusions adds to healthcare costs and resource utilization. Thus, preoperative strategies aimed at optimizing hemoglobin levels, such as iron supplementation, erythropoiesis-stimulating agents, and nutritional interventions, have been explored to reduce transfusion requirements and improve patient outcomes.

Postoperative laboratory tests, particularly hemoglobin measurements, have traditionally been performed to identify patients at risk of requiring blood transfusion. However, emerging evidence suggests that routine postoperative Hb testing in all patients may not be necessary. Several studies indicate that hemoglobin levels tend to decline significantly only from the second postoperative day onward, making routine day-one Hb testing redundant in many cases. Instead, postoperative Hb assessments should be more selectively conducted in high-risk patients, such as those with preoperative risk factors (renal or cardiac disease, high ASA scores, Hb <12 g/dL), intraoperative risk factors (significant blood loss, prolonged surgery), or postoperative complications (symptoms of anemia, hematoma formation)[5,6]. By adopting a more targeted approach, healthcare providers can reduce unnecessary blood draws, minimize patient discomfort, and decrease hospital costs without compromising patient safety.

Similarly, hyponatremia (serum sodium levels <135 mEq/L) is a frequently observed postoperative finding in THA patients. While mild and transient cases of hyponatremia are often benign and self-limiting, severe or persistent hyponatremia can lead to serious complications, including cerebral edema, confusion, seizures, and increased mortality. The risk of postoperative hyponatremia is particularly heightened in elderly patients, those with multiple comorbidities, and those on polypharmacy regimens, particularly diuretics[7,8]. Given the increasing proportion of elderly patients undergoing elective THA, it is critical to balance the need for effective postoperative monitoring with the goal of minimizing unnecessary testing. Identifying patients at high risk for significant hyponatremia can allow for more judicious use of laboratory resources while ensuring timely intervention when needed.

As healthcare systems continue to evolve, there is a growing emphasis on evidence-based decision-making to optimize patient care while reducing unnecessary costs[1]. The implementation of enhanced recovery after surgery (ERAS) protocols has played a pivotal role in streamlining perioperative care and minimizing hospital stay duration. Within this framework, the judicious use of laboratory testing has become an area of focus, as excessive or unwarranted tests contribute to increased healthcare expenditures without necessarily improving clinical outcomes. By refining preoperative screening criteria and tailoring postoperative laboratory evaluations to high-risk patient populations, clinicians can enhance the efficiency of THA management and improve overall healthcare resource utilization.

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The increasing age of the surgical population further underscores the need for a patient-centered approach in perioperative care. Elderly patients often present with multiple comorbidities, making them more susceptible to perioperative complications[8]. Identifying frail patients who are at higher risk of adverse surgical outcomes is crucial for optimizing perioperative management. Complementary preoperative assessments, including laboratory tests, imaging studies, and functional assessments, can help stratify risk and guide individualized treatment plans. At the same time, minimizing unnecessary testing in low-risk patients can alleviate the burden on healthcare resources[1] while ensuring patient safety.

The objective of this study is to evaluate postoperative hemoglobin levels and hyponatremia in patients undergoing THA for hip osteoarthritis. By analyzing patient profiles and identifying key risk factors, we aim to determine for whom these laboratory tests are most relevant. Through this investigation, we hope to contribute to the ongoing efforts to refine perioperative protocols, enhance patient recovery, and improve the overall cost-effectiveness of THA procedures. Ultimately, the findings of this study may help shape future guidelines on the selective use of laboratory tests, ensuring that testing strategies are aligned with the principles of precision medicine and value-based healthcare.

2. Materials and Methods

This retrospective cohort study aimed to investigate the incidence of abnormal postoperative laboratory values and the frequency of medical interventions associated with these abnormalities in patients undergoing total hip arthroplasty (THA) for coxarthrosis. The study involved 125 patients treated at a tertiary referral center. The main objective was to assess how frequently laboratory abnormalities occurred after surgery and the extent to which these abnormalities required direct medical interventions to address them.

The inclusion criteria for this study consisted of consecutive adult patients who underwent primary unilateral THA in the hip unit of the center. These patients were selected based on their need for a standard hip replacement due to coxarthrosis, which is a degenerative joint disease affecting the hip joint. Patients were excluded if they had undergone simultaneous or sequential bilateral THA, revision THA, total knee arthroplasty (TKA), or primary unilateral THA after a bone tumor. Additionally, individuals with a prior diagnosis of inherited bleeding disorders were excluded from the study to prevent complications related to coagulation.

As part of the study, all patients received a standard dosage of intravenous tranexamic acid (TXA) to minimize perioperative blood loss. Specifically, 1.5 grams of intravenous TXA was administered 30 minutes before the surgical incision, with an additional 1 gram injected into the surgical wound before skin closure. Although postoperative intravenous TXA dosing varied among patients, all individuals who received TXA, regardless of the dosing regimen, were included in the analysis. It is important to note that TXA use was contraindicated in patients with a history of thromboembolic events, severe renal impairment, liver insufficiency, or a known allergy to TXA.

Data collected for the analysis included a range of patient characteristics and clinical variables. These included demographics such as gender, age, size, weight, comorbidities, and risk factors for postoperative laboratory abnormalities. Additionally, preoperative laboratory results (including hemoglobin [Hb], creatinine, and sodium levels), pre-anesthetic evaluations (which included ASA classification), and surgical details (such as laterality, approach, duration, use of TXA, and intraoperative complications) were recorded. Furthermore, postoperative laboratory results at 24 and 48 hours after surgery were also documented, and any changes in medical therapy due to abnormal lab results were noted. Medical interventions directly related to abnormal laboratory values were defined as treatments specifically aimed at correcting these abnormalities.

The primary outcomes of this study were the incidence of acute anemia (defined as Hb < 7 g/dL or symptomatic anemia) that required transfusion and the incidence of hypoalbuminemia (defined as albumin < 30 g/L) that necessitated supplementation. Secondary outcomes included the incidence of acute kidney injury (characterized by a serum creatinine increase of ≥26.5 mmol/L or ≥0.3 mg/dL)

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and the occurrence of abnormal levels of serum sodium (Na), potassium (K), and calcium (Ca) in the postoperative period.

The study was conducted in adherence to the ethical principles outlined in the Declaration of Helsinki, ensuring that all research activities were performed with the utmost respect for patient rights, well-being, and confidentiality. The findings of this study could provide valuable insights into the clinical management of postoperative complications related to laboratory abnormalities, and the results may guide the development of improved protocols for patient care after THA surgery. By identifying the specific laboratory abnormalities that are most commonly encountered and the need for timely medical interventions, this research may contribute to enhancing patient outcomes and reducing the risk of complications in hip arthroplasty procedures.

3. Results

In this study, we included 125 patients, consisting of 73 women (58.4%) and 52 men (41.6%), with a mean age of 66.9 years. The demographic characteristics of the patient cohort were representative of the typical population undergoing total hip arthroplasty (THA) for osteoarthritis. Preoperative data were gathered from various assessments, including a pre-anesthetic evaluation that categorized patients according to the American Society of Anesthesiologists (ASA) classification system. The breakdown was as follows: 2.4% of patients were classified as ASA I (healthy, low-risk individuals), 63.2% as ASA II (patients with mild systemic disease), 28.8% as ASA III (patients with severe systemic disease), and 1.6% as ASA IV (patients with severe, life-threatening systemic disease).

Preoperative laboratory tests were performed to assess baseline patient health prior to surgery. The average hemoglobin (Hb) level was 14.12 g/dL, indicating no significant anemia in the cohort, while creatinine levels were 0.84 mg/dL, reflecting normal kidney function. Sodium levels were measured at 140.8 mEq/L, with only three patients having sodium levels lower than 137 mEq/L, suggesting that electrolyte imbalances were not a prevalent issue among patients prior to surgery.

In terms of the surgical approach, 74 patients (59.2%) underwent the posterior approach, which is a commonly used technique for THA, while 51 patients (40.8%) received the anterolateral approach. The average surgical time for all procedures was 76 minutes. Interestingly, no statistically significant relationship was found between the type of surgical approach and surgical time, nor was there a correlation between the approach and the incidence of postoperative complications. This suggests that both approaches were similarly effective in terms of surgical duration and complication rates.

Postoperative laboratory results were collected at both 24 and 48 hours following surgery. At 24 hours, the average Hb level was 11.69 g/dL, which was a slight drop from preoperative levels, while creatinine levels increased to 0.94 mg/dL, and sodium levels were measured at 138.86 mEq/L. Thirteen patients had sodium levels lower than 137 mEq/L, but this did not appear to be statistically significant in relation to postoperative complications. At 48 hours, the Hb levels had decreased further to 11.07 g/dL, reflecting a drop of 3.05 g/dL from preoperative levels, which is a typical occurrence after surgery due to blood loss and fluid shifts.

A significant finding of the study was the relationship between the use of intraoperative tranexamic acid (TXA) and the need for blood transfusions. Among the patients who did not receive TXA intraoperatively (11.5% of the cohort), 13.9% required a transfusion. In contrast, none of the patients who received TXA required a transfusion ($p = 0.046$, Fisher's test). This highlights the effectiveness of TXA in reducing the need for postoperative blood transfusions, a key consideration in optimizing surgical outcomes and reducing healthcare costs.

Multivariable logistic regression analysis identified factors associated with postoperative Hb levels below 8.5 g/dL. While the specific factors were not detailed, it is likely that patients with more significant blood loss, higher ASA scores, or comorbidities that predispose to anemia may be at higher risk for severe drops in Hb levels after surgery.

Regarding medical complications, 16% of patients experienced some form of postoperative issue. The most common intervention required was a transfusion of packed red blood cells, which was necessary for 7% of patients, including 2.5% of ASA II patients and 17% of ASA III patients.

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However, no significant differences were observed when comparing complication rates between the groups. This suggests that while certain risk factors, such as higher ASA classification, may predispose to more serious complications, the overall rate of complications remained relatively consistent across the patient cohort.

Surgical complications were less common but included four intraoperative periprosthetic fractures and persistent wound drainage in eight patients, one of whom required debridement, antibiotics, and debridement, irrigation, and re-suturing (DAIR) procedures. Cultures taken from the wound were negative for infection, indicating that the drainage was likely due to a non-infectious cause. There were no significant statistical differences in the complication rates between patients who experienced surgical complications and those who did not.

Overall, this study provides valuable insights into the postoperative course of patients undergoing total hip arthroplasty, highlighting the utility of preoperative and postoperative laboratory tests, the effectiveness of TXA in minimizing transfusion requirements, and the relatively low incidence of major complications following surgery. Further studies with larger cohorts and extended follow-up periods may help to refine postoperative care protocols and improve patient outcomes.

Table 1. Variation in the rate of blood loss in relation to patient variables.

Transfusion packed red blood cells	**Variable**	**NO**	**YES**	**n**	**p Value**
SEX	male	65	3	68	p = 0.563
	female	63	4	67	
AGE		66	77	7/118	p = 0.103
ASA	I	0	0	0	p=0,146
	II	82	2	84	
	III	25	5	30	
	IV	1	0	1	
TRANEXAMIC ACID	YES	90	0	90	p = 0.046
	NO	30	7	35	
BMI	< 35	79	3	82	p = 0.532
	35-40	34	3	37	
	>40	5	1	6	
SURGICAL TIME	min	76	96		p = 0.239
SURGICAL APPROACH	HARDINGE	44	2	46	p = 0.323
	POSTLAT	74	5	79	

4. Discussion

Given the aging of the population and increased life expectancy, we anticipate a rise in the number of elective procedures, with Total Hip Arthroplasty (THA) being one of the most common surgeries within our specialty. As healthcare systems aim to optimize patient care, there is increasing pressure to avoid excessive and unnecessary diagnostic testing, particularly post-surgical laboratory evaluations. To date, few studies have focused on perioperative testing, especially laboratory tests required during THA procedures[5,6,9], with most research being either limited to small sample sizes or centered around traumatic cases [11,12].

Total Hip Arthroplasty is a widely performed and highly effective procedure for individuals suffering from debilitating hip joint conditions such as osteoarthritis, avascular necrosis, and rheumatoid arthritis. With advancements in surgical techniques and perioperative management, the safety and efficacy of THA have significantly improved. However, optimizing perioperative care remains crucial in minimizing complications, reducing healthcare costs, and improving patient outcomes. One of the areas under scrutiny is the necessity of routine postoperative laboratory testing, particularly hemoglobin (Hb) monitoring.

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Our study demonstrates that routine postoperative laboratory testing, specifically for hemoglobin (Hb), offers limited clinical value in the vast majority of patients who have a preoperative Hb of 12 g/dL or higher and received blood-saving interventions such as tranexamic acid during surgery[13]. By considering such factors, we could reduce unnecessary postoperative laboratory tests and subsequently save on healthcare costs. This reduction in testing not only minimizes hospital expenses but also enhances patient comfort by reducing unnecessary blood draws and associated discomfort.

Additionally, our study examined various patient-related[14] and surgical factors that could influence postoperative blood loss and transfusion requirements. We found no significant variation in the rate of blood loss in relation to patient sex, body mass index (BMI)[15,16], age[17], or surgical time[18]. Although some studies have noted differences in blood loss based on these parameters, our study did not reveal a clear correlation. These findings suggest that perioperative blood management strategies, particularly the use of TXA, may have a greater impact on reducing blood loss than patient-specific factors alone.

When considering the timing of postoperative laboratory testing, our results support the notion that blood tests on the first postoperative day do not provide meaningful information. A decline in Hb is typically observed by the second postoperative day, making the 48-hour mark a more appropriate time to assess changes in Hb levels. Current literature suggests that routine blood tests are unnecessary unless specific risk factors are present, including preoperative anemia, comorbid conditions (renal or cardiac diseases), and significant intraoperative complications (e.g., excessive blood loss or prolonged surgery) [5,6]. Additionally, if the patient exhibits symptoms of anemia or hematoma postoperatively, lab tests may become necessary.

In the broader context of perioperative care, blood loss management is a critical factor influencing patient recovery and overall surgical success. The role of tranexamic acid (TXA) in reducing perioperative blood loss has been well documented in the literature. TXA, an antifibrinolytic agent, inhibits the enzymatic breakdown of fibrin clots, thereby reducing blood loss and the need for transfusion. Our findings align with existing evidence, showing a significant reduction in transfusion rates among patients who received TXA. Specifically, 11.2% of patients who could not receive tranexamic acid required transfusions, compared to 0% in those who did. While this difference did not reach statistical significance in our study, it supports the growing consensus that TXA is a valuable tool in blood conservation strategies [10,20].

Another key observation in our study was the incidence of postoperative hyponatremia. Although we did not observe significant changes in kidney function or sodium levels postoperatively, some patients did experience mild hyponatremia (Na <137 mEq/L). This phenomenon is not uncommon following major surgeries and is often attributed to factors such as fluid administration, stress responses, and hormonal fluctuations. While mild hyponatremia did not lead to significant complications in our cohort, further investigation is warranted to determine whether certain patient populations, such as those with pre-existing conditions or those on medications like diuretics or ACE inhibitors, are more prone to developing hyponatremia postoperatively. Understanding these risk factors could help tailor perioperative fluid management strategies [21] to minimize electrolyte disturbances.

From a healthcare policy and economic standpoint, reducing unnecessary laboratory testing is a crucial step in optimizing resource utilization [19,21-23]. Routine postoperative blood tests are often performed out of habit rather than necessity, leading to increased healthcare costs without providing substantial clinical benefit. By implementing a selective approach to laboratory testing, we can allocate resources more efficiently while maintaining patient safety. This approach aligns with value-based healthcare initiatives that aim to improve patient outcomes while minimizing unnecessary expenditures.

One of the major strengths of this study is its focused examination of the utility of routine laboratory tests following THA in patients who received tranexamic acid, offering insights into blood-saving strategies. By analyzing a well-defined patient population and utilizing standardized

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perioperative protocols, our study provides valuable evidence supporting the reduction of routine laboratory testing in select patients. However, the study also has several limitations. As a retrospective analysis, it is subject to inherent biases such as incomplete or inaccurate data, which could affect the validity of the findings. Additionally, while our study adhered to a standardized protocol for laboratory testing and clinical interventions, variability in surgeon practice and decision-making may limit the generalizability of the results.

Despite these limitations, our findings suggest that discontinuing routine postoperative laboratory tests for most patients undergoing THA could be both safe and cost-effective. The focus should shift to high-risk patients who may require more intensive monitoring based on preoperative comorbidities or complications during the surgery. A more personalized approach to postoperative monitoring could enhance patient care while reducing unnecessary interventions.

Future research with larger sample sizes and prospective designs is needed to refine the criteria for postoperative laboratory testing and further confirm the cost-saving benefits of reducing unnecessary testing in elective orthopedic surgeries. In addition to larger studies, investigating the impact of specific perioperative protocols, including multimodal blood conservation strategies, would provide further insight into optimizing THA outcomes. Additionally, exploring patient-reported outcomes and satisfaction levels related to laboratory testing reduction could add a valuable dimension to the discussion on perioperative care.

By implementing a selective approach to laboratory testing, we can improve resource utilization without compromising patient safety. As healthcare continues to evolve toward more patient-centered and cost-conscious care models, reevaluating routine practices such as postoperative blood testing is an essential step in advancing high-quality, evidence-based medicine. The findings from our study contribute to this ongoing conversation and provide a foundation for future research aimed at enhancing perioperative care in Total Hip Arthroplasty and beyond.

5. Conclusions

Routine postoperative laboratory tests are commonly used in clinical practice; however, their clinical utility has been questioned, as they often lead to unnecessary expenses without offering significant benefits [19,21,22]. Several studies have shown that the majority of these tests do not result in changes to patient management. Our experience supports this finding, as we observed a low rate of therapeutic changes following postoperative analytical controls. In fact, for the vast majority of patients, routine laboratory tests following surgery do not yield any variation in their postoperative care plan.

Based on our observations, we concluded that routine blood tests following total hip arthroplasty (THA) for osteoarthritis are unnecessary in the absence of intraoperative complications or significant comorbidities. These findings align with previous research suggesting that such tests may only be truly useful in specific circumstances, such as when complications occur during surgery or when a patient has multiple comorbidities that require careful monitoring. An exception to this conclusion could be patients classified as ASA III or higher, who have a greater risk profile and may require closer monitoring after surgery[10]. For these patients, it may not be possible to utilize all blood-saving strategies, making laboratory testing more relevant. Additionally, patients who present clinical symptoms postoperatively that suggest potential complications may benefit from more targeted laboratory assessments.

One important observation from our study was that a higher hemoglobin (Hb) level threshold post-surgery can further support our conclusion that routine laboratory tests are unnecessary for most patients undergoing elective THA. This threshold could be used to guide which patients may require more intensive monitoring and testing after surgery.

We believe that further research is needed, especially involving a larger and more diverse population. Studies should focus on refining models for selecting patients who may benefit from postoperative laboratory tests. These models should prioritize elective and non-traumatic patients,

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as this approach may help to reduce unnecessary testing and generate significant cost savings, all while maintaining patient safety and improving resource allocation in healthcare.

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Data Availability Statement: We encourage all authors of articles published in MDPI journals to share their research data. In this section, please provide details regarding where data supporting reported results can be found, including links to publicly archived datasets analyzed or generated during the study. Where no new data were created, or where data is unavailable due to privacy or ethical restrictions, a statement is still required. Suggested Data Availability Statements are available in section "MDPI Research Data Policies" at https://www.mdpi.com/ethics.

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References

Ondeck NT, Fu MC, McLynn RP, Bovonratwet P, Malpani R, Grauer JN. Preoperative laboratory testing for total hip arthroplasty: Unnecessary tests or a helpful prognosticator. J Orthop Sci [Internet]. 2020;25(5):854–60. Disponible en: http://dx.doi.org/10.1016/j.jos.2019.09.019

Wester C, Zhang TS, Harrington MA, Halawi MJ. Sodium abnormalities are an independent predictor of complications in total joint arthroplasty: A cautionary tale! J Arthroplasty [Internet]. 2021;36(12):3859–63. Disponible en: http://dx.doi.org/10.1016/j.arth.2021.08.006

Yuan Y, Zhang Y, Shen L, Xu L, Huang Y. Perioperative allogeneic red blood cell transfusion and wound infections: An observational study. Anesth Analg [Internet]. 2020;131(5):1573–81. Disponible en: http://dx.doi.org/10.1213/ANE.0000000000005122

Everhart JS, Sojka JH, Mayerson JL, Glassman AH, Scharschmidt TJ. Perioperative allogeneic red blood-cell transfusion associated with surgical site infection after total hip and knee arthroplasty. J Bone Joint Surg Am [Internet]. 2018;100(4):288–94. Disponible en: http://dx.doi.org/10.2106/JBJS.17.00237

Hennessy O, McSorley K. Is routine hemoglobin monitoring necessary after elective hip and knee arthroplasty? Arthroplast Today [Internet]. 2020;6(4):803–6. Disponible en: http://dx.doi.org/10.1016/j.artd.2020.07.036

Greco NJ, Manocchio AG, Lombardi AV, Gao SL, Adams J, Berend KR. Should postoperative haemoglobin and potassium levels be checked routinely following blood-conserving primary total joint arthroplasty? Bone Joint J [Internet]. 2019;101-B(1_Supple_A):25–31. Disponible en: http://dx.doi.org/10.1302/0301-620x.101b1.bjj-2018-0554.r1

Harris B, Schopflin C, Khaghani C, Edwards M, collaborators from the Southcoast Perioperative Audit and Research Collaboration (SPARC). Perioperative intravenous fluid prescribing: a multi-centre audit. Perioper Med (Lond) [Internet]. 2015;4(1):15. Disponible en: http://dx.doi.org/10.1186/s13741-015-0025-9

Cunningham E, Gallagher N, Hamilton P, Bryce L, Beverland D. Prevalence, risk factors, and complications associated with hyponatraemia following elective primary hip and knee arthroplasty. Perioper Med (Lond) [Internet]. 2021;10(1):25. Disponible en: http://dx.doi.org/10.1186/s13741-021-00197-1

 doi:10.20944/preprints202503.1087.v1

Kildow BJ, Karas V, Howell E, Green CL, Baumgartner WT, Penrose CT, et al. The utility of basic metabolic panel tests after total joint arthroplasty. J Arthroplasty [Internet]. 2018;33(9):2752–8. Disponible en: http://dx.doi.org/10.1016/j.arth.2018.05.003

Kildow BJ, Howell EP, Karas V, Baumgartner WT, Cunningham DJ, Green CL, Bolognesi MP, Seyler TM. When Should Complete Blood Count Tests Be Performed in Primary Total Hip Arthroplasty Patients? J Arthroplasty. 2018 Oct;33(10):3211-3214.

Zhuang T-F, Huan S-W, Luo S-M, She G-R, Wu W-R, Chen J-Y, et al. The role of routine postoperative laboratory tests following hip hemiarthroplasty for an elderly femoral neck fracture. BMC Musculoskelet Disord [Internet]. 2021;22(1):806. Disponible en: http://dx.doi.org/10.1186/s12891-021-04698-4

Gur S, Segal D, Tavdi A, Fuchs Y, Perl D, Fainzack A, Ohana N, Markushevich M, Brin YS. Are Routine Postoperative Hemoglobin Tests Justified in All Patients Who Undergo Total Hip Arthroplasty Due to a Displaced Femoral Neck Fracture? J Clin Med. 2024 Jul 26;13(15):4371.

Gilde AK, Downes KL, Leverett S, Miranda MA. Routine Postoperative Complete Blood Counts Are Not Necessary After Most Primary Total Hip and Knee Arthroplasties. J Arthroplasty. 2021 Apr;36(4):1257-1261.

Yang ZG, Chen WP, Wu LD. Effectiveness and safety of tranexamic acid in reducing blood loss in total knee arthroplasty: a meta-analysis. J Bone Joint Surg Am. 2012 Jul 3;94(13):1153-9.

Carling MS, Jeppsson A, Eriksson BI, Brisby H. Transfusions and blood loss in total hip and knee arthroplasty: a prospective observational study. J Orthop Surg Res. 2015 Mar 28;10:48.

Prasad N, Padmanabhan V, Mullaji A. Blood loss in total knee arthroplasty: an analysis of risk factors. Int Orthop. 2007 Feb;31(1):39-44.

Walsh M, Preston C, Bong M, Patel V, Di Cesare PE. Relative risk factors for requirement of blood transfusion after total hip arthroplasty. J Arthroplasty. 2007 Dec;22(8):1162-7.

Ross D, Erkocak O, Rasouli MR, Parvizi J. Operative Time Directly Correlates with Blood Loss and Need for Blood Transfusion in Total Joint Arthroplasty. Arch Bone Jt Surg. 2019 May;7(3):229-234.

Porto JR, Lavu MS, Hecht CJ 2nd, Guyler MR, Acuña AJ, Kamath AF. Postoperative laboratory testing in the era of outpatient total joint arthroplasty: Targeted patient selection and associated cost savings. J Orthop. 2024 Sep 10;60:1-9.

Sun C, Zhang X, Chen L, Deng J, Ma Q, Cai X, Yang H. Comparison of oral versus intravenous tranexamic acid in total knee and hip arthroplasty: A GRADE analysis and meta-analysis. Medicine (Baltimore). 2020 Oct 30;99(44):e22999.

Phillips JLH, Fillingham YA, Mitchell WF, Nimoityn P, Restrepo C, Sherman MB, Austin MS. Routine Laboratory Tests are not Necessary After Primary Total Joint Arthroplasty: A Prospective Study Utilizing a Selective Algorithmic Approach. J Arthroplasty. 2022 Sep;37(9):1731-1736.

Wu XD, Xiao PC, Zhu ZL, Liu JC, Li YJ, Huang W. The necessity of routine postoperative laboratory tests in enhanced recovery after surgery for primary hip and knee arthroplasty: A retrospective cohort study protocol. Medicine (Baltimore). 2019 May;98(18):e15513.

Halawi MJ, Plourde JM, Cote MP. Routine Postoperative Laboratory Tests Are Not Necessary After Primary Total Hip Arthroplasty. J Arthroplasty. 2019 Mar;34(3):538-541.