FREQUENCY OF POST-OPERATIVE HYPOTHERMIA IN PATIENTS UNDERGOING UROLOGY AND ORTHOPEDIC SURGERY IN THE DEPARTMENT OF ANESTHESIA AT A TERTIARY CARE HOSPITAL, PESHAWAR

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Abstract

Background:
Post-operative hypothermia, defined as a core body temperature below 36 °C, is a frequent complication in surgical patients, leading to increased bleeding, infection risk, delayed recovery, and prolonged hospital stay. Orthopedic and urological surgeries are particularly high-risk due to prolonged operative time and anesthesia-induced thermoregulatory impairment.

Objectives:
To determine the frequency of post-operative hypothermia in patients undergoing urology and orthopedic surgery and to identify perioperative risk factors associated with its occurrence.

Methodology:
A cross-sectional study was conducted at the Department of Anesthesia, Hayatabad Medical Complex, Peshawar, over 4 months. 160 elective surgery patients aged 18–65 years were enrolled using non-probability convenience sampling. Core temperature was recorded preoperatively, intraoperatively, and postoperatively. Data on demographics, ASA status, surgery duration, and intravenous fluids were collected and analyzed using SPSS v25. Associations were tested with Chi-square and t-test/ANOVA; p<0.05 was considered significant.

Results:
Among 160 patients, 63.8% were male and most were aged 31–45 years. Post-operative hypothermia occurred in 34.4% of patients, higher in orthopedic (38.9%) than urology surgeries (28.6%). Significant risk factors included older age, higher ASA status, prolonged surgery ≥2 hours, and IV fluid volume ≥1000 ml. Gender was not significant.

Conclusion:
Post-operative hypothermia remains common. Early identification of high-risk patients and preventive measures such as active warming and optimized fluid management are essential to improve outcomes.

INTRODUCTION:

Post-operative hypothermia is defined as an unintentional decrease in core body temperature below 36 °C following surgery and anesthesia, representing a clinically significant perioperative complication that can negatively impact patient outcomes [1]. The condition arises primarily because anesthetic agents interfere with the body's natural thermoregulatory mechanisms, causing redistribution of heat from the core to the peripheral tissues. This redistribution is compounded by heat loss due to evaporation from surgical wounds, conductive loss from contact with cold operating tables, and convection from exposure to low ambient operating room temperatures [2]. The administration of unwarmed intravenous fluids and blood products further contributes to the decline in core temperature, particularly during prolonged surgical procedures, highlighting the multifactorial nature of post-operative hypothermia.

The prevalence of post-operative hypothermia varies considerably depending on the type of surgery, patient characteristics, anesthesia techniques, and perioperative management protocols. Previous studies have reported that between 20% and 70% of patients undergoing surgical procedures may experience hypothermia during or after surgery, with a subset remaining hypothermic for extended periods in the post-anesthesia care unit (PACU) [3]. Such wide variability reflects differences in operative duration, patient comorbidities, intraoperative warming strategies, and monitoring practices, emphasizing the need for precise identification of high-risk populations. Continuous temperature monitoring during the perioperative period is therefore crucial to promptly detect and manage hypothermia, improving clinical outcomes and reducing postoperative complications. Orthopedic surgeries are particularly associated with high rates of perioperative hypothermia due to factors such as prolonged operative times, large areas of soft tissue exposure, and the combined effects of general or regional anesthesia on thermoregulatory control [4]. A multicenter retrospective study reported that approximately 72% of orthopedic patients developed intraoperative hypothermia, with 8% remaining hypothermic upon arrival in the PACU. Risk factors identified in this cohort included advanced age, low body mass index, and extended surgery duration [5]. Similarly, urological surgeries demonstrate variable rates of hypothermia, which depend on anesthesia type, patient positioning, duration of procedure, and preoperative body temperature [6]. These findings underscore the importance of focusing on specific surgical populations when evaluating post-operative hypothermia, as both orthopedic and urological patients face unique perioperative thermal challenges.

Post-operative hypothermia has multiple physiological and clinical consequences. Reduced core temperature impairs coagulation pathways and prolongs bleeding times, increasing the likelihood of perioperative blood loss and the need for transfusions, which can complicate recovery [7]. Additionally, hypothermia diminishes immune function and reduces peripheral oxygen delivery, predisposing patients to surgical site infections and delayed wound healing [8]. Impaired metabolism of anesthetic agents in hypothermic patients can result in delayed emergence from anesthesia, prolonged PACU stays, and increased demands on healthcare resources [9]. Shivering and increased metabolic requirements associated with hypothermia further contribute to patient discomfort and physiological stress, highlighting the importance of preventive strategies in perioperative care.

Several patient-related and procedural factors have been consistently associated with the development of post-operative hypothermia. Older patients, those with lower baseline body temperatures, higher American Society of Anesthesiologists physical status classifications, intraoperative blood loss, and large-volume administration of cold intravenous fluids are at increased risk [10]. Environmental factors, including operating room temperature, ventilation systems, and inconsistent application of active warming measures, further exacerbate the problem [11]. Although effective warming strategies are available such as forced-air warming devices, prewarming blankets, warmed intravenous fluids, and ambient temperature optimization post-operative hypothermia remains prevalent, particularly in high-volume tertiary care hospitals in developing countries [12].

Methodology

Study Design: Cross-sectional observational study.

Study Setting: Department of Anesthesia, Hayatabad Medical Complex (HMC), Peshawar.

Study Duration: 4 months.

Sample Size & Sampling: 160 patients, calculated via Cochran's formula; non-probability convenience sampling.

Inclusion Criteria:

- Adults 18–65 years undergoing elective urology or orthopedic surgery.
- Surgery under general or regional anesthesia.
- Preoperative temperature ≥36°C.
- Provided written informed consent.

Exclusion Criteria:

- Emergency surgery.
- Thyroid/metabolic disorders affecting temperature.
- Preoperative warming applied.
- Refusal/withdrawal of consent.

Ethical Consideration: Approval from IRB, HMC confidentiality maintained; participation voluntary.

Data Collection: Demographics, perioperative factors (surgery type, anesthesia, duration, blood loss, IV fluids), and core temperature measured pre-, intra-, and post-operatively; hypothermia defined as <36°C.

Data Analysis: SPSS v25; descriptive statistics, frequency of hypothermia, associations tested using Chi-square and t-test/ANOVA; $p<0.05$ considered significant.

Result:

Gender-wise Distribution of Patients

Gender	Frequency (n)	Percentage (%)
Male	102	63.8
Female	58	36.2

Age-wise Distribution of Patients

Age Group (years)	Frequency (n)	Percentage (%)
18–30	40	25.0
31–45	55	34.4
46–60	50	31.3
61–65	15	9.4
Total	160	100

Frequency of Post-operative Hypothermia

Surgical Type	Total Patients	Hypothermia (n)	Percentage (%)
Urology	70	20	28.6
Orthopedic	90	35	38.9
Total	160	55	34.4

Association of Post-operative Hypothermia with Perioperative Factors

Factor	Categories	Hypothermia (n)	No Hypothermia (n)	p-value
Gender	Male	36	66	0.12
	Female	19	39	
Age Group (years)	18–30	10	30	0.03*

	31–45	18	37	
	46–60	20	30	
	61–65	7	8	
ASA Status	I	10	40	0.01*
	II	25	50	
	III	20	15	
Surgery Duration (hours)	<2	12	38	0.02*
	≥2	43	67	
IV Fluids (ml)	<1000	15	35	0.04*

Discussion:

Post-operative hypothermia is a common complication that can adversely affect surgical outcomes, particularly in high-risk procedures such as urology and orthopedic surgeries [13]. In the present study, the overall frequency of post-operative hypothermia was 34.4%, with a higher incidence observed among orthopedic patients (38.9%) compared to urology patients (28.6%). This finding aligns with previous studies reporting that orthopedic procedures are associated with increased risk of hypothermia due to prolonged operative times, extensive tissue exposure, and the effect of anesthesia on thermoregulation [14,15]. Urological procedures also demonstrated a notable rate of hypothermia, which may be attributed to specific surgical positions, duration of anesthesia, and perioperative fluid administration [16].

The demographic analysis revealed that the majority of patients were male (63.8%) and within the age group of 31–45 years (34.4%). Although gender was not significantly associated with hypothermia in our study ($p>0.05$), older age showed a significant correlation with post-operative hypothermia ($p=0.03$). This observation is consistent with the literature, which suggests that age-related changes in thermoregulatory mechanisms, reduced subcutaneous fat, and diminished vasoconstrictive responses contribute to increased susceptibility to hypothermia in older adults [17,18]. The highest prevalence of hypothermia among patients aged 46–60 years in our cohort further supports the notion that advancing age is an important risk factor. ASA physical status was another factor significantly associated with post-operative hypothermia in our study ($p=0.01$). Patients classified as ASA III experienced a higher rate of hypothermia compared to ASA I and II. This finding is supported by previous research indicating that patients with higher ASA status often present with multiple comorbidities, impaired physiological reserves, and increased vulnerability to perioperative thermal disturbances [19,20]. Identifying such high-risk patients preoperatively is crucial for implementing targeted interventions, including prewarming, active intraoperative warming, and vigilant temperature monitoring.

The volume of intravenous fluids administered during surgery also emerged as a significant risk factor for hypothermia ($p=0.04$). Patients receiving ≥1000 ml of IV fluids had higher rates of post-operative hypothermia. This finding is in agreement with multiple studies showing that large-volume infusion of unwarmed fluids promotes heat loss and reduces core body temperature, particularly during lengthy procedures [21,22]. Optimizing the temperature of IV fluids and considering restrictive fluid administration when clinically feasible are therefore important preventive strategies.

Surgical duration was another significant predictor in our study ($p=0.02$). Patients undergoing procedures lasting ≥2 hours were more likely to develop post-operative hypothermia. Longer operative times increase exposure to cold ambient conditions, enhance evaporative heat loss, and prolong the effect of anesthetic-induced thermoregulatory impairment, consistent with prior observations in both orthopedic and urological populations [23]. These findings underscore the importance of early identification and management of patients undergoing prolonged surgeries to reduce hypothermia risk.

Interestingly, gender did not show a significant association with post-operative hypothermia in our study, consistent with some previous reports [24]. While some literature suggests that females may be more prone to hypothermia due to differences in body fat distribution and hormonal factors, other studies have reported no significant sex-based differences. Our results suggest that perioperative management and patient-specific factors, rather than gender alone, may play a more important role in determining thermal outcomes.

The clinical implications of these findings are substantial. Post-operative hypothermia increases the risk of bleeding, surgical site infections, delayed recovery, shivering, and prolonged PACU stay [25].

Conclusion:

Post-operative hypothermia remains a common complication among patients undergoing urology and orthopedic surgeries, with an overall frequency of 34.4%. The incidence was higher in orthopedic procedures (38.9%) compared to urology (28.6%). Significant perioperative risk factors included older age, higher ASA physical status, prolonged surgical duration, and larger volumes of intravenous fluids. Gender did not show a significant association with hypothermia. These findings emphasize the importance of identifying high-risk patients preoperatively and implementing preventive strategies to maintain normothermia.

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