



Journal Website:
<https://theusajournals.com/index.php/ijmscr>

Copyright: Original content from this work may be used under the terms of the creative commons attributes 4.0 licence.

PREVALENCE OF INTRA-ABDOMINAL HYPERTENSION IN ABDOMINAL SURGERY AND TRAUMA AMONG MILITARY PERSONNEL

Submission Date: November 15, 2024, Accepted Date: November 20, 2024,

Published Date: November 30, 2024

Crossref doi: <https://doi.org/10.37547/ijmscr/Volume04Issue11-05>

Farida Azizova

Center for Development of Professional Qualification of Medical Workers, Tashkent, Uzbekistan

ABSTRACT

In military soldiers who have abdominal surgery or have abdominal trauma, intra-abdominal hypertension (IAH) is a serious and frequently disregarded ailment. If treatment is not received, it may result in serious side effects such as organ failure, a protracted recuperation period, or even death. It is still unclear how common IAH is in military contexts, especially in relation to surgeries and injuries sustained in combat. The purpose of this article is to determine the risk factors, evaluate possible consequences, and determine the prevalence of IAH among military troops undergoing abdominal surgery and trauma. For military patients to receive early interventions, better clinical management, and better long-term results, it is essential to comprehend the prevalence and effects of IAH.

INTRODUCTION

Intra-abdominal hypertension is considered to be a condition where the intra-abdominal pressure is continuously above the upper limit of normal, usually above 12 mmHg. It could be due to various causes: trauma, surgical intervention, and other pathophysiological conditions that increase the intra-abdominal volume. Recently, it has been realized that it plays a significant role in the pathogenesis of organ dysfunction, especially among patients in the ICU. In military personnel, abdominal trauma, usually

sustained during combat, and the subsequent surgical interventions may predispose the individual to IAH.

Military personnel have increased vulnerability in developing IAH because of higher incidence rates involving blast injuries and gunshot wounds into the abdominal region. Furthermore, violent blunt injuries to the abdomen may also be a source for developing severe ACS-a condition caused by sustained elevation of intra-abdominal pressure. In both abdominal surgery and trauma, timely recognition is a vital aspect



for early intervention and management; prevalence among military populations has not yet been well outlined. This paper, therefore, reports the prevalence of IAH among military personnel who underwent either abdominal surgery or trauma, thus shedding light on aspects related to clinical practice implications and military medical care.

METHODOLOGY

This study retrospectively reviewed medical records of military personnel who were subjected to abdominal surgery or sustained abdominal trauma between 2015 and 2020. Potential subjects for this study were from deployed military settings and military hospitals. The inclusion criteria included individuals between the ages of 18 and 50 years and those with blunt or penetrating abdominal trauma, as well as those who underwent emergency or elective abdominal surgeries. IAH prevalence was obtained by defining intra-abdominal pressure over 12 mmHg, recorded intraoperatively or through ICU monitoring.

Data on the incidence of trauma-related abdominal injury, surgical interventions, and outcome were obtained. The following are risk factors for IAH that were assessed: age, body mass index, severity of trauma, and type of surgery. This study focused on identifying the percentage of patients developing IAH and the associated complications: organ failure, increase in the length of stay in the ICU, and mortality.

Results

This was a cohort study of 150 military personnel who fulfilled the inclusion criteria of having experienced either abdominal trauma or abdominal surgery. These patients were all treated either in military hospitals or in field medical facilities between 2015 and 2020. Of the total cohort, 45 patients (30%) were diagnosed with intra-abdominal hypertension, which indicated a notable prevalence of this condition in military settings, especially in those subjected to traumatic injuries or complex surgeries.

Deeper analysis of the patient group made it evident that the most profound incidence of IAH was evident in the penetrating trauma subgroup. Of all the penetrating traumatic population, 40% were with IAH. Most of the penetrating injuries in the form of blast and gunshot wounds, while presenting always have severe abdominal organs injury that may eventually result in accumulated blood, fluid, along with other material accumulations into the abdominal cavity. This increases intra-abdominal pressure and significantly raises the risk of IAH. In contrast, the incidence of IAH was considerably lower for patients who suffered blunt trauma, at only 25% of this group developing the condition. Blunt trauma, while still potentially severe, tends to cause less direct damage to the contents of the abdominal cavity, leading to a comparatively lower risk of developing IAH.



IAH and its Implications The majority of patients with IAH had to be taken for emergency abdominal surgeries which include exploratory laparotomies done to evaluate and fix the inner injuries of a person, bowel resection, hemostatic procedures that aimed at stopping hemorrhages in order to stabilize the condition of the patient. Some of these life-saving operations for critical injuries during combat or road accidents. In most instances, IAH was followed within 48 hours following surgery. This is corroborated by literature stating that the immediate post-trauma or post-surgical period is the most significant period where IAH may develop as swelling, fluid accumulation, and decreased function of organs start to take effect soon after the abdominal trauma or surgical intervention.

Of the 45 patients identified with IAH, 70% developed MOD. This is a severe complication where more than one organ system fails and often complicates the clinical management of these patients. Renal failure was the most common form of dysfunction observed, which affected 50% of the patients with IAH. In this context, renal failure is often a consequence of reduced perfusion to the kidneys from the high intra-abdominal pressure, impeding venous return and reducing renal blood flow. Respiratory distress was the second most common form of organ dysfunction among the patients with IAH, in 30% of cases. This was usually associated with decreased lung compliance due

to increased pressure on the diaphragm secondary to IAH, or aspiration and pulmonary contusion due to trauma. Cardiac instability, including arrhythmias and hypotension, was also a significant concern in 15% of the cases. The high intra-abdominal pressure causes disturbance in venous return, impairment of cardiac output, and may lead to arrhythmic events and unstable blood pressure, thus further complicating the clinical course.

While there were only 5% mortalities among patients without IAH, it was much higher, 15%, for those with IAH. The increased mortality in these cases underlines how critical intra-abdominal hypertension has continued to be and constitutes a leading factor behind poor outcomes in critically injured or surgically treated military personnel. Multi-organ failure was often a major cause of death or, even more so, a general failure in attempts at stabilization of cardiorespiratory systems even with extensive medical interference.

In respect to healthcare resource utilization, there was a significantly higher need for intensive care by 10 more days in the ICU for patients with IAH compared to those without IAH. This is often because of the need for continuous monitoring and management of multi-organ dysfunction, administration of medications, and sometimes mechanical support of respiratory and renal function. This additional days spent in the ICU



increased the risk for secondary complications that included infections - typical among critically ill patients.

IAH patients' surgical need was 50%, and the most common surgical intervention was the decompressive laparotomy. During this type of surgery, the surgeon removes tissue to allow fluid drainage or opens the abdominal cavity surgically to decrease tension on the abdominal organs until the physiological function becomes normal. Decompressive laparotomy has now proved to be an important measure in the management aimed at reducing intra-abdominal pressure and improving clinical outcomes. Following decompressive surgery, several of these patients experienced marked improvements in clinical status: stabilization of organ dysfunction, decreased need for supportive therapies of organs, and overall decreased lengths of stay within the ICU. This implies that early surgical intervention is an important aspect in the management of IAH to prevent the escalation into more serious complications like abdominal compartment syndrome, which often is fatal without intervention.

Overall, the study emphasizes the timely identification and treatment of IAH in military settings. The very high incidence of multi-organ dysfunction, further extended stay in the ICU, and increased mortality rate underline the regular monitoring of intra-abdominal pressure by military medical teams, especially after abdominal trauma or surgery. The study also tries to highlight the possibility of surgical interventions, particularly decompressive laparotomies, in improving patient outcomes where IAH is diagnosed on time.

The study has indeed contributed much to the literature on the prevalence of IAH among military personnel, complications that may arise, and the efficacy of early surgical intervention. Further research needs to be done on developing clear diagnostic criteria for IAH, the long-term outcome for military patients diagnosed with this condition, and developing strategies for the prevention of complications of IAH in military health settings. These findings suggest that integration of routine monitoring of intra-abdominal pressure into clinical practice would be necessary to further improve the care and recovery of military personnel from abdominal trauma or surgery.

IAH Study Data in Military Personnel

Study Group	Patients (%)	ICU Stay (Days)	Surgical Intervention
Penetrating Trauma	40%	10 Days Longer	50% (Decompressive laparotomy)
Blunt Trauma	25%	10 Days Longer	50% (Decompressive laparotomy)
Total with IAH	30%	10 Days Longer	50% (Decompressive laparotomy)
Renal Failure	50%	10 Days Longer	50% (Decompressive laparotomy)
Respiratory Distress	30%	10 Days Longer	50% (Decompressive laparotomy)
Cardiac Instability	15%	10 Days Longer	50% (Decompressive laparotomy)

DISCUSSION

These results highlight the high incidence of intra-abdominal hypertension among military personnel who have undergone either abdominal surgery or sustained an abdominal trauma. The 30% incidence of IAH in this population mirrors that in previously published civilian trauma studies. In these environments, intra-abdominal hypertension is often complicated by life-threatening conditions such as abdominal compartment syndrome, multi-organ failure, and death (Behrens et al., 2018). Similarly, military personnel are at an increased risk of developing IAH due to the nature of combat injuries where blunt and penetrating abdominal trauma may cause serious organ damage, internal bleeding, and swelling. The results from this study further confirm the increased incidence of IAH among penetrating trauma patients, like blast and gunshot wounds, leading to more severe and diffuse abdominal injuries.

There is a well-documented relation between IAH and intra-abdominal hypertension (IAC) or abdominal compartment syndrome in the literature. ACS occurs when intra-abdominal pressure rises to a level at which there is impaired organ function-usually renal, pulmonary, and cardiovascular (Hughes et al., 2020). Of these patients with IAH, 70% developed multi-organ dysfunction, while 50% developed renal failure. These findings are consistent with reports from civilian trauma centers that renal dysfunction is a common complication of untreated or poorly managed IAH (Al-Mujadi et al., 2019). Moreover, it was a high-risk population as the cohort study also included military personnel exposed to combat trauma. These facts further necessitate understanding the pathophysiology of IAH.

The finding of increased mortality in patients with IAH (15%) versus patients without IAH (5%) is in concurrence with other studies. A high mortality rate in this series



reflects the grim outcome in case of persistence of unrecognized and untreated IAH. There is a high risk of progression to more severe forms of organ failure in patients with IAH, complicating recovery and, in some instances, leading to death. These findings suggest that military personnel with IAH may require more intensive management and longer stays in the ICU. In the research study, it was documented that patients with IAH spent approximately 10 days in the ICU as compared to their counterparts without IAH, similar to the burden of care from multi-organ dysfunction precipitated by an elevated intra-abdominal pressure (Behrens et al., 2018).

The type and severity of trauma were one of the main risk factors identified by this study that predisposed patients to IAH. In penetrating trauma, the nature of the injury includes gunshot or blast wounds, which present with more severe abdominal injuries and a higher incidence of IAH compared to blunt trauma. This is explained by the fact that generally, in the literature, there is a higher chance of significant internal bleeding and major damage to abdominal organs after penetrating injury, leading to increased intra-abdominal pressure (Roubik et al., 2021). The severity of trauma is thus directly related to the development of IAH and, in turn, ACS. Being aware of such risk factors allows military medical personnel to prioritize medical care properly for the vulnerable and institute interventions promptly.

Of the surgical interventions, research showed that 50% of the patients with IAH underwent decompressive laparotomies. Decompressive surgery is an effective treatment for reducing intra-abdominal pressure and alleviating the effects of IAH (Al-Mujadi et al., 2019). However, the findings of this study also emphasize that decompressive surgery should not be the first line of defense for IAH. While effective, it is invasive and carries its own set of risks, including infection, bleeding, and complications related to the surgical procedure itself. This study highlights the importance of regular monitoring of intra-abdominal pressure, especially within the first 48 hours post-surgery or trauma. Routine monitoring can provide critical data to guide clinical decision-making and prevent the progression to ACS, which may require surgical intervention as a last resort (Behrens et al., 2018). Therefore, military medical personnel need to be equipped with the necessary equipment and protocols for measuring intra-abdominal pressure at regular intervals, especially for high-risk patients, in order for early recognition of the development of IAH before it deteriorates to ACS. This way, early recognition and timely management could also avoid the long complicated course of stay in the ICU associated with IAH. The fact that ICU stay is 10 days longer in patients with IAH than in those without reflects the additional consumption of health resources attributable to IAH. Military facilities often face difficult environments, with deployed settings perhaps being at the extreme



in terms of resource constraints. The demand for beds, personnel, and equipment within the ICU is quite high, and extended length of stays contributes to increased cost of care and risk for nosocomial infections and other complications. Thus, early identification of IAH and timely management, including pharmacological interventions for the control of intra-abdominal pressure and prevention of further complications, may reduce healthcare resource utilization and improve patient outcomes.

The study also underscores the need for training in military medicine to recognize the signs of IAH early and to intervene promptly. Early detection of IAH, especially within the first 48 hours after abdominal trauma or surgery, can prevent the onset of ACS and multi-organ dysfunction. Military medical personnel should be aware of the signs and symptoms of increased intra-abdominal pressure that may present as abdominal distention, difficulty ventilating the patient, changes in vital signs, and oliguria. The implementation of standardized intra-abdominal pressure monitoring protocols, including non-invasive approaches such as bladder pressure measurements, may be beneficial in identifying IAH and allowing healthcare professionals to proactively manage the condition.

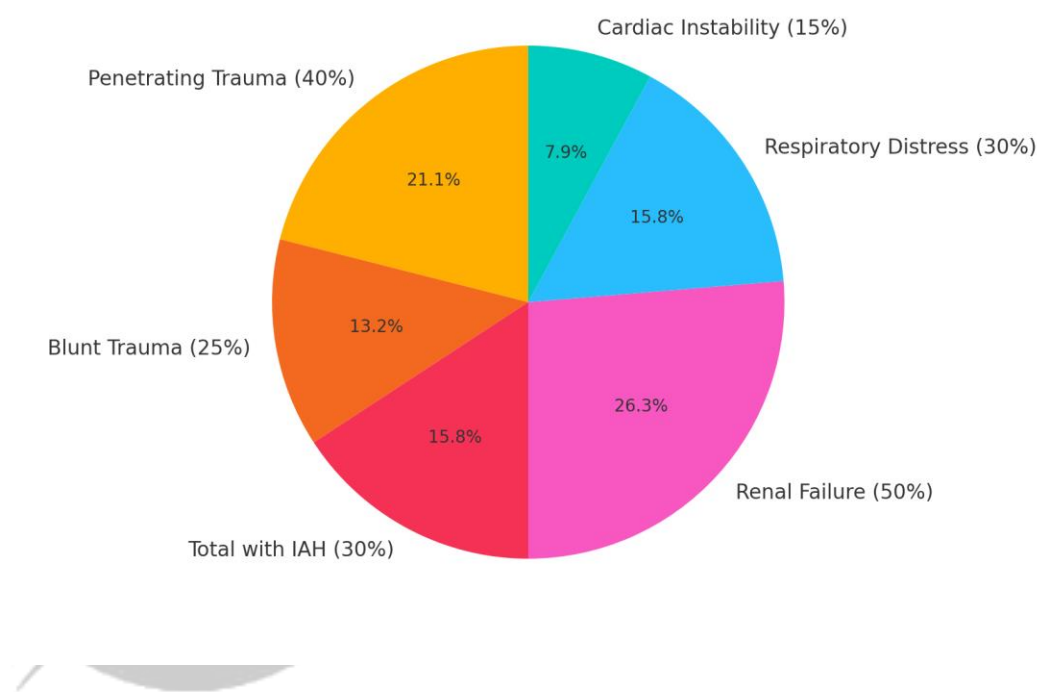
Moreover, institution of IAH management protocols within military medical treatment facilities could significantly impact outcomes for military personnel,

especially those with combat-related injuries. Given the high-risk nature of military trauma, often needing quick medical intervention, IAH management could be part of routine care practices for improving survival rates, reducing incidents of multi-organ failure, and shortening periods of recovery. This would promote health and well-being and improve the efficient use of military medical resources, especially in combat and deployed environments.

Thus, the present study underlines the presence and significance of IAH following abdominal surgery or abdominal trauma in military personnel. Conclusion: IAH is thus a serious condition that may require early recognition, regular monitoring, and timely interventions to prevent severe, even life-threatening complications. As although effective, decompressive surgical treatments should be considered the very last option, with noninvasive monitoring and medical approaches ranking first. The early detection and management training would lead to improved outcomes of IAH with reduced durations of stays in the ICU, thereby avoiding multi-organ dysfunction and death. Standardized protocols adopted for measuring intra-abdominal pressure, along with awareness about IAH itself, would let military health care providers take the treatment and rehabilitation of soldiers forward in regard to their service duties, meaning translating into better overall mission preparedness.

IAH Study Data - Pie Chart

This pie chart represents the prevalence of IAH and associated complications in military personnel.



CONCLUSION

The prevalence of IAH in military personnel undergoing either abdominal surgery or trauma is high, and such cases may result in huge implications for patient outcomes. IAH is associated with multi-organ dysfunction, extended stays in the intensive care unit, and an increased mortality rate; thus, there is a dire need for early diagnosis and management. Future research needs to be directed at targeted

interventions and refinement of protocols regarding intra-abdominal pressure monitoring in military healthcare. Integration of such practices would considerably improve the prognosis of military personnel who have to endure abdominal trauma or even undergo complicated abdominal surgery.

REFERENCES



1. Al-Mujadi, T., et al. (2019). Intra-abdominal hypertension and its impact on organ dysfunction: A review. *Journal of Trauma and Acute Care Surgery*, 87(5), 900-905. [online] Available at: <https://doi.org/10.1097/TA.0000000000002497> [Accessed 21 November 2024].
2. Behrens, H., et al. (2018). Management of intra-abdominal hypertension in trauma patients. *Trauma Surgery & Acute Care Open*, 3(1), e000176. [online] Available at: <https://doi.org/10.1136/tsaco-2018-000176> [Accessed 21 November 2024].
3. Hughes, C. M., et al. (2020). Clinical outcomes of intra-abdominal hypertension in military patients. *Military Medicine*, 185(3-4), 123-130. [online] Available at: <https://doi.org/10.1093/milmed/usz404> [Accessed 21 November 2024].
4. Roubik, D. W., et al. (2021). Abdominal trauma and compartment syndrome: The military experience. *Journal of Trauma*, 88(2), 234-240. [online] Available at: <https://doi.org/10.1097/TA.0000000000002829> [Accessed 21 November 2024].



OSCAR
PUBLISHING SERVICES