Role of controlled hypotension in Resuscitation of Elderly Trauma Patients in Emergency Department, Egypt

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Abstract

Background: In the recent decade, a new paradigm in early trauma resuscitation especially in case of ongoing, uncontrollable bleeding has emerged. This paradigm change stresses on damage control resuscitation; a combination process of controlled hypotension, balanced resuscitation and damage control surgery. This study was designed to determine the impact of controlled hypotension as a factor in improving the outcome in traumatized elderly patients because vigorous fluid resuscitation is associated with a rebleeding and high mortality rate.

Aim: This study was conducted to improve the resuscitation process and decrease the mortality rate of elderly trauma patients in the emergency department.

Subjects and methods: This comparative cross-sectional study included elderly trauma patients (> 65 years old) presenting with traumatic hypovolemic shock who were admitted to the Emergency Department of Suez Canal University Hospital according to the inclusion and exclusion criteria. The patients were divided into two groups: Group 1, which received balanced resuscitation with controlled hypotension with the target systolic blood pressure being 90 mmHg, and Group 2, which received balanced resuscitation with the target systolic blood pressure being 100 mmHg.

Results: After resuscitation, patients in the controlled hypotension group had significantly less severe base deficit than those in the group 2 ($p = 0.04$). Meanwhile, regarding coagulopathy, patients in the controlled hypotension group had significantly lower international normalized ratio (<1.5) than those in the Group 2 ($p < 0.001$). Moreover, we found that patients who took controlled hypotension have less mortality at the emergency room (21.6%) than those in the group 2 (35.1%) ($p = 0.04$).

Conclusion: The study reported a lower rate of mortality and acid deficit in the group managed by controlled hypotension. The results regarding the benefits of controlled hypotension in elderly trauma patients are optimistic. However, many confirmatory studies should be conducted.

Introduction

Trauma is one of the common cause of annual mortality worldwide. World Health Organization, Data said that 5 million people died of injuries in 2000, accounting for 9% annual mortality (1). In elderly patients, trauma is a leading cause of disability, morbidity and mortality (2, 3).

Unintentional injury has been listed as the ninth cause of death for elderly people (4). Most common cause of injury is blunt trauma resulting from falls and motor vehicle crashes. Penetrating trauma and other traumas, such as burns, account for only 4% of all traumatic injuries in the elderly (5).

Trauma in the elderly has poor outcomes in comparison to trauma in the younger population, Increasing the age and the incidence of complications are more predictive of morbidity and mortality than the severity of trauma (6).

In the last four decades, the usual treatment for hypovolemic trauma patient due to a suspected hemorrhage has been to transfuse large amounts of fluid as soon as possible. The aim of this excessive fluid transfusion is to restore the intravascular volume and normalization of vital signs as quickly as possible while maintaining important organ perfusion. High-volume intravenous (IV) fluid bolus for hemodynamic instability has been the accepted standard in most prehospital care systems, such as the Advanced Trauma Life Support program (7).

Damage control resuscitation (DCR) is a multidisciplinary strategy for treating trauma patients with serious injuries that begins in the emergency room and continues through the operating room and intensive care unit (ICU); it involves balanced (hemostatic) resuscitation, controlled hypotension, and damage control surgery. Until decisive intervention, DCR is performed to preserve circulation volume, limit hemorrhage, and rectify the “lethal triad” of coagulopathy, acidosis, and hypothermia (8, 9).

Recently, laboratory studies and clinical trials have suggested that excessive crystalloid provided in the acute trauma setting is often associated with complications. Over-resuscitation may lead to uncontrolled bleeding, coagulopathy, decrease organ perfusion, and abdominal compartment syndrome (10, 11). These complications may result in increased mortality compared with moderate resuscitation (9, 11). Recent study demonstrate that excessive fluid replacement does not improve hemodynamic parameters or regional organ perfusion (12, 13). The incidence of over-resuscitation has been minimized by implementing controlled hypotensive resuscitation (14, 15).

However, in the recent decade, a new paradigm in early trauma resuscitation has emerged. This paradigm change promotes hemostatic resuscitation as early as feasible in a patient’s care, employing ratios of plasma, platelets, and red blood cells (RBCs) that mimic whole blood. Aggressive crystalloid resuscitation increases coagulopathy by dilution, contributes to acidosis through pH changes, and increases hypothermia through the infusion of high quantities of cold solutions (16).

A study has found that volume replacement of 1.5 L or more in the emergency department was an independent risk factor for mortality. High-volume resuscitation was associated with a higher rate of mortality, especially in older trauma patients. Their finding supports the notion that excessive fluid resuscitation should be avoided in the emergency department, and when required, operative intervention or intensive care admission should be considered (17, 18).

As aggressive fluid resuscitation in elderly trauma patients is associated with high mortality rates, this study was designed to identify the role of controlled hypotension a systolic blood pressure (SBP) of 80–90 mmHg is an appropriate target and is only a short.

term measure whilst haemorrhage is controlled as a factor to improve patient outcomes.

Many study indicate the importance of controlled hypotension in adult trauma patent but there is still a debate regarding its role in elderly trauma patient as an effective method due to their comorbid condition as chronic hypertensive patient.

So, this study was designed to determine the impact of controlled hypotension as a factor in improving the outcome in traumatized elderly patients because vigorous fluid resuscitation is associated with a rebleeding and high mortality rate.

Additionally, this study was conducted to improve the resuscitation process and decrease the mortality rate of elderly trauma patients in the emergency department.

Subjects And Methods

This was a comparative cross-sectional, randomized study conducted on elderly trauma patients (> 65 years old) of both genders who presented with traumatic hypovolemic shock and were admitted to the Emergency Department of Suez Canal University Hospital. Subjects were selected according to the following criteria:

Inclusion criteria

1. Elderly trauma patients (age ≥ 65 years old)
2. Sex (both male and female)
3. All types of trauma (e.g. road traffic collision, direct trauma, falling from height, and sliding)

Exclusion criteria

1. Arrested on arrival to the emergency department.
2. Traumatic brain injury.
3. Patients known to have heart or renal failure.
4. Hypovolemic shock classes 1 and 2.
5. Patients known to have bleeding disorders or those who are on anticoagulant therapy.

Data were collected in a preorganized data sheet by the researcher after approval from the Ethics Committee of the Faculty of Medicine, Suez Canal University. All patients who were included in this study underwent the following:

1. Full history taking using a questionnaire
2. The patients were clinically evaluated on arrival to the emergency department using the ABCDE approach
3. Investigations including:

- Laboratory investigations (arterial blood gas, complete blood count, coagulation profile, and cross-matching).
- Radiological investigations (X-rays, focused assessment with sonography in trauma, and CT, as necessary).
- After resuscitating the subjects in both groups, we reassessed the vital signs and repeated the assessment every 10–15 min.

- We rechecked the laboratory findings after resuscitation.
- We followed up the patients in the emergency department until their fate (i.e., ICU admission, surgery, internal ward admission, death, or discharged).

Results

The mean age of the sample under study was 69.45 ± 3.1 years. Approximately half of the patients were manual workers, and approximately 28 were employers (Table 1). Regarding gender distribution, approximately 53% of the patients were males and 47% were females.

Table 1
Baseline characteristics of the sample under study.

Variables	Total (n = 74)	Type of resuscitation: Controlled hypotension (n = 37)	Type of resuscitation: 2nd group (n = 37)	*P*-value
Age (years), mean ± SD	69.45 ± 3.1	68.27 ± 1.77	70.62 ± 3.43	0.31 [a]
Occupation, n (%)				
Housewife/not working	13 (17.6)	7 (18.9)	6 (16.2)	0.94 [b]
Manual worker	40 (54.1)	20 (54.1)	20 (54.1)	
Employer	21 (28.4)	10(27)	11 (29.7)	

[a] *P*-values are based on the Mann–Whitney U-test. Statistical significance at $p < 0.05$.

[b] *P*-values are based on the chi-square test. Statistical significance at $p < 0.05$.

SD, standard deviation.

Table 2. History of chronic illness among the studied sample.

Variables	Total (n = 74)	Type of resuscitation: Controlled hypotension (n = 37)	Type of resuscitation: 2nd group (n = 37)	P-value
History of chronic illness, n (%)				
Absent	49 (66.2)	27 (73)	22 (59.5)	0.22 [b]
Present	25 (33.8)	11 (29.7)	16 (43.2)	
Diabetes	9 (12.2)	5 (13.5)	4 (10.8)	
Hypertension	9 (12.2)	4 (10.8)	5 (13.5)	
Atrial fibrillation	2 (2.7)	1 (2.7)	1 (2.7)	
CKD	5 (6.8)	2 (5.4)	3 (8.1)	

[a] *P*-values are based on the chi-square test. Statistical significance at $p < 0.05$.

CKD, chronic kidney disease.

No statistically significant difference in the history of chronic illness was observed between the two groups **(Table 2).**

The most common mechanism of trauma in both groups was motor car accident (51.3% in the controlled hypotension group and 54.1% in the group 2). Meanwhile, the most common type of trauma was blunt trauma in both groups (75.7% in the controlled hypotension group and 86.5% in the group 2). No statistically significant difference in the mechanism of trauma ($p = 0.93$) or the type of trauma ($p = 0.48$) was observed between the two groups **(**Table 3**).**

Table 3
Variables related to trauma characteristics of the sample under study.

Variables	**Type of resuscitation**		***P*-value**
	Controlled hypotension (n = 37)	**2nd group (n = 37)**	
Mechanism of trauma			
Motor car accident	19 (51.3)	20 (54.1)	0.93 [a]
Fall from height	7 (19.4)	8 (21.6)	
Sliding down	5 (13.9)	6 (16.2)	
Quarrel	5 (13.9)	3 (8.1)	
Type of trauma, n (%)			
Blunt	28 (75.7)	32 (86.5)	0.48 [a]
Penetrating	6 (16.2)	4 (10.8)	
Both	3 (8.1)	1 (2.7)	

[a] *P*-values are based on Fisher's exact test. Statistical significance at $p < 0.05$.

Moreover, no statistically significant difference in baseline systolic and diastolic blood pressure measures was observed between the two groups. However, patients in the controlled hypotension group had a significantly lower mean systolic blood pressure after receiving fluids than those in the 2nd group ($p < 0.001$) **(**Table 4**).**

Table 4
Comparison of blood pressure the controlled hypotension and 2nd group. before and after intervention.

Variables	Type of resuscitation		*P*-value
	Controlled hypotension (n = 37)	**2nd group (n = 37)**	
Systolic blood pressure (mmHg)			
Pre-intervention	73.61 ± 5.93	74.29 ± 6.55	0.54 [a]
Post-intervention	86.62 ± 3.87	103.51 ± 4.54	**< 0.001** [a]
Score difference	16.11 ± 3.69	29.43 ± 8.56	**< 0.001** [a]
Diastolic blood pressure (mmHg)			
Pre-intervention	47.78 ± 5.91	46.86 ± 5.83	0.51 [a]
Post-intervention	60.81 ± 4.93	63.51 ± 6.76	0.12 [a]
Score difference	13.06 ± 7.1	16.57 ± 8.38	0.11 [a]

[a] *P*-values are based on the Mann–Whitney U-test. Statistical significance at $p < 0.05$.

Furthermore, no statistically significant differences in base deficit and coagulopathy at baseline and after resuscitation were observed between both groups. However, after resuscitation, patients in the controlled hypotension group had significantly less severe base deficit than those in the 2nd group ($p = 0.04$). Meanwhile, regarding coagulopathy, patients in the controlled hypotension group had significantly lower international normalized ratio (INR) level (< 1.5) than those in the 2nd group ($p < 0.001$) **(**Table 5**).**

Table 5
Comparison of laboratory measures between the controlled hypotension and 2nd group. before and after intervention.

Variables	Type of resuscitation		*P*-value
	Controlled hypotension (n = 37)	2nd group (n = 37)	
Base deficit, n (%)			
Pre-intervention			
Mild (< 5)	4 (10.8)	5 (13.5)	0.86 [a]
Moderate (6–9)	15 (40.5)	13 (35.1)	
Sever (> 10)	18 (48.6)	19 (51.4)	
Post-intervention			
Mild (< 5)	11 (29.7)	6 (16.2)	**0.04** [a]
Moderate (6–9)	18 (45.7)	13 (34.1)	
Sever (> 10)	8 (21.6)	18 (45.7)	
Coagulopathy (INR), n (%)			
Pre-intervention			
> 1.5	23 (62.2)	20 (54.1)	0.47 [a]
< 1.5	14 (37.8)	17 (45.9)	
Post-intervention			
> 1.5	11 (29.7)	29 (78.4)	**< 0.001** [a]
< 1.5	26 (70.3)	8 (21.6)	

[a] *P*-values are based on the chi-square test. Statistical significance at $p < 0.05$.

Intraperitoneal free fluid collection was found in 70.3% of the patients in the controlled hypotension group and approximately 84% of the patients in the 2nd group ($p = 0.17$). Other findings included splenic injury, hemothorax, and pericardial effusion (only one case in each group) **(**Table 6**).**

Table 6
Comparison of sonographic outcomes between the controlled hypotension and 2nd group.

Variables	Type of resuscitation		*P*-value
	Controlled hypotension (n = 37)	2nd group (n = 37)	
FAST finding			
No IPFFC	11 (29.7)	6 (16.2)	0.17 [a]
IPFFC	26 (70.3)	31 (83.8)	
Rim	12 (32.4)	11 (29.7)	
Minimal collection	4 (10.8)	8 (21.6)	
Mild collection	2 (5.4)	4 (10.8)	
Moderate collection	6 (16.2)	4 (10.8)	
Marked collection	2 (5.4)	4 (10.8)	
Other findings			
Absent	33 (89.2)	32 (75.7)	0.58 [a]
Present	4 (10.8)	5 (13.4)	
Splenic injury	1 (2.7)	1 (2.7)	
Hemothorax	1 (2.7)	1 (2.7)	
Pneumothorax	1 (2.7)	1 (2.7)	
Hemopneumothorax	0 (0)	1 (2.7)	
Pericardial effusion	1 (2.7)	1 (2.7)	

FAST, focused assessment with sonography in trauma; IPFFC, intraperitoneal free fluid collection.

[a] *P*-values are based on the chi-square test. Statistical significance at $p < 0.05$.

Both study groups had the same crystalloid fluid resuscitation. However, regarding the amount of fluid, the 2nd group had a statistically significant higher amount (total amount of crystalloid, Ringer’s lactate, and normal saline) than the controlled hypotension group. In contrast, patients in the controlled hypotension group received significantly more colloid fluids than those in the 2nd group ($p < 0.001$). Meanwhile, the controlled hypotension group had significantly higher amount of all types of colloid fluids (i.e., plasma, platelets, and packed RBCs) than the liberal group (Table 7**)**.

Table 7
Comparison of fluid resuscitation between patients receiving Damage control resuscitation and 2nd group resuscitation.

Variables	Type of resuscitation		*P*-value
	Controlled hypotension (n = 37)	**2nd group (n = 37)**	
Crystalloid			
No	2 (5.4)	0 (0)	0.5 [a]
Yes	35 (94.6)	37 (100)	
Amount (ml), mean ± SD			
Overall amount	675.14 ± 250.8	1268.13 ± 310.1	**< 0.001** [b]
Ringer lactate	683.4 ± 201.9	978.4 ± 384	**0.01** [b]
Normal saline	431.6 ± 287.6	613.78 ± 357.5	**0.04** [b]
Colloid			
No	0 (0)	13 (35.1)	**< 0.001** [a]
Yes	37 (100)	24 (64.9)	
Amount (ml), mean ± SD			
Overall amount	2370.1 ± 190.1	1156.2 ± 324.5	**< 0.001** [b]
Plasma	1194.5 ± 475.1	651.7 ± 124.6	**0.002** [b]
Platelets	649.5 ± 325.1	341.5 ± 155.9	**0.001** [b]
Packed red blood cell	845.4 ± 319.1	678.9 ± 247.1	**0.03** [b]

[a] *P*-values are based on Fisher's exact test. Statistical significance at $p < 0.05$.

[b] *P*-values are based on the Mann–Whitney U-test. Statistical significance at $p < 0.05$.

Additionally, the controlled hypotension group has less incidence of death at the emergency room (21.6%) than the 2nd group (35.1%) ($p = 0.04$).

Logistic regression analysis was used to assess the predictors of mortality among elderly trauma patients in the emergency room. Balanced fluid resuscitation decreases the odds of mortality among patients in the emergency room by 10.9% compared with 2nd fluid resuscitation ($p < 0.001$) **(**Table 8**).**

Table 8
Logistic regression analysis of determinants of mortality among elderly patients in the emergency room.

Predictors	Unstandardized coefficients		Odds ratio (95% CI)	*P*-value
	B	Standard error		
(Constant)	4.96	0.339		0.143
Groups				
Controlled hypotension vs. **2nd group** (R)	−1.359	0.802	0.891 (0.847–0.932)	**< 0.001** [a]
[a]Statistical significance at $p < 0.0.5$				

Discussion

Trauma in the elderly is associated with poorer results than trauma in the younger population, with age and the occurrence of comorbidities being more predictive of morbidity and mortality than the severity of injuries (7).

This was a comparative cross-sectional study that included elderly trauma patients presenting with traumatic hypovolemic shock admitted to the Emergency Department of Suez Canal University Hospital. This study was designed to compare controlled hypotension and usual resuscitation regimens regarding outcomes.

In this study, the study participants were managed into two ways. The first group received fluid resuscitation with the target systolic blood pressure being 90 mmHg (n = 37) and the second group received fluid resuscitation with the target systolic blood pressure being 100 mmHg (n = 37). The mean age of the sample under study was 69.45 ± 3.1 years. Approximately half of the patients were manual workers, and approximately 28 were employers. Additionally, no statistically significant difference in the history of chronic illness was found between the two groups.

In this study, the most common mechanism of trauma in both groups was motor car accident (51.3% in the controlled hypotension group and 54.1% in the 2nd group). Meanwhile, the most common type of trauma was blunt trauma (75.7% in the controlled hypotension group and 86.5% in the 2nd group). No statistically significant difference in the mechanism of trauma ($p = 0.93$) or the type of trauma ($p = 0.48$) was observed between the controlled hypotension and 2nd groups.

Alternatively, several studies have reported that the most common mechanism of trauma in elderly was falls. Gowing *et al* (19) have reported that the mechanisms of injury included falls (64%), motor vehicle collision (27%), injury from machinery (3%), injury from natural and environmental causes (2%), suicide or self-inflicted injury (3%), and burns (1%).

Another study on severe trauma in geriatric patients has reported that falls are the most common cause of trauma and the leading cause of trauma-related deaths in this population (7).

This contradiction may be explained by the difference in the study population, inclusion criteria, and site of the study. As this study was conducted in Suez Canal University Hospital, which is a tertiary care facility, it receives more cases of motor car accidents than usual.

In this study, no statistically significant difference in baseline systolic and diastolic blood pressure measures was observed between both groups. However, patients in the controlled hypotension group had a significantly lower mean systolic blood pressure after receiving fluids than those in the 2nd group ($p < 0.001$).

These results are due to the effects of controlled hypotension that results from balanced resuscitation and this is why controlled hypotension is not recommended in case of head trauma.

Almost all studies discussing the effects of damage control resuscitation have reported that controlled hypotension results in lower blood pressure readings as it aims to keep the systolic blood pressure Between 80–90 mmHg (20, 21).

Moreover, no statistically significant differences in base deficit and coagulopathy at baseline and after resuscitation were observed between the controlled hypotension and 2nd groups. However, after resuscitation, patients in the controlled hypotension group had significantly less severe base deficit than those in the 2nd group ($p = 0.04$).

A large randomized, double-blind, parallel-group trial showed the mean improvement in base deficit excess during the first 24h with Plasma-Lyte A than with 0.9% sodium chloride (7.5 ± 4.7 vs. 4.4 ± 3.9 mmol/L; difference: 3.1 (95% confidence interval (CI): 0.5–5.6)). At 24 h, arterial pH was greater (7.41 ± 0.06 vs. 7.37 ± 0.07; difference: 0.05 (95% CI: 0.01–0.09)) and serum chloride was lower (104 ± 4 mEq/L vs. 111 ± 8 mEq/L; difference: −7 (95% CI: −10 to − 3)) with Plasma-Lyte A than with 0.9% sodium chloride (22).

In contrast, a meta-analysis discussing the use of ringer lactate versus isotonic saline in critically ill patients has reported that ringer lactate and isotonic saline have no difference in various clinical outcomes, including in-hospital mortality, and overall ICU mortality (23).

Meanwhile, regarding coagulopathy, patients in the controlled hypotension group had significantly lower INR levels (< 1.5) than the 2nd group ($p < 0.001$). Similarly, a randomized control trial has reported that implementing a controlled hypotension strategy in patients may reduce the risk of early postoperative mortality from coagulopathic bleeding (24).

Trauma increase the risk of coagulopathy due to acquired quantitative and qualitative platelet defects, hypocoagulable states, and dysregulation of the fibrinolytic system a phenomenon referred to as fibrinolytic shutdown (25). Thus, the ability to reduce INR, along with the coagulopathy risk, is a great advantage of controlled hypotension as it decreases the need for crystalloid infusion.

In this study, intraperitoneal free fluid collection was found in 70.3% of the patients in the controlled hypotension group and approximately 84% of the patients in the 2nd group ($p = 0.17$). Other findings included splenic injury, hemothorax, and pericardial effusion (only one case in each group). Similarly, a study has reported that excessive fluid resuscitation causes abdominal compartment syndrome among critically ill or injured patients, such as abdominal trauma, pelvic fracture, and intra-abdominal organ injuries (26).

Additionally, in this study, both study groups had the same type of crystalloid fluid resuscitation, but regarding the amount of fluids administered, the 2nd group had a statistically significant higher amount (total amount of crystalloid, Ringer's lactate, and normal saline) to be able to maintain systolic blood pressure at 100mmHg than the controlled hypotension group. In contrast, patients in the controlled hypotension group received significantly more colloid fluids than those in the 2nd group ($p < 0.001$). Additionally, the controlled hypotension group had a significantly higher amount of all types of colloid fluids (i.e., plasma, platelets, and packed RBC) than the 2nd group.

Furthermore, the controlled hypotension group has less incidence of death at the emergency room (21.6%) than the 2nd group (35.1%) ($p = 0.04$). Damage controlled resuscitation and controlled hypotension as one of its 3 component decreases the odds of mortality among patients in the emergency room by 10.9% compared with usual resuscitation ($p < 0.001$). Similarly, a multicenter randomized controlled trial, known as the Colloids Versus Crystalloids for the Resuscitation of the Critically Ill trial, has compared the mortality rate of critically ill patients who received colloids ($n = 1414$; gelatins, dextrans, hydroxyethyl starches, or 4% or 20% albumin) with that of patients who received crystalloids ($n = 1443$; isotonic or hypertonic saline or Ringer's lactate) for fluid resuscitation (25). Therapy was open label, but the outcome assessment was blinded to treatment assignment. No differences in the 28-day mortality, need for renal replacement therapy, development of organ failure, and number of hospital days were observed between the two groups (27, 28). The 90-day mortality was slightly lower in patients who received colloids.

Based on the results of this study, we recommend conducting further studies to assess the effectiveness of controlled hypotension in different populations and age groups. The use of damage control resuscitation in critically traumatized patients should be considered to gain the benefits of early colloid resuscitation.

The limitations of this study were as follows: (1) The Small sample size may have affected the generalizability of the results. (2) We did not follow up the patients to assess the clinical outcomes at different intervals. (4) Hypothermia as an element of the lethal triad of hypothermia, coagulopathy, and acidosis didn't assess due to unavailability of a low-reading thermometer.

Conclusion

The study was a comparative cross-sectional study that reported a lower rate of mortality and acid deficit in the group managed with controlled hypotension. The results are optimistic regarding the benefits of controlled hypotension in elderly trauma patients. However, many confirmatory studies should be conducted.

Abbreviations

ABCDE: Airway, Breathing, Circulation, Disability and Exposure

CI: Confidence Interval

CT: computed tomography;

DCR: Damage Control resuscitation

INR: International Normalized Ratio

ICU: intensive care unit

IV: Intravenous

RBCs: Red Blood Cells

SBP: Systolic Blood Pressure

Declarations

Ethical consideration

All patients provided written consent to participate in the study without affecting their course of treatment and ethic committee approved this procedure according to institutional approvals obtained and approvals of the Research Ethics Committee of the Faculty of Medicine, Suez Canal University (approval number 3832; date: April 14, 2019).

The consent was containing

Explanation of the study aim in a simple and clear manner to understood by the common people. No harmful maneuvers performed or used. There are no foreseen hazards. All data considered confidential and not used outside this study.

Consent for publication

Participants signed an informed consent for publication.

Availability of data and materials

The datasets used and analysed during the current study available from the corresponding author on reasonable request.

• The data that support the findings of this study are available from [Monira Taha Ismail] as a corresponding author] but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of [Monira Taha Ismail].

There are no prior publications or submissions with any overlapping information, including studies and patients.

The manuscript has not been and will not be submitted to any other journal while it is under consideration by BMC Emergency Medicine;

The manuscript intended to submit to BMC Emergency Medicine.

Any data and materials are needed and Available for BMC Emergency Medicine when editors needed.

Conflict of interest

No any potential conflicts of interest, real or perceived; this includes a description of the role of the study sponsor(s)

The name of the person who wrote the first draft of the manuscript is Monira Taha Ismail who corresponding author and assistant professor of emergency medicine

each author listed on the manuscript has seen and approved the submission of this version of the manuscript and takes full responsibility for the manuscript

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Authors' contributions

TM carried out the Study conception and design, participated in its design and coordination and drafted the manuscript.

EA carried out the design of the study, the Analysis and interpretation of data and helped to draft the manuscript.

MN participated in the sequence alignment, interpretation of data.

AN carried out the Study conception and design, participated in its design.

All authors read and approved the final manuscript.

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