RESEARCH PAPER

NECK TRAUMA: A PROFILE OF EXPERIENCE AT DR. SOETOMO GENERAL HOSPITAL, SURABAYA 2019–2024

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ABSTRACT

Neck trauma is a life-threatening emergency with high morbidity and mortality due to the involvement of vital structures such as major vessels, airway, and the aerodigestive tract. Data on neck trauma profiles in tertiary referral centers in Indonesia remain limited. This study aimed to describe the profile of neck trauma patients at Dr. Soetomo General Hospital, Surabaya, from 2019 to 2024.

A descriptive observational study with a cross-sectional design was conducted using retrospective medical records. A total of 48 patients meeting inclusion criteria were analyzed using total sampling. Variables included demographic characteristics, mechanism of injury, injury location, management, clinical manifestations, etiology, and patient outcomes. Data were analyzed descriptively.

Most patients were male (93.75%) with a mean age of 33.34 ± 11.08 years. Penetrating trauma was the most common mechanism (70.83%). Injuries predominantly occurred in zone II (83.33%). Debridement was the most frequently performed management (25%). Clinical manifestations varied, with most patients presenting without hard signs (37.5%) or soft signs (50%). The leading etiology was stab wounds (50%). Most patients survived (91.67%).

Neck trauma at this center predominantly affects young adult males, mainly due to penetrating mechanisms involving zone II. Timely and appropriate management results in favorable clinical outcomes.

Keywords: Neck trauma, penetrating trauma, neck zones, trauma management, clinical outcomes.

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Introduction

Neck injury is a type of trauma encountered in both major trauma centers and peripheral hospitals. The incidence of neck trauma accounts for approximately 5- 10% of all trauma cases, with a mortality rate of around 10%. Neck injuries may result from blunt trauma such as traffic accidents, violence, or falls from height, as well as penetrating trauma including gunshot wounds, stab wounds, or injuries caused by other objects (Shilston et al., 2021). The incidence of blunt neck trauma involving the carotid artery is relatively rare, ranging from 0.1% to 0.33%; however, it can be fatal if not managed appropriately. Mortality in neck trauma is often associated with concomitant injuries, including multiple trauma, vascular injuries, and burns (Sethi et al., 2014).

Blunt neck trauma may initially appear benign but can be life-threatening. Airway injuries are more commonly associated with blunt trauma, whereas vascular injuries are more frequently seen in penetrating trauma. The anatomical structures of the neck, including fascia, muscles, and bones, may mask clinical signs, resulting in minimal physical findings and delayed complications.

Comprehensive physical examination and appropriate management are essential to prevent morbidity and mortality due to delayed infection, airway obstruction, or other complications. Patients often present to the emergency department with open neck wounds, active bleeding, voice changes, respiratory distress, or dysphagia. Some may present in hemorrhagic shock requiring immediate resuscitation and hemorrhage control (Schaider et al., 2009).

The diagnosis of neck trauma is based on initial assessment and understanding of the injury mechanism. Early signs of severity are categorized

into “hard signs” and “soft signs.” Hard signs include active pulsatile bleeding, expanding hematoma, absent carotid pulse, vascular bruit or thrill, and cerebral ischemia. Soft signs include a history of bleeding at the scene, injury in proximity to vascular structures, or small non-pulsatile hematomas. Initial management should follow advanced trauma life support (ATLS) guidelines, prioritizing airway security and hemorrhage control. The presence of hard signs indicates the need for immediate surgical intervention. Airway management is critical and may involve orotracheal intubation or cricothyrotomy (Haran et al., 2022).

The mortality rate in neck trauma ranges from 3% to 13% (Alao, 2023). Despite its clinical significance, data describing the profile of traumatic neck injuries remain limited. Understanding these profiles is important for educational purposes and for evaluating current management strategies. Therefore, this study aims to describe the profile of patients with traumatic neck injuries at Dr. Soetomo General Hospital, Surabaya, from 2019 to 2024.

Methods

The study population included all patients with traumatic neck injuries treated at Dr. Soetomo General Hospital, Surabaya, from January 2019 to August 2023. Samples were selected using a consecutive sampling technique. The minimum sample size was calculated using a descriptive categorical formula (Sopiyudin, 2014), assuming a 5% prevalence, 5% margin of error, and 95% confidence level, resulting in 29 subjects; after adding 10% for potential dropout, the final required sample size was 36 subjects. Inclusion criteria were patients

diagnosed with traumatic neck injury, while exclusion criteria included patients with concomitant trauma to other body regions, incomplete medical records, or loss to follow-up. This study employed a descriptive observational design with a cross-sectional approach using retrospective data. Data were obtained from secondary sources in the form of medical records, including demographic characteristics, mechanism of trauma, injury location (neck zones I–III), management, and clinical outcomes. The independent variables were age, sex, and mechanism of injury, while the dependent variables were operative management and patient outcomes. Data analysis was conducted using univariate descriptive methods. Categorical variables were presented as frequencies and percentages, while numerical variables were expressed as mean and standard deviation (SD). All data were processed and analyzed using Statistical Product and Service Solutions (SPSS) version 25 and presented in tables and graphical formats.

Result

Characteristic of Sample

A total of 48 patients with neck trauma were treated at Dr. Soetomo General Hospital, Surabaya, during the period of 2019–2024. The demographic characteristics showed a marked male predominance, with 45 patients (93.75%) compared to only 3 females (6.25%). The mean age of patients was 33.34 ± 11.08 years, indicating that most cases occurred in young adults. Based on the mechanism of injury, penetrating trauma was the most common type, accounting for 34 cases (70.83%), while blunt trauma was observed in 14 cases (29.17%). The initial characteristics are shown in Table 1

Table1.DemographicCharacteristics of Neck Trauma Patients at Dr. Soetomo Hospital (2019–2024)

Variable	n	%
Sex		

Male	45	93.75
Female	3	6.25
Age (mean ± SD), years	33.34 ± 11.076	
Type of Neck Trauma		
Penetrating trauma	34	70.83
Blunt trauma	14	29.17

Location of Injury Characteristics

Regarding the location of injury, the majority of cases involved zone II of the neck, with 40 patients (83.33%). Injuries in zone I were found in 6 patients (12.5%), while zone III injuries were the least frequent, occurring in only 2 patients (4.17%). The location of injury characteristics are shown in Table 2.

Table 2. Location of injury characteristics

Category	n	%
Zone I	6	12.5
Zone II	40	83.33
Zone III	2	4.17

Etiology of Neck Trauma

The most common etiology of neck trauma was stab wounds (50%), followed by traffic accidents (16.67%), slash injuries (12.5%), blunt object trauma (10.42%), gunshot wounds (8.33%), and falls from height (2.08%). Etiology of neck trauma characteristics are shown in Table 3.

Table 3. Etiology of neck trauma characteristics

Category	n	%
Stab wounds	24	50
Traffic accidents	8	16.67
Lacerations	6	12.5
Blunt object trauma	5	10.42
Gunshot wounds	4	8.33
Falls from height	1	2.08

Characteristics of Neck Trauma Management

In terms of management, most patients required surgical intervention. Debridement was the most frequently performed procedure (25%), followed by primary colli suturing, colli exploration, and tracheal repair, each accounting for 16.67%. Thyroid repair and conservative management were each performed in 12.5% of cases. Additionally, tracheostomy was performed in 26 patients (54.17%). Characteristics of neck trauma management are shown in Table 4.

Table 4. Characteristics of neck trauma management

Category	n	%
Tracheostomy		
Yes	26	54.17
No	22	45.83
Debridement	12	25
Neck suturing	8	16.67
Neck exploration	8	16.67
Tracheal repair	8	16.67
Thyroid repair	6	12.5
Conservative management	6	12.5

Characteristics of Clinical Manifestations of Neck Trauma

Clinical manifestations varied among patients. For hard signs, 37.5% of patients presented without any signs, while active bleeding was the most common finding (31.25%), followed by expanding hematoma (16.67%) and hemorrhagic shock (14.58%). For soft signs, 50% of patients had no symptoms, while dysphagia (20.83%), subcutaneous emphysema (16.67%), and dysphonia (12.5%) were observed in the remaining cases. Characteristics of clinical manifestations of neck trauma in this study are shown in Table 5.

Table 5. Characteristics of clinical manifestations of neck trauma

Variabl	n	%

e		
Hard signs		
None	18	37.5
Active bleeding	15	31.25
Expanding hematoma	8	16.67
Hemorrhagic shock	7	14.58
Soft signs		
None	24	50
Dysphagia	10	20.83
Subcutaneous emphysema	8	16.67
Dysphonia	6	12.5

Outcome Characteristics of Neck Trauma

In terms of outcomes, the majority of patients survived, with 44 cases (91.67%), while 4 patients (8.33%) died, indicating generally favorable clinical outcomes following appropriate management. Outcome characteristics of neck trauma in this study are shown in table 6.

Table 6. Outcome characteristics of neck trauma

Variable	n	%
Died	4	8,33
Survived	44	91,67

Discussion

The findings of this study demonstrate that neck trauma predominantly affects young adult males, with a mean age of 33.34 years and a strong male predominance (93.75%), consistent with previous studies reporting that males are at higher risk due to greater involvement in high-risk activities such as interpersonal violence, use of sharp weapons, and traffic accidents (Tucker et al., 2024; Ranwa et al., 2024; Puttamadaiah et al., 2022; Bordoni et al., 2016; Abhilash et al., 2022). Penetrating trauma was the most common mechanism (70.83%), reflecting the predominance of sharp-force violence, which is typical in developing settings and carries a higher risk of injury to vital structures such as major vessels, airway, and esophagus (Ranwa et al., 2024; Bordoni et al., 2016; Aldhilan et al., 2025). The majority of injuries occurred in zone II (83.33%), which is anatomically more exposed and accessible for clinical evaluation and surgical exploration, explaining its higher detection rate compared to zones I and III (Loss et al., 2025; Alao & Waseem, 2023). In terms of management, most patients required surgical intervention, particularly debridement and exploration procedures, aligning with current recommendations that emphasize immediate surgery in patients with significant clinical findings, while selective non-operative management (SNOM) may be applied in stable patients without hard signs, supported by advances in CT angiography (Puttamadaiah et al., 2022; Sepúlveda et al., 2022; Siletz et al., 2024). Clinical manifestations were variable, with a substantial proportion of patients presenting without hard or soft signs, highlighting that the absence of overt clinical findings does not exclude serious underlying injury; however, active bleeding remained the most common hard sign, indicating the predominance of vascular involvement (Aldhilan et al., 2025). The leading etiology was stab wounds (50%), followed by traffic accidents, further emphasizing the role of interpersonal violence and environmental factors. Despite the severity of potential injuries, the overall survival rate was high (91.67%), with mortality (8.33%) comparable to existing literature, likely influenced by the predominance of zone II injuries, lower-energy mechanisms such as stab wounds, and timely management following Advanced Trauma Life Support (ATLS) principles; conversely, mortality was likely associated with severe vascular injury or delayed intervention leading to complications such as massive hemorrhage or sepsis (Sepúlveda et al., 2022; Aldhilan et al., 2025; Siletz et al., 2024).

Conclusion

Neck trauma at Dr. Soetomo General Hospital, Surabaya, during the 2019– 2024 period was predominantly observed in young adult males, with penetrating trauma as the most common mechanism, primarily affecting zone II as the most frequent site of injury. Appropriate and timely management, particularly surgical interventions such as debridement and exploration, was associated with favorable clinical outcomes, as reflected by a high survival rate among patients.

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