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PROFILE OF THORACIC TRAUMA PATIENTS AT RSUD DR. SOETOMO SURABAYA BEFORE AND DURING THE COVID-19 PANDEMIC (2018–2022)

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ABSTRACT

Background: Thoracic trauma is a major contributor to trauma-related morbidity and mortality. Public movement restrictions during the COVID-19 pandemic significantly altered human mobilization patterns, which may have influenced trauma epidemiology. This study aimed to analyze the demographic profile, etiology, diagnostic patterns, management, and clinical outcomes of thoracic trauma patients at RSUD Dr. Soetomo Surabaya before and during the COVID-19 pandemic.

Methods: A retrospective descriptive study was conducted using secondary medical record data of thoracic trauma patients admitted between January 2018 and December 2022. Variables included age, gender, period classification (pre-pandemic: Jan 2018–Mar 2020 vs. pandemic: Apr 2020–Dec 2022), cause of injury, trauma types, interventions, concomitant injuries, and discharge outcomes.

Results: A total of 309 patients met the inclusion criteria. Thoracic trauma predominantly affected males (79.94%) and individuals of productive age (15–64 years, 86.41 %). Total admissions slightly decreased during the COVID-19 pandemic (49.19%, n=152) compared to the pre-pandemic period (50.81 %, n=157). Traffic accidents were the main etiology (66.34%), followed by falls (16.50%). Rib fractures were the most frequent thoracic injury (39.16%), followed by pulmonary contusions (32.69%). Intercostal catheter (chest tube) insertion was the predominant treatment modality (51 .56%). Head injuries (29.16%) and abdominal trauma (29.13%) were the most prevalent accompanying injuries. The overall recovery rate was 84.14%, with a mortality rate of 15.86%.

Conclusion: Thoracic trauma incidence showed a minor decline during the COVID-19 pandemic.

Keywords: Thoracic Trauma; Traffic Accidents; Covid-19; Rib Fracture.

1 INTRODUCTION

Thoracic trauma encompasses injuries involving the chest wall, pleural cavity, lungs, tracheobronchial tree, esophagus, heart, and major intrathoracic vessels. It can be broadly categorized by mechanism into blunt thoracic trauma and penetrating thoracic trauma [1]. Thoracic trauma and its associated complications represent a leading cause of emergency admissions and account for up to 20% to 25% of all trauma-related deaths globally [2].

The vast majority of chest trauma cases occur among young and productive-age individuals, with a significantly higher prevalence in males due to higher outdoor activity levels, occupational exposures, and high-mobility commuting patterns [3]. Traffic accidents remain the leading driver of blunt thoracic trauma worldwide, followed by occupational accidents, falls from height, and physical violence [4].

The emergence of the COVID-19 pandemic in early 2020 prompted global public health measures, including Large-Scale Social Restrictions (PSBB) in Indonesia. These mobility restrictions profoundly affected human traffic volume, daily commuting, and occupational dynamics [5]. Previous international studies reported notable shifts in trauma admission volume and etiology during pandemic lockdown periods [6]. As the main tertiary referral hospital in East Java, RSUD Dr. Soetomo plays a pivotal role in emergency trauma care. This study was conducted to evaluate the comprehensive clinical profile, diagnostic distribution, management strategies, and survival outcomes of thoracic trauma patients at RSUD Dr. Soetomo before (2018–March 2020) and during (April 2020–2022) the COVID-19 pandemic.

2 METHODS

2.1 Study Design and Setting

This study was a retrospective descriptive investigation conducted at RSUD Dr. Soetomo Surabaya, utilizing secondary medical records spanning from January 2018 to December 2022. Ethical approval was granted by the Health Research Ethics Committee of RSUD Dr. Soetomo (Ref No: 1029/KEPK/VII/2024).

2.2 Patient Selection

The study population comprised all patients presenting with thoracic trauma. Out of 721 medical records screened, 309 patients met the inclusion criteria. Inclusion criteria included complete medical record entries of primary thoracic trauma diagnoses (rib fractures, pulmonary contusion, hemothorax, pneumothorax, hemopneumothorax, thoracic spine fractures, flail chest, tracheobronchial injury, sternal fracture, aortic rupture, diaphragmatic rupture, and cardiac tamponade). Exclusion criteria consisted of incomplete medical files, non-trauma chest pathologies (such as malignancies, tuberculosis, spondylitis, or pathological fractures), and patients lost to follow-up before definitive outcome recording.

2.3 Variable Definitions and Data Analysis

Analyzed variables included demographic parameters (age, gender), period classification (Pre-pandemic: January 1 , 2018 – March 31 , 2020 vs. Pandemic: April 1 , 2020 – December 31 , 2022), etiology of trauma, thoracic injury patterns, therapeutic interventions, concomitant extra-thoracic injuries, and final discharge status (recovered/healed vs. deceased). Data were processed and analyzed descriptively using Microsoft Excel to calculate frequency distributions and percentages.

3 RESULTS

3.1 Patient Demographics and Temporal Distribution

A total of 309 thoracic trauma patients were included. Males significantly outnumbered females (79.94% vs. 20.06%). The productive age group (15–64 years) constituted 86.41 % of cases. Case distribution demonstrated a minor reduction in thoracic trauma presentations during the COVID-19 pandemic (49.19%, n=152) compared to the pre-pandemic era (50.81 %, n=157).

Table 1: Demographic Characteristics and Time Period Distribution of Thoracic Trauma Patients (N = 309)

Demographic Parameter	Frequency (n)	Percentage (%)
Age Group		
Productive Age (1 5–64 years)	267	86.41

Non-Productive Age (<1 5 or >64 years)	42	1 3.59
Gender		
Male	247	79.94
Female	62	20.06
Time Period Classification		
Pre-Pandemic (Jan 201 8 – Mar 2020)	1 57	50.81
During Pandemic (Apr 2020 – Dec 2022)	1 52	49.1 9

3.2 Etiology of Trauma:

Traffic accidents were the single predominant cause of thoracic trauma, accounting for 66.34% (n=205) of total cases, followed by falls from height (16.50%, n=51), stab wounds (6.15%, n=19), and occupational accidents (6.15%, n=19).

Table 2: Distribution of Thoracic Trauma Etiology Across Study Periods

Etiology / Mechanism	Pre-Pandemic (n)	During Pandemic (n)	Total (n)	Percentage (%)
Traffic Accidents (KLL)	11 0	95	205	66.34
Falls	1 7	34	51	1 6.50
Stab Wounds	9	1 0	1 9	6.1 5
Occupational Accidents	1 0	9	1 9	6.1 5
Physical Assault / Violence	7	2	9	2.91
Gunshot Wounds	3	2	5	1 .62
Burn Injury	1	0	1	0.32

3.3 Specific Thoracic Injuries and Concomitant Trauma:

Rib fractures were the most common thoracic diagnosis (39.16%), followed by pulmonary contusions (32.69%), hemothorax (29.13%), thoracic vertebrae fractures (25.57%), and pneumothorax (21 .68%). Concomitant extra-thoracic injuries were frequent, with head trauma (29.16%) and abdominal trauma (29.13%) representing the most common co-existing injuries.

Table 3: Distribution of Thoracic Injury Types and Associated Extra-Thoracic Trauma*

Diagnostic Category	Frequency (n)	Percentage (%)
Thoracic Injury Subtype		
Rib Fractures	1 21	39.1 6
Pulmonary Contusion	1 01	32.69
Hemothorax / Hematothorax	90	29.1 3
Thoracic Vertebrae Fracture	79	25.57
Pneumothorax	67	21 .68
Hemopneumothorax	35	11 .33
Flail Chest	1 5	4.85
Tracheobronchial Injury	1 4	4.53
Sternal Fracture / Aortic Rupture / Diaphragmatic Rupture	9 / 3 / 3	2.91 / 0.97 / 0.97
Accompanying Extra-Thoracic Trauma		

Head Trauma / Abdominal Trauma	90 / 90	29.1 6 / 29.1 3
Upper Extremity Trauma / Lower Extremity Trauma	31 / 30	1 0.03 / 9.71

*Patients may present with multiple concurrent injuries.

3.4 Management and Clinical Outcomes:

Intercostal catheter placement (chest tube insertion) was performed in 51 .56% of patients (n=165). Conservative/non-operative management was maintained in 21 .88% (n=70). Open surgical procedures included posterior spinal stabilization (15.63%), rib clipping (15.31 %), and thoracotomy (8.13%). Overall survival reached 84.14% (n=260 recovered), while 15.86% (n=49) succumbed to severe multi-organ trauma complications.

4 DISCUSSION

The male predominance (79.94%) and concentration among productive-age adults (86.41 %) align with established global trauma literature [7]. Young males exhibit higher daily commuting frequencies, active participation in labor-intensive occupations, and higher risk-taking behaviors when operating motor vehicles [3].

The minor drop in overall chest trauma cases during the COVID-19 pandemic (50.81 % vs. 49.19%) reflects the impact of movement restrictions and remote working policies enacted by the Indonesian government [5]. Similar trends were noted by Yorulmaz & Gökçe (2022), who observed reduced emergency trauma presentations during lockdown periods [6]. Nevertheless, traffic accidents persisted as the primary trauma mechanism, likely due to essential workers, public logistics drivers, and agricultural transporters continuing active road travel during restrictions [4].

Rib fractures (39.16%) and pulmonary contusions (32.69%) dominated the intrathoracic injury patterns. Rib fractures serve as a key marker of significant blunt impact energy, frequently predisposing patients to underlying parenchymal injury, hemothorax, or pneumothorax [8]. The majority of thoracic trauma conditions were managed effectively with minimally invasive tube thoracostomy (51 .56%) or conservative care (21 .88%). Standard tube thoracostomy promptly relieves pleural space hypertension and evacuative drainage, successfully averting critical respiratory failure in over 80% of presenting chest trauma cases [9]. Mortality (15.86%) was heavily influenced by concomitant severe head trauma and intra-abdominal hemorrhages.

5 CONCLUSION

Thoracic trauma cases at RSUD Dr. Soetomo showed a minor decline during the COVID-19 pandemic. Traffic accidents remained the chief etiology, with rib fractures being the most frequent injury type. Intercostal chest tube insertion was the primary effective intervention, yielding a high overall recovery rate (84.14%).

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare no conflicts of interest regarding this manuscript.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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