

CASE SERIES



Incidentally Detected Radiologically Suggestive Tuberculosis in Traumatic Soldiers: Uncovering the Hidden Burden of Tuberculosis in Somalia - A Retrospective Case Series and Literature Review

Ahmed Adam Osman^{1*}; Ibrahim Mohamed Osman²; Mohamed Jafar Salah³; Abdirahim Ali Nur Adam⁴ and Mohamed Abdirahman Omar⁵

¹Department of Radiology, Mogadishu Somali Turkish Training and Research Hospital, Mogadishu, Somalia; ²Department of Pediatrics, Mogadishu Somali Turkish Training and Research Hospital, Mogadishu, Somalia; ³National Tuberculosis Program (NTP), Ministry of Health, Mogadishu, Somalia; ⁴Department of Infectious Diseases, Mogadishu Somali Turkish Training and Research Hospital, Mogadishu, Somalia; ⁵Tuberculosis Basic Management Unit, Banadir Hospital; National Public Referral and Teaching Hospital

Abstract:

Background: Tuberculosis (TB) remains a major public health challenge in Somalia, with substantial underdiagnosis. In conflict-affected settings, trauma-related chest computed tomography (CT) is frequently performed, offering an opportunity for incidental detection of pulmonary TB.

Objective: To describe radiological findings suggestive of pulmonary tuberculosis incidentally detected on trauma chest CT among injured soldiers in Somalia and to contextualize these findings within the national TB burden.

Methods: A retrospective case series was conducted at a tertiary referral hospital in Somalia. Trauma chest CT scans performed on 1 March 2025 following a single blast incident were reviewed. Cases demonstrating CT features suggestive of active or post-primary pulmonary tuberculosis were identified. TB was not clinically suspected at presentation.

Results: Three young adult male soldiers (aged 20-26 years) were incidentally found to have CT features suggestive of pulmonary tuberculosis, including upper-lobe consolidation with calcified nodules, thick-walled cavitary lesions, nodular ground-glass opacities, and pleural involvement. All findings were unrelated to acute traumatic injuries. Following stabilization, all cases were referred to the National Tuberculosis Program (NTP) for further evaluation.

Conclusion: Trauma chest CT can reveal radiological patterns suggestive of pulmonary tuberculosis in high-burden settings such as Somalia. Radiologists play a critical role in opportunistic TB detection, particularly in emergency and trauma care, with important implications for infection control and public health surveillance.

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1. INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*. It is one of the major causes of sickness and death globally [1, 2]. Most of the time, the infection does not cause symptoms, but

*Correspondence should be addressed to Ahmed Adam Osman, Department of Radiology, Mogadishu Somali Turkish Training and Research Hospital, Mogadishu, Somalia; Tel: +252 615 570262; E-mail: fahadyare@gmail.com

about 10% of people who have latent TB will develop active TB at some point during their life. The mortality rates are high in cases where TB is left untreated [3, 4]. Disruptions in the TB treatment due to multidrug resistance are a significant problem, especially in low-resource and conflict-affected areas [5].

Somalia is classified by the World Health Organization (WHO) as a high TB-burden country, where prolonged conflict, population displacement, weak surveillance systems, and limited access to diagnostic services contribute to significant underdiagnosis. A substantial proportion of TB cases are believed to be subclinical or asymptomatic, resulting in a large number of “missing cases” that remain undetected through routine symptom-based screening approaches. Consequently, TB is often diagnosed late or incidentally during evaluation for unrelated medical conditions [6].

In situations of conflict and after conflicts, trauma-related imaging, and chest computed tomography (CT) in particular, is commonly done to evaluate wounding by penetration and explosions in soldiers. Although the main aim of these procedures is trauma evaluation, chest CT can show in great detail the lung tissue and may incidentally disclose pulmonary abnormalities that are suggestive of active or post-primary tuberculosis [6].

The use of CT in emergency departments has increased substantially due to its diagnostic accuracy and efficiency in the management of polytrauma patients [7]. However, incidentally discovered infections during trauma imaging are not well described in the literature, especially in high-burden TB countries like Somalia. This series of cases sheds light on the detection of pulmonary TB in unsuspected trauma chest CTs of Somali soldiers, thus revealing the silent burden of the disease and the indispensable role of radiologists in the opportunistic detection of TB.

2. METHODS

2.1. Study Design and Setting

This retrospective case series was conducted at a tertiary referral and teaching hospital in Somalia that routinely manages trauma cases among military personnel.

The study period has been clarified as a single-day retrospective event [1 March 2025] following a blast-related incident. Case identification was performed retrospectively from all trauma chest CT examinations conducted on that day. A total of 5 trauma chest CT examinations were performed on that day.

2.2. Case Identification

Trauma chest CT scans performed for acute injury evaluation were reviewed. Cases were included if CT findings were suggestive of:

- Active Pulmonary Tuberculosis
- Post-primary (secondary) pulmonary TB sequelae
- None of the patients had clinical suspicion or a documented history of TB at the time of presentation.

2.3. Imaging Technique

Multidetector CT examinations were performed using standard trauma protocols, including non-contrast and contrast-enhanced phases when indicated. Lung, mediastinal, and soft-tissue windows were systematically reviewed by an experienced radiologist.

Microbiological confirmation (sputum smear microscopy, GeneXpert, or culture) was not performed at the trauma center due to the emergency context and resource limitations. Following post-traumatic stabilization, all patients with CT findings suggestive of pulmonary tuberculosis were referred to the Somalia National Tuberculosis Program (NTP) centers for confirmatory testing, contact tracing, and management according to national guidelines.

2.4. Case Presentations

Case 1

Clinical summary: 23-year-old male soldier, hemodynamically stable, no respiratory symptoms.

Key CT findings: Left upper-lobe ill-defined consolidation with calcified nodules, suggestive of post-primary TB sequelae.

Differential diagnosis: Post-inflammatory scarring, healed granulomatous disease.

Action taken: Referral to NTP after trauma stabilization.

Outcome: Pending TB program evaluation.

Case 2

Clinical summary: 20-year-old male soldier with polytrauma, asymptomatic respiratory-wise.

Key CT findings: Thick-walled cavitory lesion in the right upper lobe with surrounding nodular ground-glass opacities, suggestive of active post-primary TB.

Differential diagnosis: Necrotizing pneumonia, fungal infection.

Action taken: Referral to NTP after stabilization.

Outcome: Pending TB program evaluation.

Case 3

Clinical summary: 26-year-old male soldier with penetrating thoracic trauma, clinically stable.

Key CT findings: Right upper-lobe cavitory lesion with bilateral parenchymal opacities and pleural thickening, suggestive of chronic/post-primary TB.

Differential diagnosis: Chronic infection, post-inflammatory bronchiectasis.

Action taken: Referral to NTP.

Outcome: Pending TB program evaluation.

All three patients were young male soldiers who had been sitting together in the same location chewing khat during the evening. Approximately three hours prior to hospital arrival, a hand-thrown explosive device detonated, causing multiple thoracic and abdominal injuries.

Case 1A 23-year-old male soldier underwent chest CT following blast-related thoracic trauma. On presentation, the patient was clinically stable, with normal vital signs, including heart rate, blood pressure, respiratory rate, oxygen saturation, and body temperature. He had no respiratory complaints or systemic symptoms, and all recorded biophysical parameters were within normal limits. CT imaging demonstrated a chest wall soft-tissue defect with associated hematoma and extensive subcutaneous emphysema involving the left anterior chest wall, consistent with acute traumatic injury. Incidentally, lung window images revealed ill-defined consolidation with calcified nodules in the apex of the left upper lobe, findings consistent with post-primary pulmonary tuberculosis sequelae. These abnormalities were unrelated to the acute trauma and had not been clinically suspected at the time of presentation (Figure 1).

Case 2A 20-year-old male soldier presented with polytrauma following the same explosive incident. On arrival, the patient was hemodynamically stable, with normal vital signs, including heart rate, blood pressure, respiratory rate, oxygen saturation, and body temperature. He had no respiratory symptoms at presentation, and systemic biophysical parameters were within normal limits. Chest CT demonstrated a thick-walled cavitory lesion in the right upper lobe. Additional nodules were identified in the right lower lobe, one of which showed subtle surrounding ground-glass opacities, findings suggestive of post-primary reactivation pulmonary tuberculosis. Associated traumatic findings included a fracture of the left iliac crest, a skin defect in the left iliac fossa, and abdominal wall air bubbles (Figure 2).

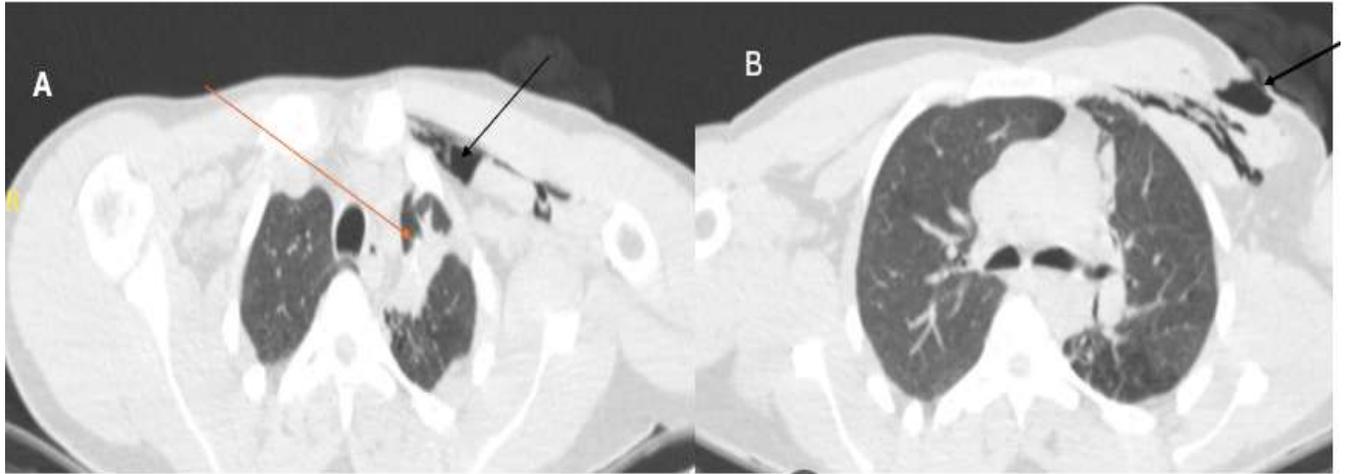


Figure 1A-B. Axial parenchymal window chest CT images demonstrate ill-defined consolidation with calcified nodules in the apex of the left upper lobe (orange arrow), consistent with post-primary tuberculosis sequelae. Associated acute traumatic findings include a chest wall soft-tissue defect with extensive subcutaneous emphysema involving the left anterior chest wall (thick and thin black arrows).

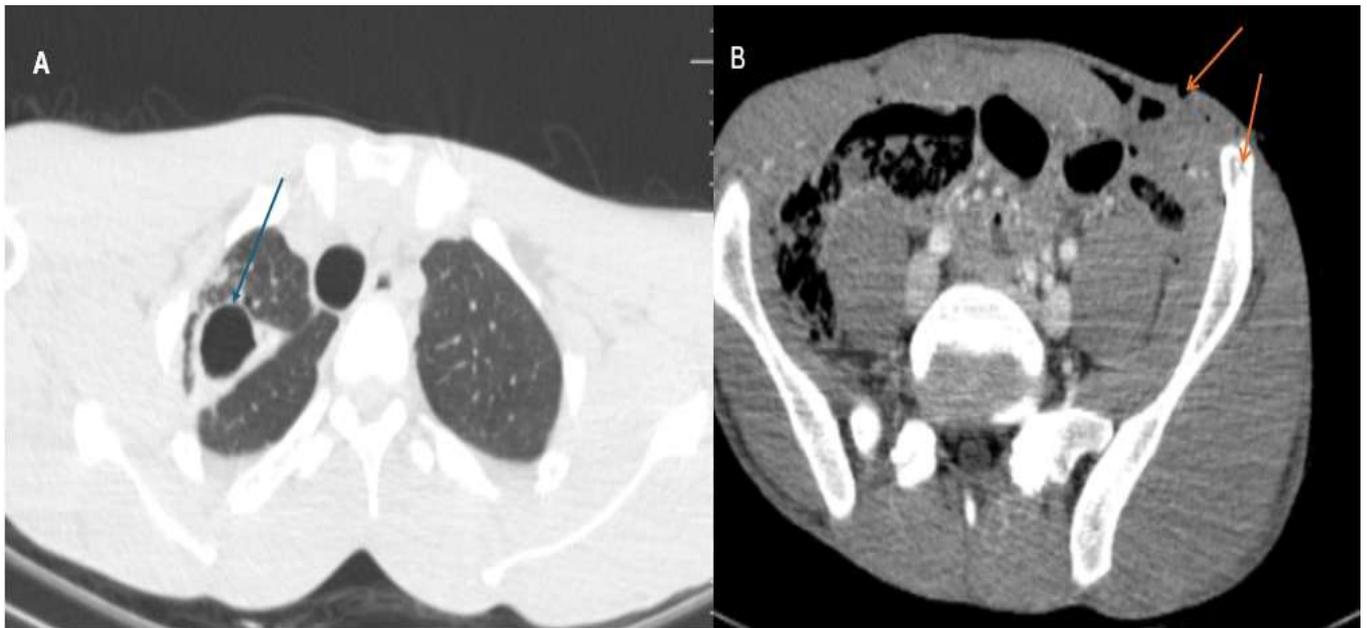


Figure 2A-B. Chest CT lung window shows a thick-walled cavitary lesion in the right upper lobe with surrounding nodular ground-glass opacities (blue arrow), highly suggestive of active pulmonary tuberculosis. Corresponding abdominopelvic CT images demonstrate a left iliac crest fracture, left iliac fossa skin defect, and small intra-abdominal air bubbles (orange arrows), indicating associated traumatic injury.

Case 3A 26-year-old male soldier was referred for chest CT following penetrating thoracic trauma. At presentation, the patient was clinically stable, with normal vital signs and no evidence of respiratory distress, fever, or hypoxia. All measured biophysical parameters were within normal ranges. CT imaging of the left chest wall demonstrated a small skin laceration with retained metallic fragments within the thoracic chest wall, along with focal ground-glass opacities in the left lung, findings consistent with pulmonary contusion. On lung window evaluation, an incidental cavitary lesion in the apical segment of the right upper lobe was identified, associated with bilateral parenchymal opacities and pleural thickening, features suggestive of chronic pulmonary tuberculosis. These abnormalities were unrelated to the traumatic injury and were detected incidentally during trauma assessment (Figure 3).



Figure 3A-B. reveals a right upper lobe cavitory lesion with bilateral parenchymal opacifications and pleural thickening (green and black arrows), compatible with tuberculous lung disease. Soft-tissue window images demonstrate a focal skin laceration with retained metallic shrapnel in the left chest wall, along with focal ground-glass opacities in the left hemithorax (blue arrow), consistent with pulmonary contusion secondary to penetrating trauma.

3. LITERATURE REVIEW: INCIDENTAL DETECTION OF TUBERCULOSIS ON CT

Incidental detection of pulmonary tuberculosis (TB) on imaging performed for unrelated clinical indications has been increasingly reported in high-burden and resource-limited settings. These reports highlight the limitations of symptom-based screening and demonstrate the potential role of radiological examinations in identifying subclinical or unsuspected disease.

Glaser *et al.* reported incidental radiological findings suggestive of tuberculosis during screening activities in Southern Africa, where CT and radiographic imaging identified individuals with previously undiagnosed pulmonary disease despite minimal or absent symptoms [6]. Their findings emphasized that a significant proportion of TB cases may remain undetected when screening relies solely on symptom assessment.

Similarly, studies examining incidental findings on emergency CT have shown that clinically significant infectious processes can be identified during imaging performed for non-infectious indications, although communication and follow-up of these findings may be inconsistent [10]. These observations support the concept that emergency and trauma imaging can serve as an opportunistic case-finding tool for communicable diseases such as tuberculosis.

In addition, prevalence surveys have demonstrated the presence of subclinical TB in a considerable proportion of bacteriologically confirmed cases, many of whom were asymptomatic at the time of detection [9]. These findings suggest that imaging-based approaches may play a complementary role in identifying otherwise missed cases in high-burden environments.

Compared with previously published reports, the present case series shares several important characteristics. All patients were young adults from a high-risk environment, none had respiratory symptoms at presentation, and chest CT was performed exclusively for trauma assessment. The imaging findings particularly upper-lobe cavitory lesions, calcified nodules, and nodular ground-glass opacities—are consistent with post-primary pulmonary tuberculosis patterns described in prior studies. However, unlike structured

screening programs reported in the literature, detection in the present series occurred opportunistically during emergency trauma imaging following a single blast-related incident.

These observations reinforce the potential role of radiologists in opportunistic TB detection, particularly in emergency and trauma settings in high-burden countries.

4. PUBLIC HEALTH AND INFECTION CONTROL IMPLICATIONS

In TB-endemic countries, incidental CT detection should trigger a structured workflow: immediate communication to the clinical team, basic infection-prevention measures where feasible, and rapid linkage to National TB Program pathways for confirmatory testing and treatment. Integrating radiology into TB surveillance can reduce diagnostic delays and transmission risk.

5. DISCUSSION

This case series highlights an underrecognised but clinically important phenomenon in Somalia: pulmonary tuberculosis detected incidentally on trauma chest CT in young soldiers evaluated for acute blast injuries. Although CT was performed exclusively for trauma assessment, each scan provided high-resolution visualisation of lung parenchyma, revealing post-primary TB sequelae (calcified nodules and upper-lobe consolidation) or features concerning for reactivation TB (thick-walled cavitation, bronchiectasis, nodular ground-glass opacities, and pleural involvement). In a high-burden setting, these findings are not incidental in meaning rather, they are signals of a broader detection gap [8].

Table 1. Comparison of the present case series with selected reports of incidental tuberculosis detection.

Study	Setting	Patient Context	Symptoms at Presentation	Imaging Modality	Key Finding
Glaser <i>et al.</i> [6]	Southern Africa	Screening populations	Often asymptomatic	CT / radiography	Incidental TB-like findings during screening
Emergency CT incidental findings [10]	Emergency departments	Non-infectious indications	Variable	CT	Clinically significant infections detected incidentally
Subclinical TB prevalence surveys [9]	High-burden communities	Community screening	Asymptomatic	Imaging + microbiology	Large proportion of TB cases subclinical
Present study	Somalia (trauma center)	Blast-injured soldiers	Asymptomatic	Trauma chest CT	TB-suggestive lesions detected incidentally

In this manuscript, the term *post-primary (secondary) pulmonary tuberculosis* is used consistently. Imaging features suggestive of post-primary disease include thick-walled cavitory lesions in the upper lobes, calcified nodules, fibrotic bands, and architectural distortion, which typically indicate chronic or healed infection. These patterns were observed in our cases. In contrast, imaging Active - reactivation features more commonly associated with primary tuberculosis include nodular parenchymal ground-glass opacities, pleural effusion, lymphadenopathy, and granulomatous lesions.

One crucial takeaway would be that these are probably subclinical or only mildly symptomatic TB cases which ordinarily would have been missed in the standard symptom-based pathways. In Somalia, the TB case detection largely relies on the patient's passive presentation, and the availability of microbiological testing varies in different locations.

This contributes to delayed diagnosis, ongoing community transmission, and periodic discovery of disease only when imaging is performed for unrelated indications [9]. The present cases align with evidence from high-burden settings showing that a substantial proportion of bacteriologically confirmed TB can be

asymptomatic at the time of detection, reinforcing the concept that routine symptom screening alone misses a meaningful share of disease.

Table 2. Clinical Characteristics and Chest CT Findings of Traumatic Soldiers with Incidentally Radiologically suggestive Detected Pulmonary Tuberculosis.

Case	Age (years)	Sex	Trauma Mechanism	Indication for CT	Incidental Pulmonary CT Findings (TB-related)	Associated Traumatic CT Findings	TB Pattern
Case 1	23	Male	Blast injury (hand-thrown explosive)	Thoracic trauma assessment	Ill-defined consolidation with calcified nodules in the left upper lobe apex	Chest wall soft-tissue defect, hematoma, extensive subcutaneous emphysema (left anterior chest wall)	Post-primary TB sequelae
Case 2	20	Male	Blast injury (hand-thrown explosive)	Polytrauma evaluation	Thick-walled cavitary lesion with surrounding nodular ground-glass opacities in the right upper lobe	Left iliac crest fracture, left iliac fossa skin defect, abdominal wall air bubbles	Pulmonary TB (active-reactivation chronic)
Case 3	26	Male	Penetrating blast injury	Thoracic trauma assessment	Right upper lobe cavitary lesion with bilateral parenchymal opacifications and pleural thickening	Retained metallic shrapnel in left chest wall, focal ground-glass opacities consistent with pulmonary contusion	2 nd Pulmonary TB

Table 2. Summary of demographic data, trauma-related indications, and incidental pulmonary tuberculosis findings on chest CT among injured soldiers.

TB Status / Action
Case 1: Radiologically suggestive secondary TB - referred to NTP
Case 2: Radiologically suggestive active -reactivation TB - referred to NTP
Case 3: Radiologically suggestive chronic TB - referred to NTP

From a radiology and emergency-care perspective, these cases also emphasise a systems issue seen in broader incidental-finding literature: identification does not guarantee action. Incidental CT findings in emergency settings are often inconsistently communicated and variably followed up, especially when immediate trauma management dominates clinical priorities [10]. In our context, the problem is amplified by infection-control implications. When an unrecognised, potentially infectious pulmonary process is detected on CT in a crowded emergency/trauma workflow, the issue is not only outpatient follow-up it is prompt risk stratification, early isolation precautions where feasible, and fast linkage to TB diagnostic pathways.

These findings carry particular relevance for Somalia’s TB control efforts. Military personnel often live and work in conditions that can facilitate TB transmission—crowding, mobility, limited ventilation in shared settings, and inconsistent access to health services. Importantly, all three patients shared a close-contact exposure setting prior to injury, which may reflect the kind of prolonged contact environments where TB can spread efficiently. While this case series cannot establish transmission chains, it underscores that high-risk populations may harbour undiagnosed disease and may come to medical attention for reasons unrelated to TB. Emergency imaging therefore becomes a practical point of opportunity for TB case finding.

5.1. These Cases Likely Represent Only a Small Visible Fraction of a much larger, undetected TB Burden the “Tip of the Iceberg”

Our findings highlight the need for increased awareness among radiologists and emergency clinicians and support the integration of opportunistic TB detection into trauma imaging workflows in high TB-burden settings such as Somalia.

Practical implications for reporting and referral (radiology-led)

These cases support adopting a simple, workable approach for trauma CT reporting in TB-endemic settings:

Structured language in the impression when TB-pattern findings are present (CT features suggest active/post-primary pulmonary TB; correlation and confirmatory testing recommended”).

Clear escalation pathway: notify the ED/trauma team directly (verbal + documented) when findings raise concern for active TB.

Linkage to diagnostics: sputum GeneXpert/Ultra, sputum smear/culture, or referral through the NTP pathway; consider HIV testing per local policy.

Infection prevention: when possible, basic measures (masking, separation, and ventilation) should be implemented while confirmatory tests are being arranged.

LIMITATIONS

Microbiological confirmation (sputum smear microscopy, GeneXpert, or culture) was not performed during the acute trauma evaluation due to the emergency context and prioritization of life-saving interventions. Although GeneXpert testing is available within referral TB centers, immediate testing was not feasible in the trauma setting at the time of presentation. All patients were referred to the National Tuberculosis Program (NTP) for confirmatory testing following stabilization.

RECOMMENDATIONS

Radiologists in TB-endemic regions should maintain a high index of suspicion when interpreting trauma chest CTs.

Structured reporting templates should include prompts for infectious findings.

Multidisciplinary collaboration between radiology, trauma, and TB programmes is essential.

Further multicentre studies are needed to quantify the true burden of incidentally detected TB in trauma populations.

AUTHORS' CONTRIBUTIONS

Ahmed Adam Osman conceived and designed the study, interpreted all radiological images, supervised data collection, and drafted the manuscript. He critically revised the manuscript for important intellectual content and served as the corresponding author.

Ibrahim Mohamed Osman contributed to clinical data acquisition, assisted in patient assessment and case documentation, and reviewed the manuscript for clinical accuracy.

Mohamed Jafar Salah provided expert input from the National Tuberculosis Program perspective, contributed to tuberculosis-related interpretation, and critically reviewed the manuscript for public health and policy relevance.

Abdirahim Ali Nur Adam contributed to infectious disease assessment, supported clinical contextualization, and participated in manuscript review and revision.

All authors read and approved the final manuscript and agree to be accountable for all aspects of the work.

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

CONSENT FOR PUBLICATION

Written informed consent was obtained from all patients for the publication of this case series and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of the journal upon request.

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REFERENCES

- [1] Ali SA, Mavundla TR, Fantu R, Awoke T. Outcomes of TB treatment in HIV co-infected TB patients in Ethiopia: a cross-sectional analytic study. *BMC infectious diseases*. 2016 Nov 4; 16(1): 640.
- [2] Raviglione M, Sulis G. Tuberculosis 2015: burden, challenges and strategy for control and elimination. *Infectious disease reports*. 2016 Jun 24; 8(2): 6570.
- [3] Narasimhan P, Wood J, MacIntyre CR, Mathai D. Risk factors for tuberculosis. *Pulmonary medicine*. 2013; 2013(1): 828939.
- [4] Esmail H, Barry 3rd CE, Young DB, Wilkinson RJ. The ongoing challenge of latent tuberculosis. *Philosophical Transactions of the Royal Society B: Biological Sciences*. 2014 Jun 19; 369(1645): 20130437.
- [5] Ali MK, Karanja S, Karama M. Factors associated with tuberculosis treatment outcomes among tuberculosis patients attending tuberculosis treatment centres in 2016-2017 in Mogadishu, Somalia. *Pan African Medical Journal*. 2017; 28(1).
- [6] Glaser N, Bosman S, Madonsela T, van Heerden A, Mashaete K, Katende B, Ayakaka I, Murphy K, Signorell A, Lynen L, Bremerich J. Incidental radiological findings during clinical tuberculosis screening in Lesotho and South Africa: a case series. *Journal of Medical Case Reports*. 2023 Aug 25; 17(1): 365.
- [7] Salim A, Sangthong B, Martin M, Brown C, Plurad D, Demetriades D. Whole body imaging in blunt multisystem trauma patients without obvious signs of injury: results of a prospective study. *Archives of Surgery*. 2006 May 1; 141(5):468-75.
- [8] Glaser N, Bosman S, Madonsela T, van Heerden A, Mashaete K, Katende B, Ayakaka I, Murphy K, Signorell A, Lynen L, Bremerich J. Incidental radiological findings during clinical tuberculosis screening in Lesotho and South Africa: a case series. *Journal of Medical Case Reports*. 2023 Aug 25; 17(1):365.
- [9] Frascella B, Richards AS, Sossen B, Emery JC, Odone A, Law I, Onozaki I, Esmail H, Houben RM. Subclinical tuberculosis disease—a review and analysis of prevalence surveys to inform definitions, burden, associations, and screening methodology. *Clinical Infectious Diseases*. 2021 Aug 1; 73(3): e830-41.
- [10] Thompson RJ, Wojcik SM, Grant WD, Ko PY. Incidental findings on CT scans in the emergency department. *Emergency medicine international*. 2011; 2011(1): 624847.

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