Tuberculosis-Associated Chylothorax: Case Report and Systematic Review of the Literature

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Established Facts

- Trauma is the most common cause of chylothorax.
- Tuberculosis (TB) is described as a cause of nontraumatic chylothorax, but several large series do not include any patients with TB-chylothorax.

Novel Insights

- TB is a very rare cause of chylothorax with only 37 cases reported in the literature.
- TB-chylothorax developed subsequent to the diagnosis of TB in 27.8% (10/36) of the patients after a median of 6.75 weeks (IQR 4–9) while on anti-TB treatment.
- TB-chylothorax developed during an immune reconstitution syndrome in 16.7% (6/36) of the patients, even in immunocompetent ones.
- TB-chylothorax developed in the absence of any mediastinal lymphadenopathy in 45.9% (17/37) of the patients; 13.5% (5/37) had isolated tubercular empyema alone.
- TB-chylothorax developed along with chylous ascites in 10.8% (4/37) of the patients.
- Most patients with TB-chylothorax responded to anti-TB treatment and dietary manipulation alone, and only 17.1% (6/35) needed thoracic duct ligation.

Keywords

Tuberculosis · Chylothorax · Pleural effusion · Chylomicron

Abstract

Tuberculosis (TB) is a rare cause of chylothorax. We describe a case and the results of a systematic review of all reported cases of TB-chylothorax. We identified 37 cases of TB-chylothorax. The symptoms at presentation were constitutional (85.7%; 30/35), dyspnea (60.6%; 20/33), and cough (54.5%;

18/33). Chylothorax developed subsequent to the diagnosis of TB in 27.8% (10/36) of the patients, after a median of 6.75 weeks (IQR 4–9). Chylothorax developed during an immune reconstitution syndrome (IRS) in 16.7% (10/36) of the patients, including immunocompetent ones. TB was disseminated in 45.9% (17/37) of the patients at the diagnosis of chylothorax. Chylothorax developed in the absence of any mediastinal lymphadenopathy in 45.9% (17/37) of the patients; 13.5% (5/37) had isolated tubercular empyema alone. The diagnosis of TB was established microbiologically in

72.2% (26/36) and by biopsy alone in 27.8% (9/36) of the patients. Anti-TB treatment (ATT) was administered for a median of 7.57 months (IQR 6–9). Steroids were administered to 22.9% (8/35) of the patients, often for suspected IRS. Thoracic duct ligation and octreotide were required for only 17.1% (6/35) and 8.6% (3/35) of the patients, respectively. In all, 94.4% (34/36) of the patients had resolution of chylothorax and completed treatment successfully; only 5.6% (2/36) died. In conclusion, TB-chylothorax may develop without obvious mediastinal lymphadenopathy and be associated with tubercular empyema alone. TB-chylothorax can develop during treatment of TB due to IRS, even in immunocompetent patients. ATT and dietary manipulation are associated with good resolution and low mortality, and duct ligation is needed for only a small minority of patients.

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Introduction

Tuberculosis (TB) continues to be a global scourge. India has the highest TB burden and accounts for approximately more than one-fifth (21%) of the global disease burden, with recently revised higher estimates of disease burden [1, 2]. Chylothorax is characterized by the presence of chyle in the pleural space due to thoracic duct disruption [3, 4]. Accumulation of cholesterol or lecithin-globulin complexes in pleural fluid of long-standing effusions can occur and is described as a pseudochylothorax [3, 5]. TB is a well-described cause of pseudochylothorax [5]; the association of TB with chylothorax, however, is very rare but has been described. The mechanisms of development of chylothorax in TB (TB-chylothorax), clinical features, radiological findings, mode of diagnosis, and management aspects are unclear.

Case Report

A 50-year-old gentleman with diabetes mellitus of 5 years duration presented with productive cough for 15 days, intermittent fever, and right-sided pleuritic chest pain of 1-week duration. Chest radiography (Fig. 1, left) confirmed a right-sided pleural effusion, and diagnostic thoracentesis showed pus-like material; an intercostal tube drain was inserted, and he was referred to this center for persisting purulent drainage from the drain. There was no history of trauma, anorexia, or weight loss. He did not report any significant illness in his family or contact with TB, did not smoke or drink alcohol, and did not raise pets. The examination showed pallor, pedal pitting edema, a regular heart rate of 72/min, and a blood pressure of 120/70 mm Hg. There was no evidence of alveolopleural fistulae, and the intercostal drain continued to drain 750 mL/day of whitish fluid.

Fig. 1. Left: chest radiograph at diagnosis showing a right pyopneumothorax with pleural thickening and intercostal drain in situ. Right: chest radiograph at completion of anti-tuberculosis treatment showing significant interval resolution with minimal pleural thickening.

Chest radiography showed a right pyopneumothorax (Fig. 1, left). Hemoglobin was at 6.9 g/dL, with normal leukocyte and platelet counts. Renal function testing showed renal failure with serum creatinine at 9.4 mg/dL (normal 0.8–1.0). Urine microscopy showed bland sediments without albuminuria. Ultrasound showed a normal kidney size with increased renal cortical echogenicity. Arterial blood gas showed metabolic acidosis (pH 7.25, HCO₃ 14 mEq/L, pCO₂ 30 mm Hg, anion gap 16 mEq/L). Fundus examination showed findings consistent with mild nonproliferative diabetic retinopathy. HbA_{1c} was at 9.2% (normal <6.5). Human immunodeficiency virus (HIV), hepatitis B, and hepatitis C tests by enzyme-linked immunosorbent assay were all negative. Two sputum smears were negative for acid-fast bacilli by Ziehl-Neelsen (ZN) staining. Liver function and thyroid function tests were normal. Pleural fluid analysis showed 99% neutrophils, with sugar <0.8 mg/dL. Pleural fluid cultures yielded *Candida albicans* twice; bacterial cultures were sterile, and the ZN smears of the pleural fluid were negative. Echocardiography showed normal left ventricular function with no valvular abnormalities, and fundoscopy was normal. A diagnosis of candidal empyema was made and fluconazole treatment was started according to sensitivity. Repeat pleural fluid cultures were sterile and showed an exudative (protein 4.1 g/dL, LDH 321 IU/mL), lymphocytic effusion (95%); however, the patient continued to have persistent drainage of purulent-looking fluid. A pleural fluid biochemical analysis was requested; it showed triglycerides at 135 mg/dL and cholesterol at 35 mg/dL. Because of diagnostic ambiguity, pleural fluid chylomicron testing was done (Christian Medical College, Vellore, India) and it was strongly positive for chylomicrons. Plain CT of the thorax (Fig. 2, 3) showed significant mediastinal adenopathy with calcification involving the pretracheal, aortopulmonary, bilateral hilar and subcarinal stations. He was planned for endobronchial ultrasound-guided needle aspiration, but, meanwhile, GeneXpert testing of the pleural fluid was positive for *Mycobacterium tuberculosis* (MTB), and *Mycobacterium* growth indicator tube cultures of the pleural fluid isolated MTB.

A final diagnosis of poorly controlled diabetes, disseminated TB with right-sided chylothorax complicated by candidal empy-

Fig. 2. Plain computed tomography images of the thorax (taken because of acute renal failure) showing moderate pericardial effusion and right mediastinal pleural collection and thickening; significant mediastinal adenopathy (largest: 2.5 × 2 cm) involving the pretracheal, aortopulmonary, bilateral hilar, and subcarinal stations was observed with calcifications.

ema, and sepsis with acute renal failure was made. The patient underwent intermittent hemodialysis and was managed with oxygen, medium-chain fatty acid-based diet, intravenous fluids, weight-based anti-TB treatment (ATT) modified for renal failure, fluconazole, and deep venous thrombosis and stress ulcer prophylaxis. Surgery of the right trapped lung was postponed because of renal failure. His renal function gradually normalized, and the pleural drainage significantly reduced, with complete lung expansion by the second week. The intercostal drain was removed. His course was complicated by ATT-induced hepatotoxicity, necessitating initiation of levofloxacin, streptomycin, and continuation of ethambutol. He was subsequently rechallenged successfully with isoniazid and rifampicin and completed 9 months of TB treatment with clinical and radiological improvement (Fig. 1, right). He remains on follow-up and has had no further symptoms at 12 months.

Systematic Search of the Literature

Two of the authors (S.R. and R.K.) independently conducted a systematic search in PubMed (National Library of Medicine, Bethesda, MD, USA) using the terms “tuberculosis” AND “chylothorax” restricted by a publication date of 1980 onwards. These articles were screened, without blinding, by title and abstract review to identify relevant studies. Any discrepancy was resolved by consensus. This was further supplemented by a search in the Indian medical search engine IndMed, references from the retrieved articles, our personal records, and the Internet search engine Google. Full texts or abstracts were then retrieved to identify the spectrum of clinical features of chylothorax associated with TB. Articles identified in languages other than English were translated into English before data abstraction. If either the abstract or the full text was inaccessible, the corresponding author was contacted by mail requesting access to the published report. Only those articles that included patients who fulfilled the criteria (below) for chylothorax and TB as documented by the microbiologic or pathological criteria (below) were included for analysis.

Fig. 3. Plain computed tomography images of the thorax at the level of the diaphragm indicating lack of pleural thickening and near-total lung expansion; mediastinal windows show calcified mediastinal nodes.

Chylothorax was defined by (a) the presence of chylomicrons in the pleural fluid *or* (b), in the absence of an evaluation for chylomicrons, pleural fluid triglyceride >110 mg/dL *and* pleural fluid cholesterol <200 mg/dL (*or* a ratio of pleural fluid to serum cholesterol <1.0 if pleural fluid cholesterol ≥200 mg/dL). TB was defined by either (a) sputum, bronchoalveolar fluid, pleural, ascitic fluid, cerebrospinal fluid, or tissue biopsy positive for acid-fast bacilli by ZN staining *or* (b) growth of MTB by culture in the above, *or* (c) caseating granulomas *or* miliary nodules on radiology in the presence of a compatible clinical syndrome *and* a response to ATT alone.

Data Extraction

The data were abstracted in a predefined data extraction form (see online suppl. Table; for all online suppl. material, see www.karger.com/doi/10.1159/000484694). From the selected cases, the following data were gathered: (a) publication details (title, authors, year of publication, journal name, and other citation details); (b) the number of cases reported in each publication; (c) the demographic details of each case, including age and gender; (d) the duration of symptoms; (e) the symptoms at presentation, including constitutional symptoms in the form of fever, anorexia, or weight loss, dyspnea, cough, chest pain, or hemoptysis; (f) the side of the effusion; (g) details on concurrent organ system involvement; (h) the time to involvement of chylothorax, if sequential; (i) comorbidities and their details, including a diagnosis of HIV; (j) pleural fluid analysis results; (k) results of microbiologic testing of pleural and sputum samples; (l) tissue biopsy results when performed for the diagnosis of TB; (m) treatments administered, including details on steroids, ATTs, and their duration; and (n) outcome.

Informed consent was obtained from the index patient described in the paper. The institutional ethics committee approved the study.

Statistical Analysis

Continuous data are presented as mean (SD) or median (range or IQR), and categorical data as percentages and proportions. All statistical analyses were done using the statistical software SPSS IBM version 21 (PSG IMS&R).

Table 1. Clinical features of all patients with tuberculosis-associated chylothorax in the literature ($n = 37$ cases)^a

Age ($n = 35$), years	39.27±4.13 ^b
Gender (male:female) ($n = 36$)	20:16
Duration of symptoms prior to presentation ($n = 29$), months	1 (0.75–3.00)
Symptoms at presentation ($n = 35$)	
Constitutional	30/35 (85.7)
Dyspnea	20/33 (60.6)
Cough	18/33 (54.5)
Chest pain	10/33 (30.3)
Hemoptysis	0/33 (0)
Diagnosis concurrent ($n = 36$)	
Simultaneous involvement	26/36 (72.2)
Sequential	10/36 (27.8)
Time to chylothorax after diagnosis of tuberculosis ($n = 10$), weeks	6.75 (4–9) ^c
<i>Clinical findings</i>	
Chest radiography findings: effusion side ($n = 37$)	
Right	17/37 (45.9)
Left	8/37 (21.6)
Bilateral	12/37 (32.4)
Lung findings ($n = 37$)	
None	19/37 (51.4)
Consolidation	8/37 (21.6)
Nodular	8/37 (21.6)
Interstitial	2/37 (5.4)
Nodes ($n = 37$)	
None	11/37 (29.7)
Mediastinal	17/37 (45.9)
Abdominal	3/37 (8.1)
Both	4/37 (10.8)
Disseminated	2/37 (5.4)
Other organ involvement ($n = 36$)	
None	14/36 (38.9)
Multiple	11/36 (30.6)
Abdomen	5/36 (13.9)
Bone	3/36 (8.1)
Pericardium	1/36 (2.8)
Comorbidities ($n = 37$)	
Yes	17/37 (45.9)
No	20/37 (54.1)
Renal failure	4/37 (10.8)
Human immunodeficiency virus positive	6/37 (16.2)
Reported mechanism of chylothorax ($n = 35$)	
Mediastinal nodes	18/35 (51.4)
Abdominal nodes	5/35 (14.3)
Extensive pleural disease	5/35 (14.3)
Constrictive pericarditis	1/35 (2.8)
Spinal abscess rupture	2/35 (5.6)
<i>Pleural fluid analysis</i>	
Milky appearance ($n = 36$)	
Yes	34/36 (94.4)
No	2/36 (5.6)
Cell count ($n = 18$)	
Lymphocytes	16/18 (88.9)
Neutrophils	3/18 (11.1)
Lymphocytes, %	90 (67–96)
Protein ($n = 21$), g/dL	4.70±0.37
Sugar ($n = 14$), mg/dL	107.0±11.6

Table 1 (continued)

LDH (<i>n</i> = 10), U/L	177 (105–461.5)
Adenosine deaminase (<i>n</i> = 8), U/mL	53 (35.3–87.1)
Triglyceride (<i>n</i> = 33), mg/dL	678 (280.25–1,154)
Cholesterol (<i>n</i> = 25), mg/dL	72 (35.5–106)
Chylomicrons	4/36 ^d
<i>Mode of diagnosis</i>	
Pleural fluid AFB smear and/or NAAT positive (<i>n</i> = 36)	
Yes	5/36 (13.9)
No	31/36 (86.1)
Pleural fluid MTB culture positive (<i>n</i> = 37)	
Yes	9/37 (24.3)
No	28/37 (75.7)
Sputum or BAL AFB smear and/or NAAT positive (<i>n</i> = 35)	
Yes	8/35 (27)
No	27/35 (73)
Sputum/BAL AFB smear, NAAT, or sputum/BAL MTB culture positive (<i>n</i> = 35)	
Yes	16/35 (45.7)
No	19/35 (54.3)
Tissue diagnosis of necrotizing granulomas (<i>n</i> = 37)	
Yes	19/37 (51.4)
No	18/37 (48.6)
Site of tissue biopsy yielding diagnosis (<i>n</i> = 16) ^e	
Nodes	10/16 (62.5)
Pleura	5/16 (31.25)
Liver, marrow, spleen	5/16 (31.25)
Lung and pericardium	2/16 (12.5) each
Mode of diagnosis (<i>n</i> = 36)	
Microbiologic alone	18/36 (50)
Pathologic alone	10/36 (27.8)
Both	8/36 (22.2)
Treatment with ATT (<i>n</i> = 21), months	7.57 (6–9)
Chylothorax-specific therapy (<i>n</i> = 35)	
FFD/MFA	22/35 (62.9)
ICD	22/35 (62.9)
Octreotide	3/35 (8.6)
Duct ligation	6/35 (17.1)
Steroids	8/35 (22.9)
Outcome (<i>n</i> = 36)	
Alive	34/36 (94.4)
Dead	2/36 (5.6)

Values are presented as mean $\pm$ SE, median (IQR), or *n*/total *n* (%). AFB, acid-fast bacilli by Ziehl-Neelsen staining; ATT, anti-tuberculosis therapy; BAL, bronchoalveolar lavage; FFD, fat-free diet; ICD, intercostal tube drainage; IRS, immune reconstitution syndrome; MFA, medium-chain fatty acids; MTB, *Mycobacterium tuberculosis*; NAAT, nucleic acid amplification test. ^a Includes the current case in the analysis. ^b 6/37 (17.1%) $\leq$ 16 years. ^c 6/36 (16.7%) with IRS. ^d 11.1% positive. ^e More than one reported in some.

Results

We identified 37 reports of chylothorax associated with TB in 36 case reports, including the present case (see online suppl. Table) [6–40]; we excluded 8 reports containing 12 cases [41–49] because neither the full texts nor abstracts were available, as well as another 5 reports with

5 cases because there was no microbiologic or pathologic evidence of TB [50–54]. The cases where full information was not available were treated as “missing data.” There were 20 males and 16 females with a mean age of 39.27 ± 4.13 years; 13.9% (5/36) were children [15, 22, 23, 26]. The patients had had symptoms for a median of 1 month (range 0.1–24 months) prior to presentation to the hos-

Table 2. Causes of chylothorax and expected frequencies

Traumatic chylothorax	≈50%
Noniatrogenic (blunt trauma to chest or vertebrae; knife wound to chest/gunshot wound; childbirth; forceful emesis)	≈12–15%
Iatrogenic (thoracic surgery [esophagectomy, congenital heart disease, lung/mediastinal resections]; head and neck surgery; radiation; pacemaker; central line; embolization of arteriovenous malformations)	35–38%
Nontraumatic chylothorax	≈44%
Malignancy (lymphomas [non-Hodgkin or Hodgkin]; other solid tumors) and other miscellaneous diseases (lymphangioleiomyomatosis; filariasis; sarcoidosis; amyloidosis; tuberculosis; superior vena cava obstruction; constrictive pericarditis; hemangiomas [Gorham's disease]/lymphangiomatosis; cardiac failure; transdiaphragmatic movement in cirrhosis)	≈15–20%
Idiopathic	≈6%

pital (Table 1). Constitutional symptoms in the form of fever, anorexia, and weight loss (85.7%; 30/35), dyspnea (60.6%; 20/33), cough (54.5%; 18/33), and chest pain (30.3%; 10/33) were the most common symptoms at presentation. Close contact with a source of pulmonary TB [22, 23, 30] or a prior history of TB [6, 12, 31] was reported by 8.3% (3/36) of the patients each.

Forty-six percent (17/37) of all chylothoraces developed in patients with TB associated with comorbidities; 16.2% (6/37) were in association with HIV infection [12, 23, 25, 26, 33, 38]. A very high proportion also had disseminated TB at diagnosis (45.9%; 17/37), including milary TB in 18.9% (7/37) [14, 18, 26, 32, 33, 35, 36]. Chylothorax developed in association with chylous ascites in 10.8% (4/37) of the cases [14, 26, 35, 38]. Chylothorax developed on the right side or bilaterally in the majority of cases (78.3%; 29/37). Accompanying parenchymal infiltrates and lymphadenopathy were seen in 48.6% (18/37) and 70.3% (26/37) of the cases, respectively, leading to suspicion of associated TB. However, 45.9% (17/37) of the cases did not have any thoracic infiltrate or mediastinal adenopathy, including 13.5% (5/37) that presented with tubercular empyema alone [10, 21, 27, 29, 31]. The mechanism of development of chylothorax in association with TB was presumed to be due to interruption of lymphatic flow by mediastinal nodes in 51.4% (18/35), abdominal nodes in 14.3% (5/35), extensive pleural disease in 14.3% (5/35), constrictive pericarditis in 2.8% (1/35) [19], and erosion of a spinal abscess into the thoracic duct in 5.6% (2/35) of the cases [8, 12]. The diagnosis of TB was made concurrently with the diagnosis of chylothorax in 72.2% (26/36) of the cases. Chylothorax developed subsequent to a diagnosis of TB on ATT in 27.8% (10/36) of the

cases at a median of 6.75 weeks (IQR 4–9) following the initiation of treatment [7, 12–14, 25, 26, 32, 36, 38, 40]. Chylothorax occurred along with an immune reconstitution syndrome (IRS) in 6 (60%; 6/10) of these cases [12, 25, 26, 32, 36, 40], including 3 in immunocompetent individuals [32, 36, 40].

The vast majority of chylothoraces were suspected because of a milky appearance of the pleural fluid (94.4%). Pleural fluid analysis showed exudative effusion in all cases described (mean protein 4.70 ± 0.37 g/dL; median LDH 177 U/L). About 88.9% of the effusions were lymphocytic predominant, with a median of 90% lymphocytes (IQR 67–97). The median triglyceride value observed was very elevated at 678 mg/dL (280.25–1,154). Consequently, chylomicrons were reported in only 11.1% (4/36) of the cases, including the index case [9, 24, 40].

The diagnosis of TB was established microbiologically in 72.2% (26/36) of the cases, with a positive pleural fluid or sputum, bronchoalveolar lavage, gastric aspirate, or tissue mycobacterial culture, or a positive nucleic acid amplification test. Tuberculous empyema was associated with chylothorax in 25% (9/36) of the cases, including the index case [10, 13, 21, 24, 27–29, 31, 35]. Pathologic biopsies of the involved organ alone established the diagnosis of TB in a further 27.8% (10/36) [6, 7, 16, 18–20, 31, 34, 37, 39].

ATT was administered for a median of 7.57 months (IQR 6–9). A fat-free or medium-chain fatty acid diet was administered in 62.9% (22/35) of the cases. Steroids were given in 22.9% (8/35) of the cases, often for suspected IRS (37.5% [3/8]) or endobronchial TB. Chylothorax increased or developed on ATT alone in 25% (9/36) of the cases, including in 16.7% (6/36) with IRS. However, tho-

racic duct ligation [12, 14, 20, 24, 36, 40] and octreotide [22, 26, 36] were required in only 17.1% (6/35) and 8.6% (3/35) of the cases, respectively. In all, 94.4% (34/36) of the cases had good resolution of chylothorax and completed treatment successfully; only 5.6% (2/36) died [18, 27].

Discussion

A wide variety of etiologies can cause nontraumatic chylothorax (Table 2). In a large series of patients with chylothorax ($n = 203$), none were reported to have chylothorax due to TB [55]. Our systematic review suggests that chylothorax is a very rare but well-described complication of TB [6–40]. The occurrence of an acute effusion with smooth unthickened pleural surfaces along with demonstration of elevated triglyceride (≥ 110 mg/dL) and low cholesterol levels (pleural/serum cholesterol <1) or demonstration of chylomicrons by lipoprotein electrophoresis differentiates a chylothorax from a pseudochylothorax [3]. The absence of long-standing pleural effusion prior to the current illness and clear biochemical evidence and definitive demonstration of chylomicrons along with radiological features suggestive of TB and microbiologic demonstration of MTB established the association of chylothorax with TB in the index case. Pleural thickening was due to TB and *Candida albicans*-related empyema; it has been reported earlier in association with TB-chylothorax [31, 40].

Several mechanisms have been described for the development of chylothorax in TB. These include (1) mediastinal adenopathy with occlusion or erosion into the thoracic duct and leakage of chyle into the pleural space, (2) abdominal lymphadenopathy with occlusion of the cisterna chyli and opening of lymphaticovenous anastomosis, and (3) constrictive pericarditis associated with elevated left subclavian venous pressures leading to increased production and reduced drainage of lymph. The observation of exudates in all cases of TB-related chylothorax reported in the present systematic review, however, suggests a direct involvement of the pleura and/or lymphatic ducts due to TB or host-immune responses as the primary cause in most patients. Other mechanisms are also evident from this systematic review; these include erosion of the thoracic duct by spinal abscesses, extensive pleural disease with lymphatic exudation, and duct damage due to IRS. The occurrence of chylothorax subsequent to initiation of ATT in 27.8% (10/36) of the patients, the absence of any associated mediastinal or ab-

dominal adenopathy in 35%, the very high proportion of cases with disseminated TB (45.9%; 17/37) in apparently immunocompetent individuals presenting with chylothorax, including miliary TB (18.9%; 7/37), and the development of chylothorax during immune reconstitution suggest direct or host-immune damage to the thoracic duct as a major mechanism for the development of chylothorax. The median time to development of chylothorax observed in our systematic review was 6.75 weeks (IQR 4–9), which is the most common time period of immune reconstitution; IRS can occur in 2.4–28% of immunocompetent individuals with lymph nodal [40] or pulmonary TB [56].

The occurrence of chylothorax was suspected due to obvious milky pleural fluid, suggesting an underrecognition of chylothorax in TB. Tuberculous empyema was associated with chylothorax in 25% (9/36) of the cases, including 13.9% (5/36) where this was the sole manifestation. Given the disseminated paucibacillary disease in a significant majority, biopsies of involved tissues like nodes and the pleura were needed in 50% (18/36) of the cases, with 22.2% (10/36) being diagnosed only by pathology. Lymphangiograms were reported only for 8.6% (3/35) [6, 14, 37], and the site and cause of leakage of chyle was presumptive in most reported cases.

Steroids were administered in 22.9% (8/35) of the cases for IRS, bronchial stenosis, and severe disseminated TB with variable responses in reduction of chylothorax. The need for thoracic duct interruption was reported only for 17.1% (6/35) of the cases, with success in 83.3% (5/6) of these, indicating that chylothorax may resolve with a fat-free diet and ATT in the majority of cases. TB-chylothorax is associated with good prognosis with conservative treatment despite the higher proportion with disseminated disease at diagnosis and associated comorbidities. The survival rate was 94.4%.

Conclusions

Chylothorax is a very rare but well-described complication of TB. It develops with extensive mediastinal or abdominal lymphadenopathy and extensive pleural disease, but it may also develop without any obvious lymphadenopathy and as part of an IRS. ATT and dietary manipulation – followed by duct ligation if needed in a small minority of cases – are associated with good outcome and low mortality.

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Author Contributions

All authors were responsible for patient care and initiated manuscript preparation. S.R. and R.K. performed the systematic review, retrieving the articles of our systematic search and abstracting data. S.R. and R.K. take responsibility for the content of the paper, including the data and analysis.

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