

# Pulmonary manifestation of Brucellosis

Payam Tabarsi

NRITLD

SBMU

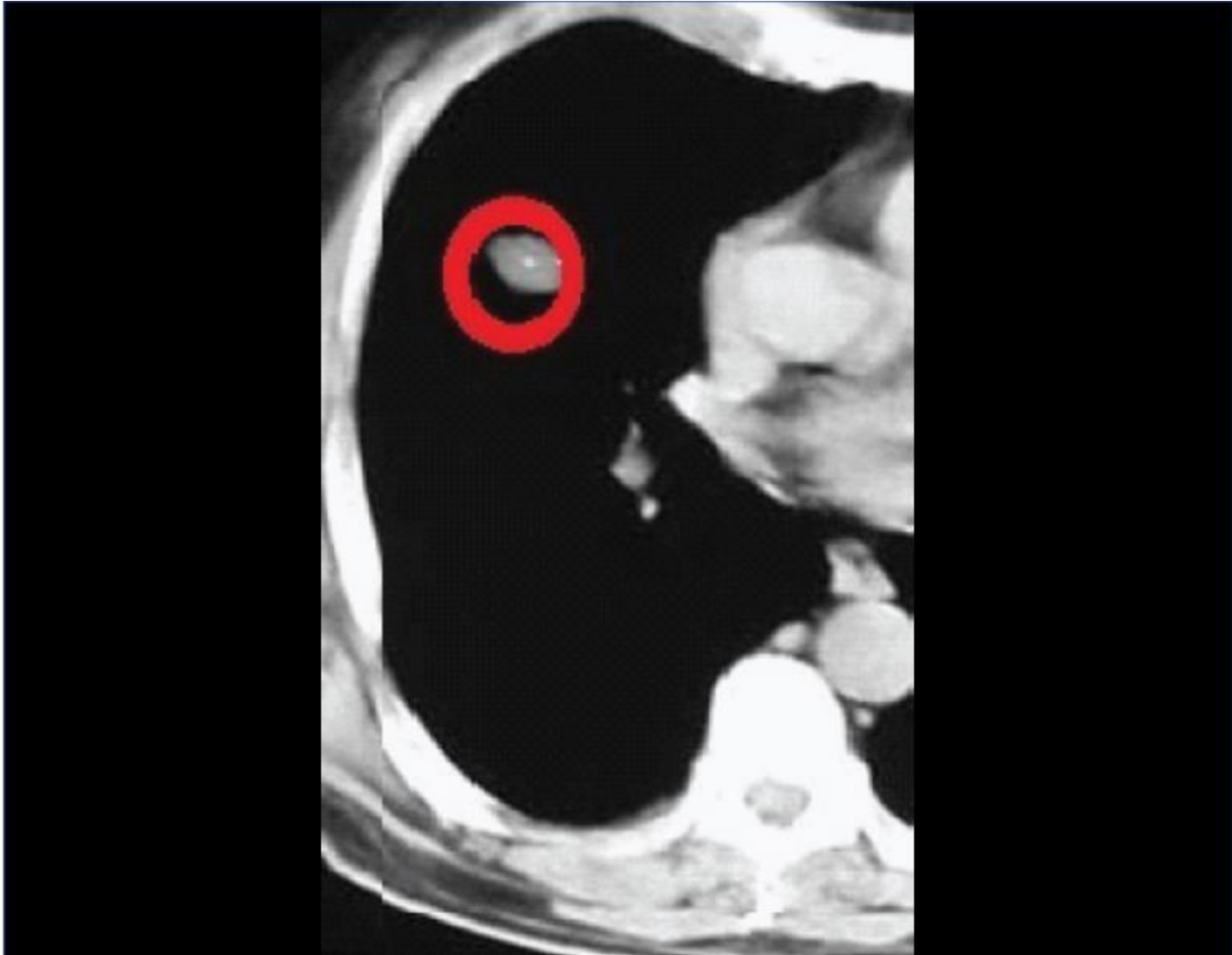
- Brucellosis is a zoonotic bacterial infection caused by the genus *Brucella*. These small aerobic intracellular coccobacilli, which are Gram-negative and non spore forming, shed in the urine, milk, placenta and other fluids of animals, mainly domestic.

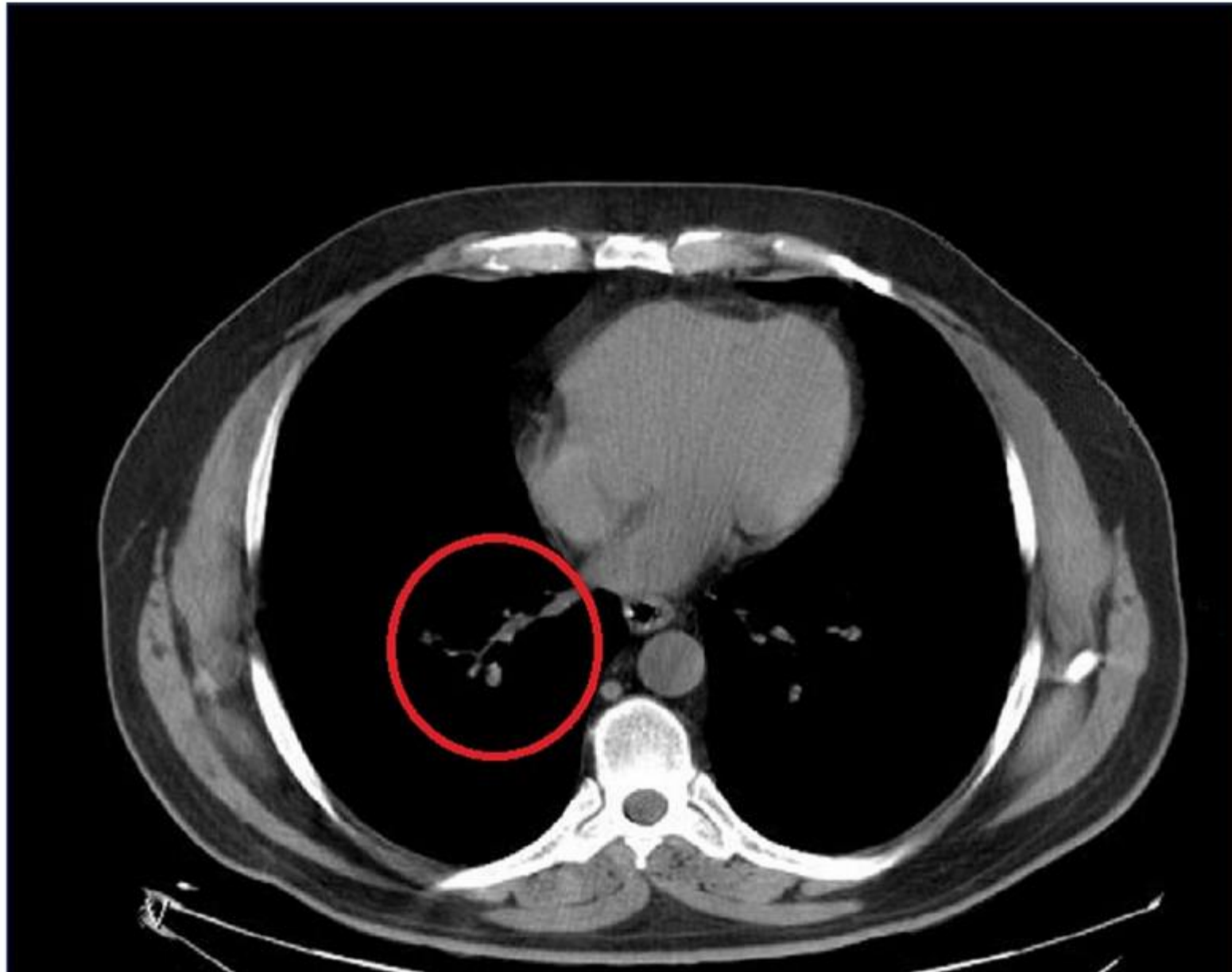
- Humans are accidental hosts
- Transmission is generally achieved either through direct contact with contaminated animals, or through ingestion of unpasteurized dairy products and inhalation of infectious aerosol particles, suggesting that Brucellae enter the human body through skin or mucous discontinuities

- Symptoms include fatigue, malaise, anorexia and body aches.
- Fever is the most common sign
- Pulmonary involvement rarely occurs as a result of inhalation of infected aerosol or hematogenous spread and pulmonary manifestations including pleural effusions and pneumonias, can be found in up to 16% of complicated cases

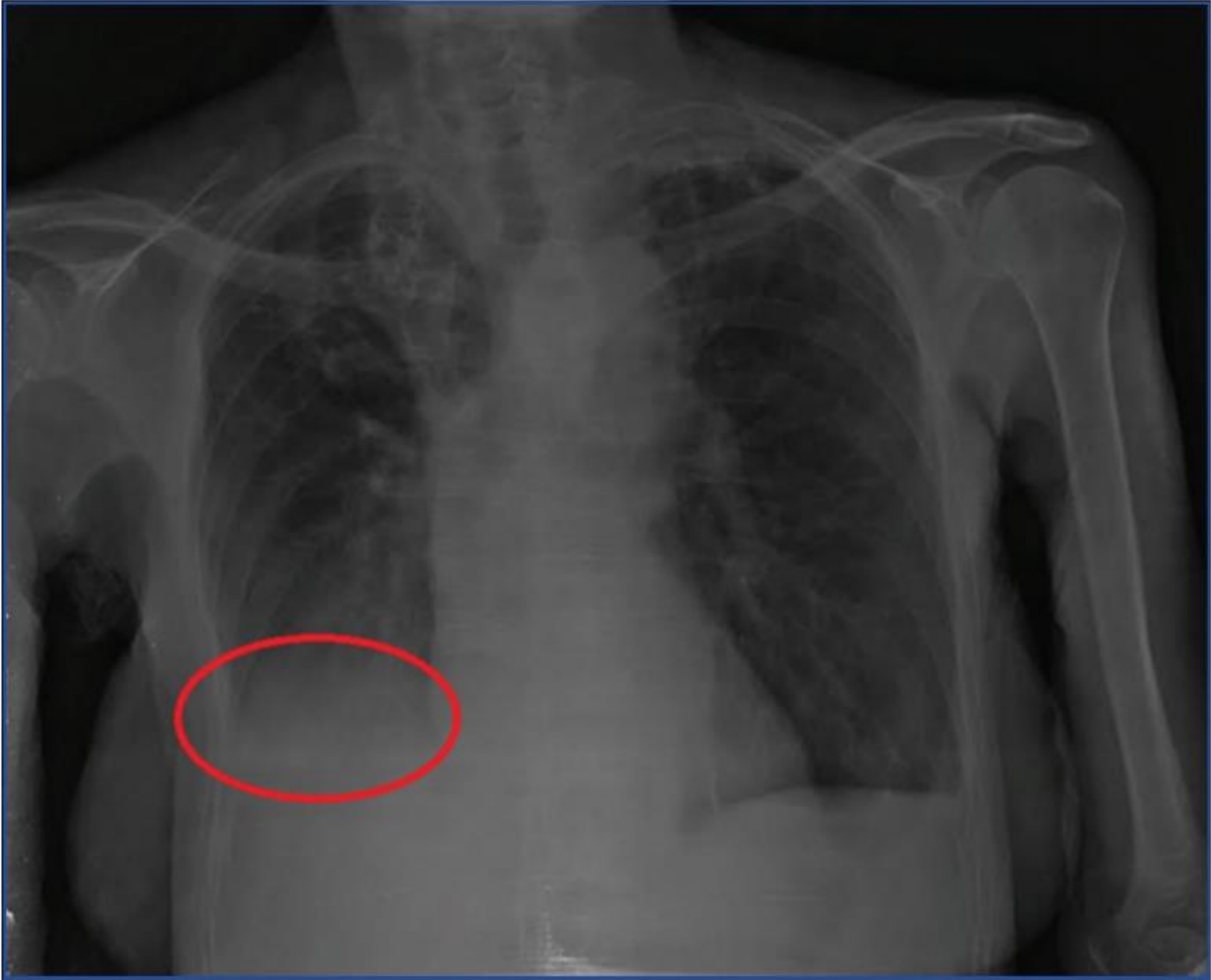
- There are few reports of respiratory involvements and a wide spectrum of lung disease has been reported ; empyema , pleural effusion , solitary nodules , interstitial pneumonia and even pneumothorax and pulmonary embolism have all been reported and they can even be the sole symptom of brucellosis

No	Sex	Age	Possible Exposure	Prominent Symptoms and Signs	Other Symptoms	Lung CT Scan	WBC (10 <sup>3</sup> /mm <sup>3</sup> )	PLT (10 <sup>3</sup> /mm <sup>3</sup> )	CRP (mg/l)	ESR (mm/h)	Other Lab finding	Cultures		WRIGHT test	ELISA IgM
												blood	sputum		
1	M	55	Shepherd	Fever, productive cough	Fatigue	Ground glass opacity	4.0	172	9.4	32	None	-	-	+ 1/1280	3,8 (+)
2	M	49	Farmer	Low-grade-fever, non productive cough, bronchospasm	Pain in joints, anorexia	Pulmonary nodules	6.8	220	15.7	50	SGOT=68 SGPT=70 (U/L)  Sacroiliitis	+	-	+1/640	4.2 (+)
3	F	68	Shepherd	Fever, paroxysmal cough	Fatigue, pain in joints	Basal right side pneumonia, thoracic lymphadenopathy	4.1	102	8.3	38	None	-	-	+1/320	3 (+)
4	M	72	Farmer	Fever, dyspnoea, hypoxemia	Anorexia	tree-in-bud sign	9.9	198	11.2	49	None	-	-	+1/320	3.2 (+)









**Table 1** The characteristics of patients with pulmonary involvement

	Sex	Age	Pulmonary symptoms	Radiological findings	Coexisting pulmonary disease	Other complications of brucellosis
1	F	68		Parenchymal nodules		Uveitis
2	F	43	Cough	Parenchymal nodules		
3	M	75	Cough, sputum, dyspnoea	Parenchymal nodules, lobar pneumonia, pleural effusion	COPD	
4	M	51	Cough, sputum, dyspnoea	Parenchymal nodules	COPD	Sacroiliitis
5	M	39	Cough, dyspnoea	Parenchymal nodules	COPD	
6	M	48	Dyspnoea	Lobar pneumonia	COPD	Sacroiliitis
7	F	35	Dyspnoea	Parenchymal nodules		
8	F	53	Dyspnoea	Parenchymal nodules		
9	F	33		Parenchymal nodules		
10	F	59		Parenchymal nodules		
11	M	31	Cough, sputum	Paratracheal lymphadenopathy		

- Pulmonary involvement is reported in up to 20% of patients with brucellosis, manifesting as a dry cough with no other respiratory signs
- Objective features of respiratory involvement are only present in about 1% of patients with brucellosis

- Interstitial pneumonia, lobar pneumonia, bronchitis, and pleural effusion are the most common manifestations report
- Granuloma formation and solitary nodules in the parenchyma, hilar lymphadenopathy, empyema, and abscesses have also been observed

- Brucella species are rarely isolated from sputum cultures
- In a study from India all sputum and pleural fluid cultures remained sterile.<sup>3</sup> In other few studies, Brucella species were isolated from pleural fluid cultures

Test	No. Tested	No. (%) Positive
Rose Bengal	131	109 (83.2)
Wright STA	133	125 (94)
Coombs-STA	51	49 (96.1)
STA (−), Coombs-STA (+)	8	4 (50)
Automated culture results		
Blood culture (automated)	119	56 (47.1)
Bone marrow culture (automated)	13	7 (53.8)
Conventional culture		
Pleural fluid	19	2 (10.5)
Endotracheal aspirate	3	1 (33.3)
Sputum	60	0 (0)

**Table 3—Chest Radiograph and Thoracic CT Imaging Findings**

Radiologic Finding	No. Patients	Chest Radiograph (n = 133)	Thoracic CT Imaging (n = 92)
Consolidation	84	77 (57.9)	58 (63)
Interstitial or patchy infiltration	32	29 (21.8)	27 (29.3)
Parenchymal nodules	10	9 (6.8)	10 (10.9)
Abscess	1	1 (0.8)	1 (1.1)
Cavity	1	1 (0.8)	1 (1.1)
Pleural effusion	44	38 (28.6)	38 (41.3)
Bilateral	27	15 (11.3)	25 (27.2)
Unilateral	17	23 (17.3)	12 (13)
Localization			
Limited to one to two lobes	74	73 (54.9)	43 (46.7)
More than two lobes	17	14 (10.5)	14 (15.2)
Bilateral infiltration	46	38 (28.6)	35 (38)

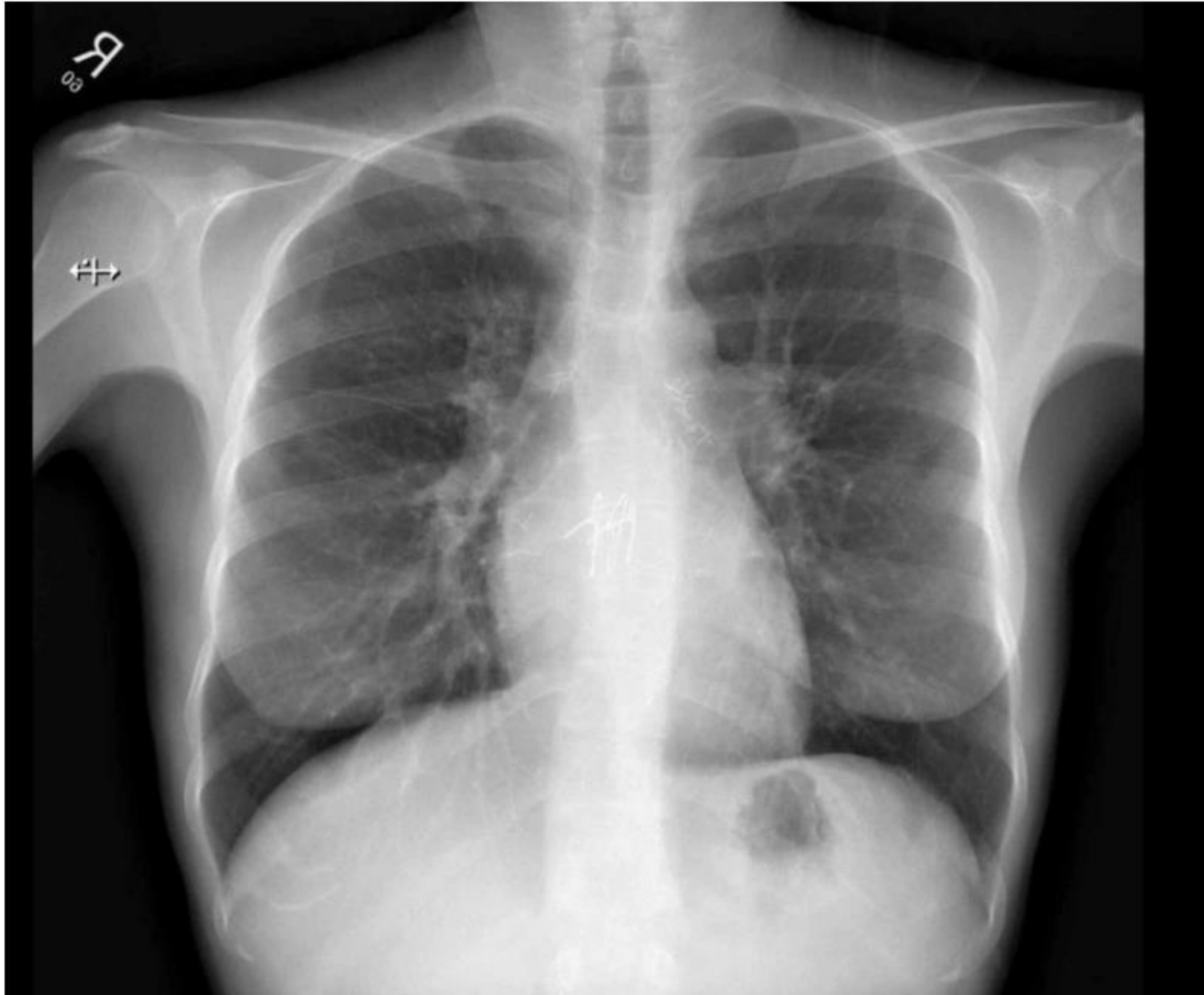
**Table 4—Treatment and Outcome Data for Brucellosis in Patients With Pulmonary Involvement (N = 133)**

Antibiotic Combination	No. Patients	Duration, d	LOS, d	Failure	Relapse	Negative Outcome
Doxy + Rif	82	44.4 ± 10.4 (28-90)	12.1 ± 5.8 (3-30)	0	1 (1.2)	2 (2.4)
Doxy + Rif + Str	16	55.9 ± 35.1 (42-180)	15.6 ± 9.1 (6-30)	2 (12.5)	1 (6.2)	3 (18.8)
Doxy + Str	10	42.3 ± 0.9 (42-45)	19 ± 11.3 (6-42)	0 (0)	0 (0)	0 (0)
Doxy + Rif + Str + Cfxn	8	39.4 ± 6 (28-45)	13.6 ± 3.4 (7-17)	0 (0)	0 (0)	0 (0)
Doxy + Rif + Cfxn + Fq <sup>a</sup>	7	82.3 ± 66.7 (42-180)	25.6 ± 13.6 (15-50)	0 (0)	0 (0)	0 (0)
Doxy + Rif + Fq	3	80 ± 48.2 (45-135)	18.3 ± 3.8 (14-21)	1 (33.3)	1 (33.3)	1 (33.3)
Doxy + Rif + TMP-SXT	2	58.5 ± 23.5 (42-75)	33 ± 26.8 (14-52)	0 (0)	0 (0)	0 (0)
Other <sup>b</sup>	5	113.8 ± 79.8 (42-215)	26.8 ± 14.5 (15-51)	1 (20)	0 (0)	1 (20)
Total	133	50.9 ± 30.1 (28-215)	15.3 ± 9.4 (3-52)	4 (3)	3 (2.3)	7 (5.3)









Age in years	Organ transplanted	Time post-transplant	Risk factors	Presentation	Diagnosis of Brucella	Treatment	Duration of therapy	Reference
41	Kidney	3 years	Not reported	Fever and weakness	Blood culture	Doxycycline, TMP-SMX, rifampin	6 weeks	Bishara et al. [15]
56	Kidney	3 years	Remote history of raw dairy product consumption	Fever and confusion	Serology	Doxycycline, rifampin	6 weeks	Yousif and Nelson [7]
58	Kidney	3 years	Raw cheese consumption	Fever and arthritis	Blood/synovial fluid culture	Doxycycline, rifampin, ciprofloxacin	Not reported	Einollahi et al. [8]
15	Liver	2 months	Lives in endemic area	Fever and poor appetite	Serology	Doxycycline, rifampin	8 weeks	Polat et al. [13]
58	Kidney	3 years	Traveled to endemic country	Fever, chills, and sweating	Blood culture	Tigecycline IV, Minocycline, TMP-SMX	2 weeks 3 months	Ting et al. [9]
39	Liver	2 years	Not reported	Fever and poor appetite	Blood culture and serology	Rifampin, TMP/SMX	8 weeks	Xie et al. [16]
7	Liver	2 years	Lives in endemic area & raw cheese consumption	Fever	Serology	Rifampin, TMP/SMX	3 months	Islek et al. [11]
12	Liver	5 years	Lives in endemic area	Fever and hip pain	Blood culture and serology	Doxycycline, rifampin	8 weeks	Sutcu et al. [12]
20	Kidney	4 months	Occupation	Fever and cough	Serology	Rifampin, doxycycline	6 weeks	Ay et al. [17]
63	Kidney	8 years	Lives in endemic area	Fever	Blood culture and serology	Ciprofloxacin, doxycycline	2 weeks 6 weeks	Inayat et al. [10]
51	Heart	3 months	Farmer with animal contact	Fever, chills, and leukopenia	Serology	Doxycycline, TMP-SMX	3 months	Nair et al. [14]

- The majority of patients presented with lobar pneumonia, with or without pleural effusions, that was radiologically similar to those seen in other types of CAP
- Clinicians should be alert to the possibility of brucellosis being the cause of respiratory problems, especially in those suspected of having TB.
- Clues include a history of residence in or travel to an endemic area, consumption of unpasteurized milk products, and a past or family history of brucellosis.

- Respiratory symptoms often have been present for 1 month before admission for Brucella pneumonia, and almost one-half of the patients have significant concurrent rheumatologic symptoms.
- In baseline laboratory investigation, neutrophilia is uncommon, but many patients have mildly raised transaminase levels and thrombocytopenia.
- All these clues should prompt the clinician to request the specific serologic and culture tests required for the diagnosis of a condition with excellent outcomes following specific combination antimicrobial therapy, which typically includes a 6-week course of doxycycline with rifampin or an aminoglycoside.