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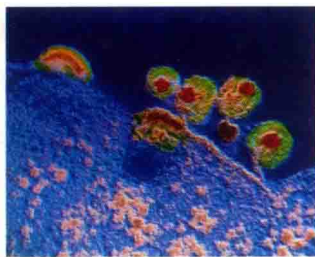
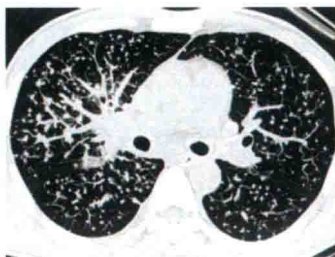
ATLAS OF AIDS CO-INFECTION

艾滋病胸腹部 影像诊断图谱

(英文版)

Jinxin Liu, Xiaoping Tang (Chief Editors)

刘晋新 唐小平 主编



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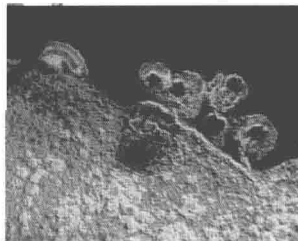
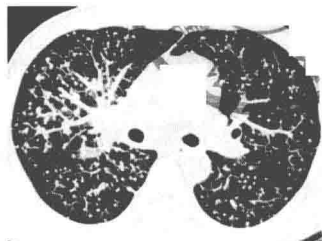
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北京

内 容 简 介

本书共18章, 内容主要包括艾滋病(AIDS)常见的及少见的机会性感染。本书涵盖了AIDS 144例病例的1400余幅图, 以AIDS 影像图片为主, 文字描述为辅, 结合镜下彩色病理图片, 通过对动态的AIDS 患者的胸腹部影像资料的描述, 以每一病例病变发生发展的过程, 说明AIDS 的影像学特点; 结合每一病例的临床资料, 诊断及鉴别诊断, 阐述AIDS 各种机会性感染的发病、演变、治疗及转归, 对AIDS 及其机会性感染的临床诊治具有较大的参考价值, 适合临床医学及影像医学工作者阅读。

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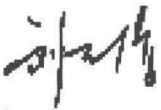
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Foreword

In recent years, HIV/AIDS-related opportunistic infections have drawn worldwide attention only due to their escalating prevalence and their complexity in etiology. From their onsets to their progress in the course, opportunistic infections vary in terms of different stages and different immunosuppression of hosts. In the advanced stage of AIDS, they may lead to multiple complications simultaneously. As a result, they present varying unspecific manifestations in imaging so that to make an affirmative diagnosis we depend more on the clinical observations and laboratory data, especially the results from bacterial culturing and pathological analyses. But the particularity of AIDS allows few chances for us to obtain the specimen for biopsy. Favorably, the radiological examinations on the AIDS-related infections have the advantage of non-invasiveness, accurate location of lesions, full scale of observation and repeatability, which no doubt to say makes imaging diagnoses so valuable for the detection, diagnosis, treatment and prognosis of AIDS-induced opportunistic infections.

Guangzhou No. 8 Hospital is a government-run hospital, only designated by the local government to service the AIDS patients in South China. In the past twenty years, we have attained fair knowledge and rich experience in prevention and treatment of AIDS-related opportunistic infections. In the context, the two experts, Prof. Jinxin Liu and Prof. Xiaoping Tang from the hospital, co-worked hard to compile the book, *An Atlas of Thoracic and Abdominal Images of AIDS Patients*, which I believe is of significance for clinical reference.

The book contains 15 chapters and has collected in it more than 101 cases of AIDS-related infections and over 1,000 radiographic and CT images with rich legends, which is a general summary of clinical studies on AIDS-related opportunistic infections in recent years. Therefore, I wish that this book would play a role in promoting the clinical diagnosis and treatment of AIDS patients.



May 1, 2010

Academician of Chinese Engineering Academy
Fuwai Hospital of Chinese Academy of Medical Sciences

Preface

AIDS (acquired immunodeficiency syndrome) is a severe clinical immunosuppressive syndrome caused by human immunodeficiency virus (HIV) infection. By severely suppressing human T lymphocyte immune function, HIV may induce various malignant tumors and all kinds of opportunistic infections. The opportunistic infections are commonly caused by fungi, bacteria and viruses, and clinically show the manifestations of fever, weight loss and systemic lymphadenopathy.

Epidemically, AIDS has spread rapidly worldwide since the first AIDS case was detected in America in 1981. According to UNAIDS Report on the Global AIDS Epidemic 2009 and 2010 Prospects in Prevention and Care of AIDS, at least 60 million people were infected by HIV and 25 million of them died of AIDS-related diseases. In 2008, comparatively, only 33.4 million were HIV-infected including 2.7 million new victims and 2 million died of AIDS.

The similar situation happens in China for the rapid increase of HIV cases. By the end of October 2009, 319,877 HIV/AIDS patients were reported and documented. Of them 102,323 were AIDS patients and 46,845 died. Comparatively, the prevalence of AIDS epidemic was so late that the majority of medical imageologists in China are green hands in terms of full-scale and systematic investigations in AIDS imageology. At this point, it is essential for medical doctors to familiarize themselves with clinical and imaging manifestations of AIDS.

Clinically, imageological examinations can present the lesions caused mainly by opportunistic infections and partly by HIV infections. The imaging manifestations of AIDS with opportunistic infections are characterized by complexity and non-specificity only because AIDS patients can contract various different opportunistic infections due to individual immunosuppression at the different stages of AIDS. In this case, the diagnoses of opportunistic infections in AIDS patients are dependent on clinical symptoms, imaging data, experimental results and most importantly, bacterial identification and pathological analyses. Therefore, specimen collections and biopsies become essential and fundamental for the diagnoses. But the particularity of AIDS makes clinical diagnosis tricky in China. Luckily, the imaging examinations are advantageous for its noninvasiveness, repeatability, accurate location and full-scale observation, which together contribute the great value to the identification, assessment of curative effect and prognosis of AIDS.

Opportunistic infections most commonly involve the thoracic and abdominal organs and tissues, which are most available for specimen collection and biopsy for the sake of affirmative diagnoses. For recent years, we have undertaken a number of imaging diagnoses of typical opportunistic infections in AIDS patients in Guangzhou No. 8 People's Hospital. Therefore, we would like to share our experience in imaging diagnoses of the opportunistic infections with peers as well as other clinical doctors by gathering, compiling and publishing the imaging findings from our clinical practice. The atlas is a collection of images on AIDS patients together with respective legends.

It elaborates not only the imaging features of AIDS patients by dynamically presenting the thoracoabdominal images and depicting the onset and progress of each AIDS case, but the onset, progress, treatment and improvement of AIDS-induced opportunistic infections of all kinds as well by integrating the clinical data of each case. From this point of view, the book is a complete summary of thoracoabdominal diagnostic imaging and treatment of AIDS patients and therefore is of great value for the clinical diagnosis and treatment of AIDS.

Thanks to the hard work of all other compilers, the atlas is successfully completed. We would like to thank the leaders of Guangzhou No. 8 People's Hospital. It could not be so smooth and successful without their support. Moreover, we really wish to express our gratitude to Prof. Yuqing Liu, academician of the Chinese Academy of Engineering, who wrote the preface for the atlas. Finally, we are strongly hopeful that the peer experts as well as the readers in this discipline would not bother to dedicate their critics on this book only because there may be some mistakes in it for the sake of our limited clinical experience and the rapid development of imaging technology.

LIU Jin-xin, TANG Xiao-ping
March 15, 2010

Preface of second edition

As time flies, it has been over three years since the publishing of *An Atlas of Thoracic and Abdominal Images of AIDS Patients*. Happily, a few doctors or researchers have still asked me for the book until yesterday, indicating that it is still valuable to a certain extent though it needs further supplementing and perfecting.

I can't help feel his hardship when I have been pondering over the words by Prof. Yanhao Li in the preface of the third edition of his works: "Writing is hard, but writing with your heart is harder" since I submitted the first edition of manuscript in 2010. This empathy pushed me for my preliminary and major principles for my passion to compile this book: 1. Authenticity of the data for the atlas is predominant, with fewer textual descriptions as well as our own insights; 2. After it comes familiarity, e.g., We should compile in it what we have studied and mastered; 3. The book needs constant enrichments by accumulating latest scientific findings.

Nowadays, sources for solving problems are always available on line by 'surfing' in and "downloading" from the Internet. However, they are controversial when it comes to their authenticity. Only the authentic first-hand image data are of great value for the scientific research.

Currently, the cases of AIDS still remain relatively rare in most hospitals in China. More importantly, a lot of my peers just hold an incomplete picture of it from the prospective of its imaging manifestations. This status certainly arouses our interest in the compilation of the atlas. Therefore, we gathered the first-hand image data based on our long-term experience in 2010, in hopes that these collected data could facilitate the readers with a comprehensive understanding of AIDS-related opportunistic infections from the future perspective.

The second edition of the atlas come out with new cases by differential diagnosis and more importantly latest achievements we have harvested through these years, which hopefully could be referential and helpful for our peers.

Writing is always a matter of regret. Therefore, we are strongly hopeful that the peer experts would not bother to dedicate their critics on this book only because there may be some mistakes in it for the sake of our limited clinical knowledge.

LIU Jin-xin
May 1, 2014

Contents

- 1 Imaging findings of bacterial pneumonia in AIDS — 1**
 - 1.1 Introduction — 1
 - 1.2 Imaging findings — 2

- 2 Imaging findings of AIDS with pulmonary *Rhodococcus equi* disease — 13**
 - 2.1 Introduction — 13
 - 2.2 Imaging findings — 14
 - 2.3 Imaging features — 21

- 3 Imaging manifestation of pulmonary candidiasis in AIDS — 22**
 - 3.1 Introduction — 22
 - 3.2 Imaging findings — 23
 - 3.3 Imaging features — 32

- 4 Imaging findings of pulmonary aspergillosis in AIDS — 33**
 - 4.1 Introduction — 33
 - 4.2 Imaging findings — 34
 - 4.3 Imaging features — 43

- 5 Imaging findings of pulmonary mucormycosis in AIDS — 44**
 - 5.1 Introduction — 44
 - 5.2 Image findings — 45
 - 5.3 Imaging features — 56

- 6 Imaging findings of pulmonary cryptococcosis in AIDS — 58**
 - 6.1 Introduction — 58
 - 6.2 Image findings — 58
 - 6.3 Imaging features — 64

- 7 Imaging features of *penicilliosis marneffei* in AIDS — 65**
 - 7.1 Introduction — 65
 - 7.2 Image findings — 66
 - 7.3 Imaging features — 82

- 8 Image findings of pneumocystis pneumonia (PCP) in AIDS — 83**
 - 8.1 Introduction — 83
 - 8.2 Image findings — 84
 - 8.3 Imaging features — 98

- 9 Imaging findings of pulmonary Mycobacterium tuberculosis in AIDS — 99**
 - 9.1 Introduction — 99
 - 9.2 Radiologic findings — 100
 - 9.3 Imaging features — 114

- 10 Imaging findings of nontuberculous mycobacterial pulmonary infection in AIDS — 116**
 - 10.1 Introduction — 116
 - 10.2 Radiographic findings — 117
 - 10.3 Imaging features — 124

- 11 Imaging findings of CMV pneumonia in AIDS — 126**
 - 11.1 Introduction — 126
 - 11.2 Imaging findings — 127
 - 11.3 Imaging features — 138

- 12 Imaging features of multiple microbial pulmonary infections in AIDS — 139**
 - 12.1 Introduction — 139
 - 12.2 Imaging features — 162

- 13 Imaging findings of AIDS-related Lymphoma — 163**
 - 13.1 Introduction — 163
 - 13.2 Radiologic findings — 164
 - 13.3 Imaging features — 173

- 14 Abdominal CT findings in AIDS — 174**
 - 14.1 Introduction — 174
 - 14.1.1 Liver and spleen — 174
 - 14.1.2 Biliary system — 175
 - 14.1.3 Retroperitoneal and mesentery lymph nodes — 175
 - 14.1.4 Kidney and adrenal glands — 176
 - 14.1.5 Digestive tract — 176
 - 14.1.6 Pelvic cavity and abdominal — 176
 - 14.1.7 Peritonitis and ascites — 176
 - 14.2 Abdominal CT findings of PM infection in AIDS — 177
 - 14.2.1 Introduction — 177
 - 14.2.2 Radiologic findings — 177
 - 14.2.3 Imaging features — 196
 - 14.3 Abdominal CT findings of abdominal tuberculosis in AIDS — 197
 - 14.3.1 Introduction — 197
 - 14.3.2 Radiologic findings — 198
 - 14.3.3 Imaging features — 215

15	Thoracic and abdominal imaging features of pediatric AIDS — 217
15.1	Introduction — 217
15.2	Radiologic findings — 217
15.3	Imaging features — 234
16	CT diagnoses and differential diagnoses of mediastinal hilar lymphadenopathy in AIDS patients — 236
16.1	The imaging features of mediastinal hilar lymphadenopathy in AIDS patient — 236
16.1.1	Opportunistic infections — 236
16.1.2	Tumors — 237
16.2	The imaging features and differential diagnosis of mediastinal hilar lymphadenopathy in AIDS patient — 238
16.2.1	Size of lymph nodes — 238
16.2.2	Density of lymph nodes and enhancement mode — 238
16.2.3	Diffuse miliary lesions — 238
16.2.4	Primary complex or similar-primary complex — 239
16.2.5	Mesenteric lymphadenopathy (Sandwich sign) — 239
16.2.6	Pleural effusion and pericardial effusion — 239
17	CT diagnoses and differential diagnoses of cavitary pulmonary diseases in AIDS patients — 255
17.1	AIDS-associated TB — 256
17.2	AIDS-associated NTM diseases — 262
17.3	AIDS-associated pulmonary abscess — 265
17.3.1	AIDS-associated pulmonary mycosis — 269
18	The CT diagnosis and differential diagnosis of disseminated miliary nodules in AIDS patients — 275
18.1	Introduction — 275
References — 298	
Index — 303	

1 Imaging findings of bacterial pneumonia in AIDS

1.1 Introduction

The incidence of AIDS patients with opportunistic infections is related with the virulence of pathogenic bacteria and the patient's immune level. The level of CD4+ cell in the peripheral blood (Table 1.1) is the best reflection of the immune status, many opportunistic infections will arise when CD4+ cell counts declines. The incidence of pulmonary infection is the highest in the opportunistic bacterial infections. AIDS with bacterial pneumonia accounted for more than 30% of HIV/AIDS with pulmonary infection. It can be occurred at each stage, especially in the early stage (i. e. the count of CD4+ is relatively high). The incidence of AIDS patients with pulmonary bacterial infections is five times that of HIV-negative people. The *Staphylococcus* is the main pathogens, followed by *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Pseudomonas aeruginosa* and so on.

The main clinical features are recurrent fever, cough, expectoration, fatigue and weight loss, and some patients with chest pain, diarrhea and superficial lymph nodes enlargement.

Table 1.1: HIV infection classification and AIDS diagnostic criteria revised by U.S. Centers for Disease Control in 1993

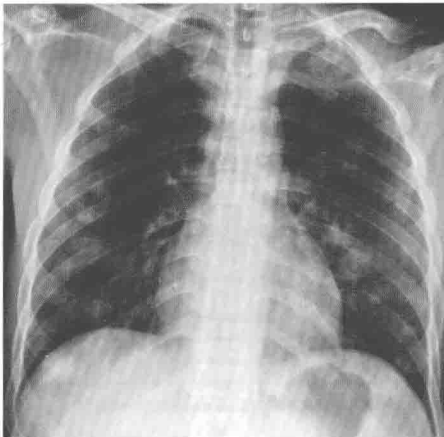
CD4+ T cell number	HIV infection Classification	Clinical classification		
		A asymptomatic and acute HIV infection or PGL	B people who have symptoms, but different from A or C	C disease which has AIDS features
≤500/μl		A1	B1	C1
200–499/μl		A2	B2	C2
<200/μl (T cell which has AIDS indications)		A3	B3	C3

PGL: persistent generalized lymphadenopathy.

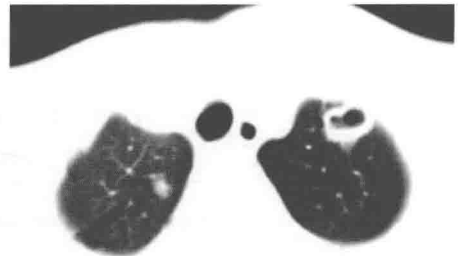
1.2 Imaging findings

Case 1.1 (Fig. 1.1 a–g)

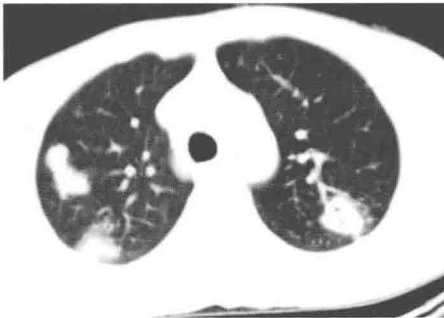
A 25-year-old male patient. Fever occurred two weeks ago before hospitalized, up to 40 °C no obvious chills, cough, expectoration or sore throat. Lumbago occurred one week ago and gradually get worse, accompanied by the generalized muscle aches. Admission body temperature was 38.8 °C. Pharynx mild congestive, bilateral tonsil no enlargement. Bilateral lung breath sounds coarse, no dry or moist rales. Left lower extremity showed multiple 0.5×0.5 cm pustules. Superficial lymph nodes no enlargement. CD4+ cell count was 28/μl. Bronchoalveolar lavage fluid (BALF), blood, marrow and pustular fluid culture: *Staphylococcus aureus* positive. The diagnosis was AIDS with *Staphylococcus aureus* pneumonia.



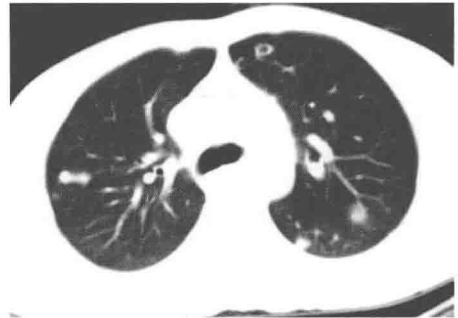
(a)



(b)



(c)



(d)

Fig. 1.1 a–g: *Staphylococcus aureus* pneumonia.

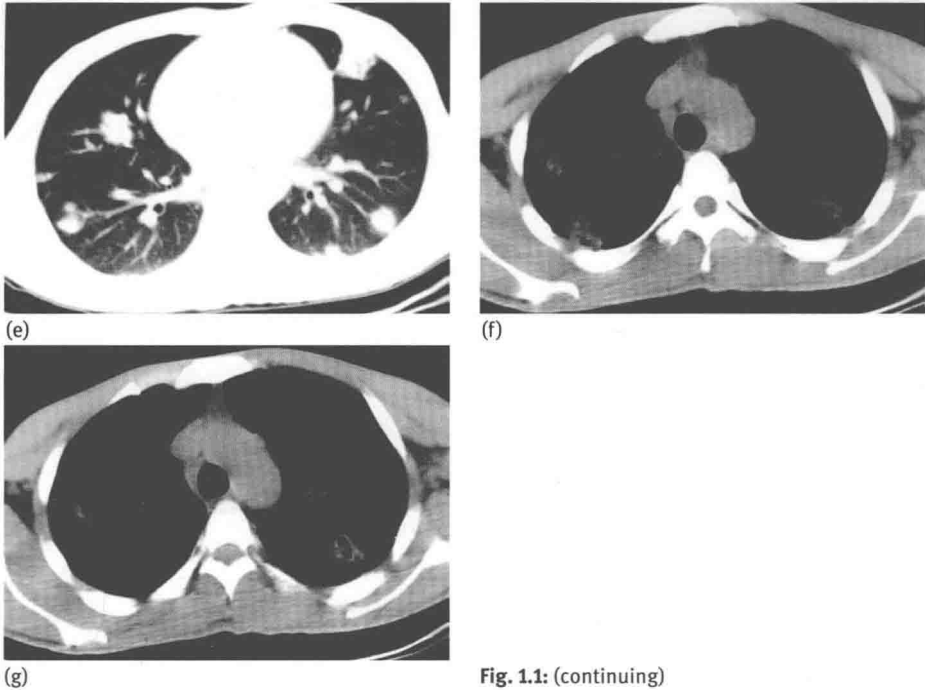


Fig. 1.1: (continuing)

Chest X-ray showed multiple and various size of nodules in bilateral lung, with blurring edge, and low-density area was seen in some lesions (a). CT showed multiple nodules in bilateral lung, mainly located in subpleural area, edge blur, cavity can be seen in most nodule lesions, with uneven thickness cavity wall, and air-fluid level was seen in some cavities (b–g).

Case 1.2 (Fig. 1.2 a–g)

A 25-year-old male patient. Fever and chill occurred two months ago, highest body temperature up to 40.0°C, accompanied by cough and expectoration with some blood stained sputum, getting worse for a month. Admission body temperature was 37.2°C. Physician examination: throat congestion, no tonsil enlargement. Dry rales were heard at expiratory in bilateral lung. The scattered rash was seen in the whole body, and with some ulcer and eschar. No superficial lymph nodes enlargement. CD4+ cell count was 4/μl. Bronchoalveolar lavage fluid (BALF), blood and marrow culture: *Staphylococcus aureus* positive. The diagnosis was AIDS (C3) accompanied by *Staphylococcus aureus* pneumonia and septicemia.

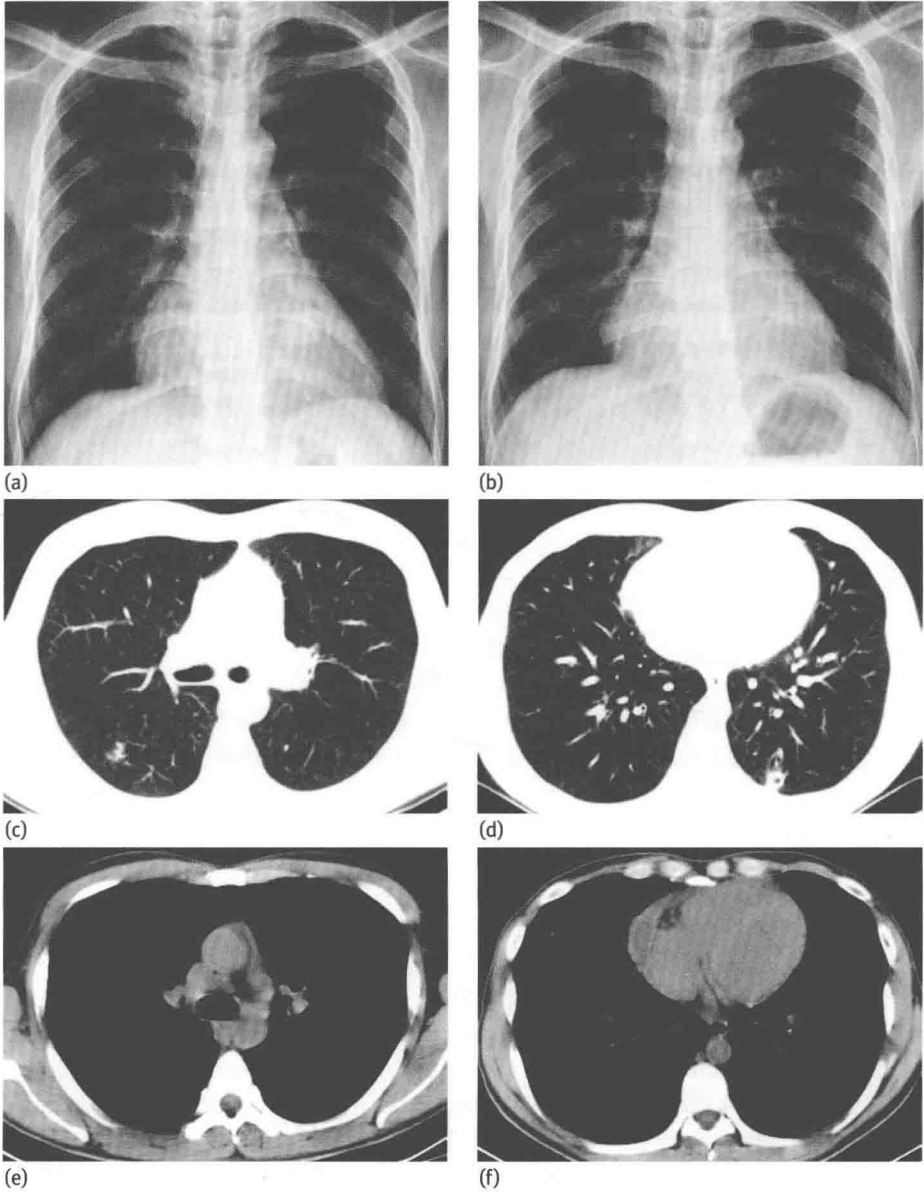
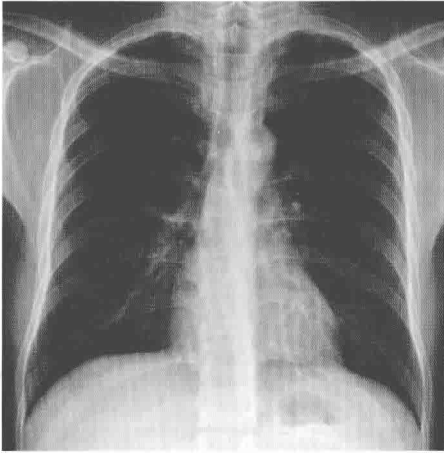


Fig. 1.2 a-g: *Staphylococcus aureus* pneumonia.



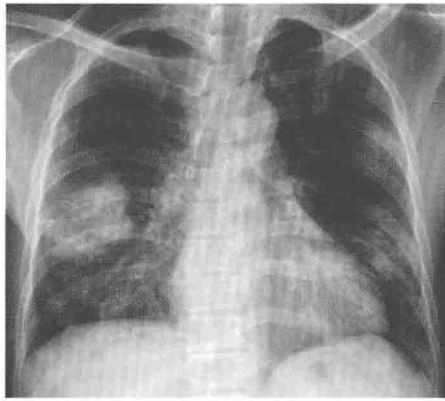
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Fig. 1.2: (continuing)

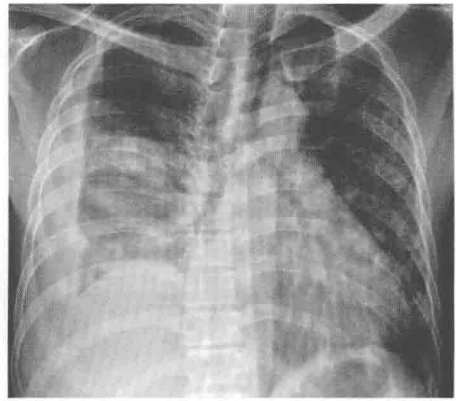
The chest radiograph showed multiple small cystic lesions with thin walls in the right upper lung, the nodular opacity in the left lower lung and the heart shadow extending flask-shaped (a). After 15 days treatment, the lesions were absorbed in the right lung and the nodules shrank in the right lower lung and heart postzone as showed in the chest radiograph (b). Chest CT scans with lung window showed multiple nodules in bilateral lung and small cavity in the left lower lung lesions (c, d). The CT scans with mediastinal window showed mediastinal lymph node enlargement (e) and pericardial effusion (f). After 25 days treatment, lesions were absorbed in the bilateral lung, and normal heart shadow was showed in the chest radiograph (g).

Case 1.3 (Fig. 1.3 a–j)

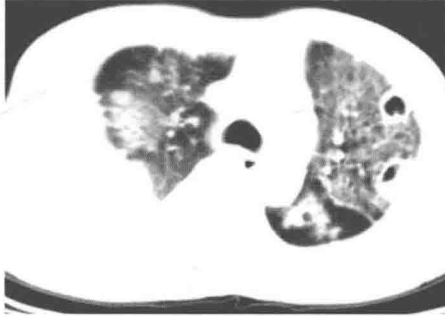
A 42-year-old male patient. Persistent fever occurred one week ago, body temperature fluctuated at 38–39 °C, accompanied by cough with a little yellow white thick phlegm and slight chills. The symptoms got worse two day ago, with severe obvious cough. Admission body temperature was 37.8 °C. Respiratory smooth, bilateral lung breath sounds coarse, a little moist rale could be heard. The scattered rash was seen in the whole body skin, and with some ulcer and eschar. No superficial lymph nodes enlargement. CD4+ cell count was 388/μl. Bronchoalveolar lavage fluid (BALF), and blood culture: *Staphylococcus aureus* positive. The diagnosis was AIDS (B2) accompanied by *Staphylococcus aureus* pneumonia and septicemia.



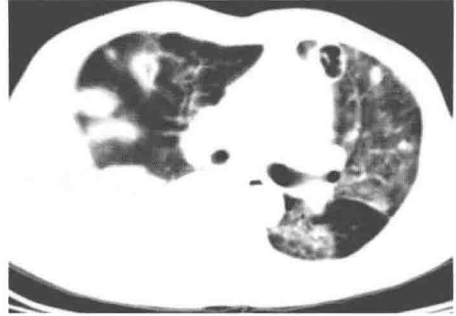
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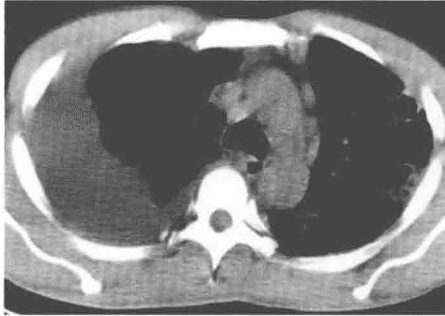
(b)



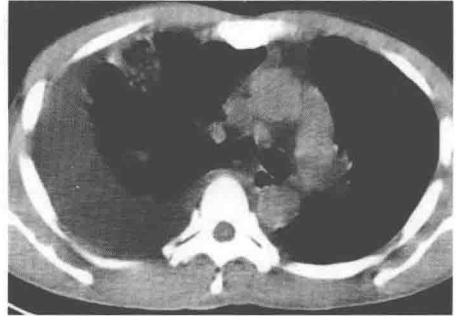
(c)



(d)



(e)



(f)

Fig. 1.3 a-j: *Staphylococcus aureus* pneumonia.

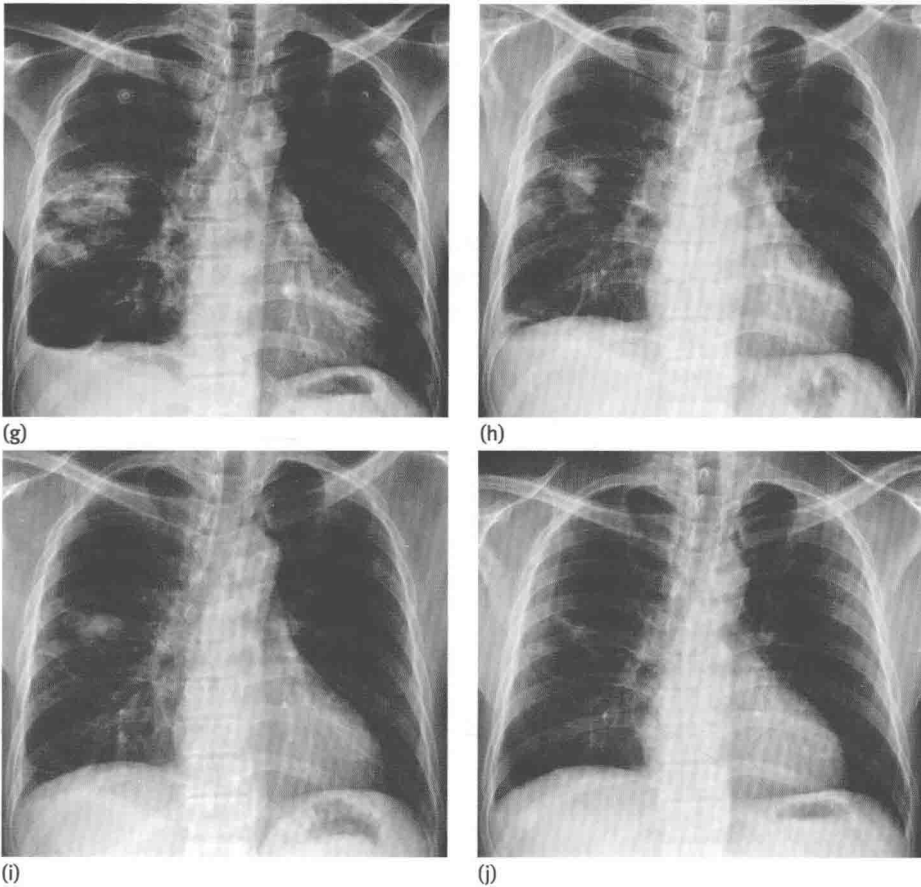


Fig. 1.3: (continuing)

The chest radiograph showed multiple lumpy and patchy high-density opacities of various sizes, blurring edges, and thickened fuzzy lung-markings in the bilateral lung (a). After 4 days treatment, the lesions were worsened with many small cavities in them and moderate pleural effusions in the right side as showed in the chest radiographs (b). The CT scans with lung window showed multiple nodules of various sizes in bilateral lung, with cavities in some nodules, and the ground-glass-like image in the bilateral upper lobes (c, d). The CT scans with mediastinal window showed multiple opacities in some nodules, pleural effusion in the right lung and mediastinal lymph nodes enlargement (e, f). After 17, 29, 38, 73 days treatment, lesions in the both lungs and pleural effusion in the right lung were gradually absorbed as showed in the chest radiographs (g-j).