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## A Case of Pyrazinamide Induced Fulminant Hepatic Failure

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Standard antituberculous therapy, including isoniazid (INH), rifampin, ethambutol, and pyrazinamide (PZA), is widely used to treat active tuberculosis. The most important side effect is hepatotoxicity. In a standard four-drug regimen, PZA was the most common cause of drug-induced hepatitis and was dose-related. The incidence of drug-induced hepatitis is high at doses of 40~70 mg/kg per day but has fallen significantly since the recommended dose was reduced. Liver toxicity induced by PZA is rare at doses of 25 mg/kg per day or less. PZA-induced fulminant hepatic failure is also rare but fatal. We report a case of fulminant hepatic failure caused by a re-challenge of PZA. (*Tuberc Respir Dis* 2007;63:435-439)

**Key Words:** Drug induced hepatitis, Fulminant hepatic failure, Pyrazinamide

### 서 론

### PZA

1

Pyrazinamide (PZA) 1952

가 . PZA

가

가

Isoniazid (INH), Rifampin (RFP), PZA,

Ethambutol (EMB) 4 가

1-4

가

3,4

HREZ

5~10%

0.02%

<sup>5,6</sup> Yee

PZA

2% INH

5

4

가

### 증 례

환 자: OO, 17

주 소: 10

기왕력, 사회력 및 가족력:

현병력: 5

INH, RFP, EMB,

PZA

28

10 ,  
37 5 12,300/  
mm<sup>3</sup>, aspartate aminotransferase (AST) 536 IU/L, L-alanine aminotransferase (ALT) 388 IU/L, Total Bilirubin (TB) 0.8 mg/dl 1 AST  
650 IU/L, ALT 1,025 IU/L, TB 1.7 mg/dl

1

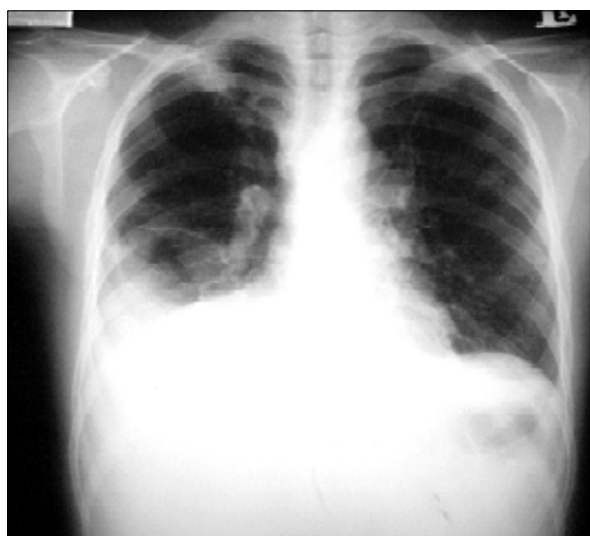
과거력:

진찰 소견: 120/80 mmHg, 102 / ,  
24 / , 38°C

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Received: Sep. 10, 2007

Accepted: Oct. 9, 2007



**Figure 1.** The radiographic study of chest showed poorly defined patch opacity in right upper lung zone. There was poorly defined nodular opacities in left middle lung zone. There was ill defined hazy opacity in right lower lung zone. The both costophrenic angle blunting was noted.

검사실 소견: 13.0 g/dL, 19,700/mm<sup>3</sup>,  
214,000/mm<sup>3</sup> 가  
pH

7.489, PaO<sub>2</sub> 59.8 mmHg, PaCO<sub>2</sub> 34.1 mmHg, HCO<sub>3</sub>  
26.2 mmol/L TB 1.6  
mg/dl, AST 637 IU/L, ALT 878 IU/L 가  
albumin 2.8 g/dl Prothrombin  
Time (PT) 18.8

가  
가  
가  
(Figure 1).  
가

가 (Figure 2).

치료 및 경과: 가  
가  
가  
가

3 TB 3.4 mg/dl, AST  
1,021 IU/L, ALT 1,174 IU/L 37.5°C  
가 4

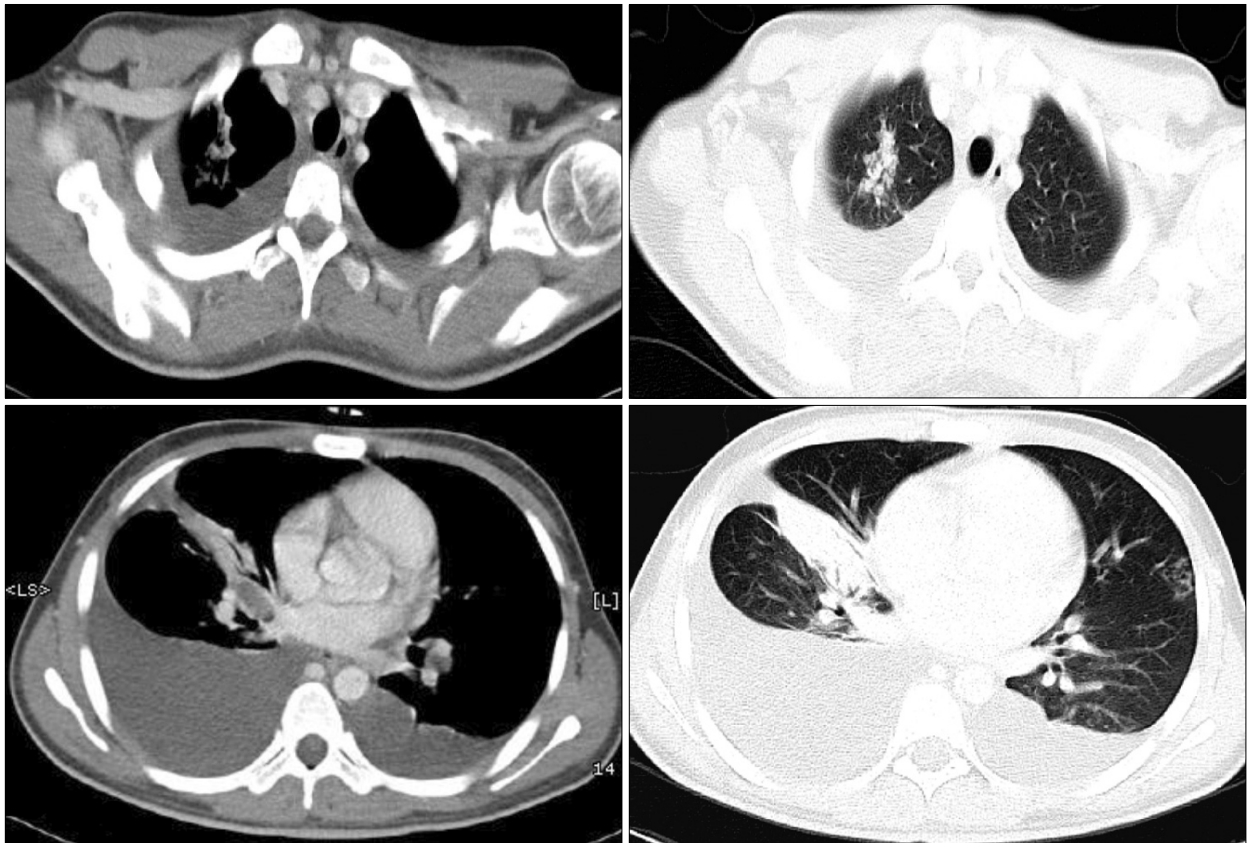
AST, ALT  
9 AST 474 IU/L, ALT 316 IU/L  
TB 11.0 mg/dl albu-  
min 2.7 g/dl PT 29.2  
13 TB 4.7 mg/dl, AST  
78 IU/L, ALT 113 IU/L albumin 3.6 g/dl  
PT 17.1

가 가  
17 TB 3.9 mg/ dl,  
AST 59 IU/L, ALT 74 IU/L, albumin 3.6 g/dl, PT  
15.0 19, 20  
PZA 500 mg 2 (39.7°C)

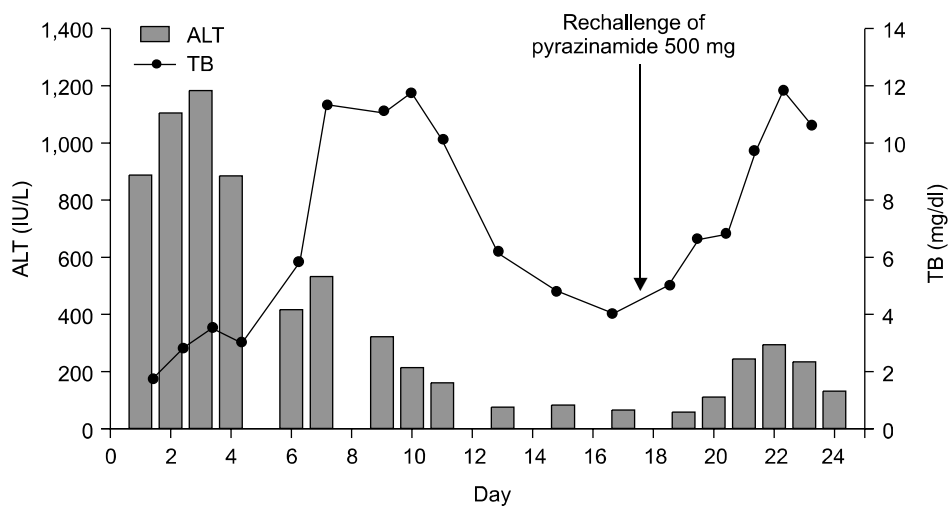
21 TB 6.7 mg/dl, AST 2,000 IU/L, ALT  
240 IU/L 가 albumin 2.7 g/dl  
PT 46.2 21  
ammonia  
227 µg/dl 23  
24 5  
(Figure 3).

고 찰  
PZA 1952 가  
가 4 40~60  
mg/kg 25 mg/kg 가  
1970 가  
4 6  
1-5 4

5,7-12 PZA 1981  
Danan 4  
INH, RFP, PZA  
AST ALT가 3  
가 AST 가 5  
7-9 AST  
ALT 가 5 가  
5~10 가



**Figure 2.** The Contrast enhanced CT scans of the chest showed low attenuation lesion in a bronchus lumen of right middle lobe and atelectasis. Both pleural effusion was noted. There was linear branching nodular opacity and ground glass opacity in both lung fields. No definite lymphadenopathy in mediastinum was noted.



**Figure 3.** The clinical course of patient since admission. All antitubercular drugs were withdrawn initially. AST decreased on the 4th day, and total bilirubin also decreased a week after. Pyrazinamide 500 mg was administered on Day 18, the patient developed nausea, vomiting, and high fever the next day. Hepatic encephalopathy was manifested three days later. The patient expired two days later.

10 가 가 . bilirubin 1  
 5~10%  
 aminotransferase (AT) 2 RFP  
 0.02% 5,6 Yee bilirubin  
 5 AT 2 가 1  
 INH 2%, RFP 3 가 INH bilirubin  
 0%, PZA 2% bin AT가 가  
 PZA  
 가  
 , ( 5 ), ,  
 , , , ( , ),  
 10,11  
 17 가  
 ALT 1,000 IU/L 가 TB가 11 mg/dl 가  
 가 B , C . INH, RFP, PZA  
 가 . INH  
 50 mg/ 2, 3 300  
 4 mg/ . RFP 75 mg/  
 300, 450 (<50 kg), 600 mg/ (>50 kg)  
 7 AT가 PZA 250 mg/  
 1 g, 1.5 g/ 7,8  
 INH, RFP, PZA  
 7,8 , RFP  
 2 AT가 가 가 RFP  
 PZA 500 mg 2 가 가 가 RFP  
 (BTS), (ATS),  
 (CDC) 가 INH 가 9  
 가 PZA 가  
 RFP INH 가 PZA가 가  
 . PZA  
 가  
 AST 가 5  
 가 AST가 3  
 가  
 ALP 가 가  
 가 . A, B, C 가 80%  
 PZA  
 PZA  
 7-9,13 Durand 14 8  
 INH, PZA  
 INH  
 PZA  
 PZA  
 Thompson 13  
 . RFP bilirubin  
 INH, RFP, PZA

PZA

가

가

<sup>5,7,13,14</sup>, INH  
RFP

acetaminophen

<sup>14,15</sup>

요 약

PZA

2%

가

PZA

PZA

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