Treatment of Tuberculous Pleurisy with Effusion by Artificial Pneumothorax

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Summary: 57 patients were divided into two groups at random. The patients of two groups were all given standard treatments with anti-tuberculous drugs. Treatment group received artificial pneumothorax to help the cure. Results showed that the frequency and quantity of drawing liquid in the treatment group were obviously less than those in the control group and the duration of the complete liquid absorption was shortened markedly in the treatment group and that total effective rate in treatment group (92.5%) was obviously higher than that of the control group (83.33%). We found that the artificial pneumothorax could raise the intra-pleural pressure by 0.20—0.39 kPa, reduce leakage in parietal pleurae and increase the absorption in visceral layer evidently. As it can isolate the two layers of pleurae from one another by the air in thorax, the incidence of pleurae adhesion can be decreased.

Key words: artificial, pneumothorax; treatment; tuberculous pleurisy with effusion

The curative effect of anti-tuberculous drugs (chemotherapy) on the tuberculous pleurisy with effusion has been greatly improved since its introduction into the treatment of the disease. But there are still problems with this therapy, i.e., long treatment duration, frequent drainage of liquid and development of pleural membrane adhesion in some patients. The purpose of this study is to explore the possibility of enhancing the curative effect of standard chemotherapy complemented with artificial pneumothorax on the tuberculous pleurisy with effusion.

1 PATIENTS AND METHODS

1.1 Subjects

57 patients with tuberculous pleurisy with effusion were included. Of them 31 were men and 26 were woman with age ranging from 14 to 68 years (mean 32.7 years). The diagnosis was established by following methods. 2 cases were diagnosed by detecting the tubercle bacilli in pleural fluid; diagnosis was established in 11 patients by histologically detecting the tuberculous change with thoracoscopy; in 23 patients (40%), tubercle bacilli DNA were twice detected by PCR; in 21 cases (37%), the diagnosis was reached according to the clinical diagnostic standards, which include tuberculous toxæmia symptoms, exudative effusion and marked abating of symptoms and evident absorption of fluid 15 days after chemotherapy. All subjects were de nova patients and had only unilateral pleurisy without encystment of effusion. Patients with non-tuberculous pleurisy were all excluded.

1.2 Grouping and Treatment Protocols

The patients were divided into two groups at random, i.e., treatment group and control group. Control group had 30 patients (16 male and 14 males). They all received shortened course of chemotherapy such as 2 HRS/4HR or 2 HRS/4HRP and their effusion was drawn once every two days. If no uncomfortable feeling was experienced, the fluid could be drawn out as
much as possible and then INH 0.1 g and
dexamethasone 5 mg were injected into their
pleural cavity. Treatment group had 27 pa-
tients, including 15 males and 12 females,
with their age ranging from 14 to 68 years
(mean 32 years). Apart from pneumotho-
rax, the other treatment protocols were the
same as the control group. After the fluid
was drawn out 60—100 ml of filtered air
was injected into pleural cavity. The
amount of injected air was believed to be
suitable when the pleural cavity pressure
went up by 0.20 to 0.39 kPa and the pa-
tient did not experience any uncomfortable
feeling. The patients in both groups were
further grouped into 3 subgroups according
to the amount of fluid. Subgroup 1 included
patients with fewer fluid and the top of the
fluid was below the lower edge of the fourth
prior rib; subgroup 2 covered patients with
medium amount of fluid and the top of
which was between the lower edge of the
second and the fourth prior rib; patients in
the subgroup 3 had large amount of effusion
and the top of the fluid was above the lower
down of the fluid cavity. The age, sex
distribution, duration of illness were simi-
lar.

1.3 Standards for Judging the Therapeutic
Effects
“Cure” meant that the fluid was ab-
sorbed entirely in two weeks and no pleural
membrane thickening or adhesion was
found. “Evidently effective” referred to the
fact that fluid was essentially absorbed in
four weeks after effusion existed for 2
weeks with obliterated costo-phrenic angle
lasting for over two months. “Effective”
meant that most of fluid was absorbed with-
in one month and reexamination after two
months revealed slight pleural adhesion and
thickening with exterior zone of the lung
was 1—2 cm thick two month later. "Not
effective" meant that the fluid was not ab-
sorbed for a long time and encystment de-
veloped with serious adhesion or thickening
of pleural membrane two months later with
exterior zone being over 2 cm thick.

1.4 Test and Examination
The tests employed in the study includ-
ed pleural effusion routine, biochemistry
and cytology.

Tubercle bacilli were detected by Ziehi-
Neelsen’s staining on the smear of the de-
posit of pleural fluid.

DNA of mycobacterium tuberculosis in
the fluid was detected by PCR; 2 ml of
pleural fluid was centrifugaled and de-
posited and then the DNA gene of tubercle
bacilli in the fluid was extracted[13]. The
DNA reagent kits was purchased from Insti-
tute of Inheritance of Shanghai Fudan Uni-
versity (China). DNA amplifying meter
(PCR-90AD model) was produced by the
Institute of Inheritance of Chinese Academy
of Science. The amplified products of the
DNA were analyzed by agarose gel elec-
trophoresis.

The pleural membrane biopsy was per-
formed by using fiber-optic bronchoscope
(Olympus BF-20 model) instead of thoraco-
scope according to Chen’s method with
some modification[7]. 3—4 patches of pleura
were clipped from affected area marked by
course, white nodule and plaques and they
were sent to department of pathology for
histological examination.

The pressure in the thoracic cavity was
measured by pressure meter.

1.5 Observation Items
The following items were measured;
the total quantity of the fluid drawn out,
the frequency of drawing, volume of air be-
ing injected into the pleural cavity, the
pressure changes in the cavity, chest
roentgenoscopy before and after fluid draw-
ing. An X-ray chest film was taken two
months after study for follow-up purpose.

Data were analyzed by student t-test.

2 RESULTS

The frequency of fluid drawing, the to-
tal quantity of the fluid drawn and the fluid
absorption are listed in table 1.

Comparison of the therapeutic effects
in two groups is listed in table 2.

The relationship between the changes
of pressure in pleural cavity before and after
injecting gas and the change of exudative
power and absorptive power in treatment
group is listed in table 3.

The effusion in pleural cavity exuded
from parietal pleura and is absorbed from