Tuberculous Empyema Treated with Vitamin A - D Concentrate
(A Preliminary Report)

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In 1934 Lohr1 reported the external use of cod liver oil in the treatment of skin wounds. Recently, "A Status Report on the External Use of Cod Liver Oil"2 summarized the Literature. Many other conditions have also been treated according to the same principles. To this subject we would like to add the following:

We proceeded to inject intra-pleurally, considering it as a topical application, a Vitamin A-D concentrate.**

Material and Method:

We selected six cases of tuberculous empyema complicating artificial pneumothorax; all were failures of the conventional conservative therapy, i.e., aspirations and lavage with antiseptic solutions. The general condition in all cases was too poor to warrant any surgery. Most had fever, loss of weight, and poor appetite. Five of the cases had had for several months draining, cutaneous-pleural sinuses. These followed the needle tracks of previous aspirations.

In two of these cases the empyema threatened to break through the skin (Empyema Necessitatis). The chest fluid was purulent in five out of the six cases and all had remained positive on smears as well as on cultures from six months to four years. In one instance there was a mixed infection with B. Aerogenous.

Five cc. to 8 cc. of Vitamin A-D concentrate, sterilized, were intrapleurally injected once a week. In the course of the treatment the fluid was never aspirated more than once a week, as it accumulated, or for diagnostic purposes. All specimens were examined for tubercle bacilli by concentration and culture, as well as for pyogenic organisms.

Results:

Most apparent was local improvement followed by general well being, then changes in the fluid's appearance. Locally, the draining sinuses closed, and in a few days a scab formed. This scab was

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replaced later by a fine scar; and the empyema necessitatis dis-
appeared. The general condition improved. The temperature re-
turned to normal. The appetite was regained, and some of the
patients spoke of craving food for the first time since being taken ill.
Morning nausea and vomiting of two of the sickest patients
stopped, and most of them gained weight.

The consistency of the chest fluid changed in a few weeks from
thick purulent to semi-purulent and later on to slightly turbid in
appearance. Microscopically the fluid showed a considerable in-
crease of cells (leucocytes). Tubercle bacilli which were present
in all cases on smear and cultures before treatment, were not
demonstratable on smear in five out of the six cases after three
or four weeks of treatment. However in some of these cases the
cultures remained positive for some time.

In one instance where the chest fluid still remained positive,
the tubercle bacilli count considerably decreased.

CASE REPORTS

Case No. I: M. L. J., 34 years old, colored, female. Admitted 1/6/43
with history of pulmonary tuberculosis since December 1942; right lung,
caseouspneumonic disease with positive sputum; right pneumothorax
initiated 4/2/43; pneumolysis 4/20/43; chest fluid positive for tubercle bacilli on culture 5/24/43; also positive on direct smear 6/26/43.

Despite frequent aspirations and lavage with Azochloramid, fluid re-
mained positive for tubercle bacilli; fever and loss of weight continued.

Vitamin A-D concentrate was first given intrapleurally 9/22/44. Pa-
tient gained 4½ pounds during first month of treatment. Temperature returned to normal within two weeks. The empyema necessitatis dis-
appeared. Oxygen lavage to re-expand the lung was done twice in
November 1944 with unfavorable results; viz., increase of fluid and re-appearance of bacilli on smear and luxurious growth on culture.
The lung did not re-expand. Further vitamin therapy improved the
patient again.

Case No. II: E. C., 32 years old, colored, female. Admitted 8/19/43,
with caseous pneumatic disease of left upper lobe; sputum positive;
left pneumothorax initiated 8/26/43; fluid on right side 1/6/44; fluid
on left side positive for tubercle bacilli on culture 1/20/44; vitamin A-D concentrate given intrapleurally since 12/4/44. Chest fluid negative since 12/14/44.

Case No. III: L. W., 22 years old, colored, female. Admitted 6/20/42,
with cavity in hilar region of left lung; sputum positive, Gaffky 5, on
direct smear; left empyema positive for tubercle bacilli on direct smear
4/25/44. Frequent aspiration and lavage with Azochloramid; fluid re-
mained positive with multiple draining, needle track sinuses since June
1944; vitamin A-D concentrate injections initiated 11/22/44 followed
by closing of the sinuses in a few days. The fluid turned negative within
three weeks, and has remained so since.

Case No. IV: A. S., 17 years old, colored, female. Admitted 8/31/43,
with caseous pneumatic disease left upper lobe; sputum positive; left
pneumothorax 9/15/43; chest fluid positive for tubercle bacilli. Gaffky 3, 12/17/43; Bacillus Aerogenous found in chest fluid 9/26/44; treatment with Azochloramid lavage unsuccessful. Vitamin A-D concentrate initiated 10/16/44; patient's general and local conditions improved, and fluid turned negative for tubercle bacilli. Sinuses closed. Oxygen lavage caused set-back, and thoracotomy became necessary 12/18/44, however, patient's general condition was good and has been since. Vitamin A-D concentrate has been intrapleurally applied continuously since 10/16/44.

Case No. V: G. C., 21 years old, white, male. Admitted 10/8/42, with bilateral disease; caseouspneumonic, with cavity in left upper lobe; positive sputum; left pneumothorax discontinued because of unsatisfactory collapse. Right pneumothorax 6/16/43; fluid on right side positive for tubercle bacilli on culture 2/28/44; fluid positive on direct smear. Gaffky 8, 9/7/44; draining needle track sinuses after aspiration and lavage. Vitamin A-D concentrate injections initiated 10/19/44 with closing of sinuses in a few days. Empyema necessitatis disappeared; appetite improved; fever returned to normal despite active disease on left. Fluid continued positive for tubercle bacilli, but decreased in count.

Case No. VI: J. L., 44 years old, white, male. Admitted 6/1/43, with history of tuberculosis since 1940. On this re-admission, his right pneumothorax was complicated with tuberculous empyema (fluid positive). The sputum was also positive. Aspiration and lavage with Azochloramid unsuccessful. Rib resection and closed drainage 11/5/43; this was followed by an open drainage. The wound closed spontaneously 6/13/44. Chest fluid remained positive. Vitamin A-D injections initiated 11/18/44. Chest fluid turned negative within three weeks after beginning of Vitamin therapy.

DISCUSSION

The local effects of the treatment with the Vitamin A-D concentrate which were most readily noticeable were the closed sinuses, the changed appearance of the chest fluid and its increased number of leucocytes. All this concurs with the observations of other workers who applied cod liver oil locally, and who reported that such treatment resulted in "a definite leucocytic response with rapid liquefaction of necrotic material . . . with rapid healing and minimal scarring."2

The general improvement of the patients could be explained partly as a result of the local improvement, and partly because of a possible absorption of the vitamins. However, this is purely speculative as we were not able to do any vitamin assays.

Since the tubercle bacilli content of the fluids was changed, the question was raised whether or not the vitamin concentrate was bacteriostatic and bactericidal. Also in the one case of mixed infection with B. Aerogenous a similar impression was given. Lohr and Treusch believed cod liver oil to possess bacteriostatic and bactericidal properties.2 Our attempts to prove such in vitro with tubercle bacilli have so far been unsuccessful, although investigation continues.
The dosage was from 5 cc. to 8 cc. of Vitamin A-D concentrate administered once a week. The dose was varied according to the patient's general and local conditions, the higher dose being given in the more severe cases. We do not know, as yet, the minimum or optimum dose; further studies are needed to determine this, and also the length of the treatment. We feel that this therapy should be continued long after the fluid is negative for tubercle bacilli, and as long as the fluid is re-forming; until by these criteria and others the empyema can be considered as cured.

We might mention that the impression is given that a decrease in the amount of the fluid—as shown by some of our cases over a five month period of observation—was due to the application of Vitamin A-D concentrate.

**SUMMARY**

1. Six cases of tuberculous empyema, complicating artificial pneumothorax, and unsuccessfully treated by the conservative method of aspirations and lavage, were given intrapleural injections of a vitamin A-D concentrate.

2. The results were local improvement, general improvement, and some changes in the tubercle bacilli content.

3. No attempt is made to draw a definite conclusion as to the specificity of this treatment, but further investigations are suggested.

**RESUMEN**

1. Seis casos de empiema tuberculoso, secundario al neumotórax artificial, y tratados sin éxito con el método conservador de aspiraciones y lavados, recibieron inyecciones intrapleurales de un producto concentrado de vitaminas A y D.

2. Los resultados obtenidos fueron: mejoría local, mejoría general y algunas alteraciones en el contenido de bacilos tuberculosos.

3. No se intenta sacar definidas conclusiones en cuanto a lo específico de este tratamiento, pero se sugiere las investigaciones adicionales.

**REFERENCES**
