

## Decortication in the Treatment of Chronic Empyema

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Chronic empyema is a troublesome Problem at our hospital and elsewhere<sup>1, 2)</sup>. Patients with longstanding empyema cavities, especially if complicated by pleuro-cutaneous fistulae, or by broncho-pleural fistulae, are chronically disabled, unable to work, a burden to their families, and are more susceptible to other illnesses. We wish to report our experience with decortication in the treatment of this debilitating disease.

**Clinical Material:** Over a five year period, from January 1972 to December 1976, 32 patients received decortication for chronic empyema at our hospital. Twenty-three were male, and 9 were female. Average age for the group was 31.8 years, with the youngest being a nine year old boy, and the oldest a 57 year old woman. Disease was on the right in 21 patients and on the left in eleven.

Clinical diagnoses were: Simple empyema, 5 patients; Pyo-pneumo thorax without broncho-pleural fistula, 7 patients; Pyo-pneumothorax with broncho-pleural fistula, 6 patients; Pyo-pneumothorax with pleuro-cutaneous fistula, 10 patients; and Pyo-pneumothorax with broncho-pleural and pleuro-cutaneous fistula, 4 patients.

After operation the pathologic diagnoses were: Chronic pleural inflammation-23; Chronic pleural inflammation, tuberculosis not

excluded-1; Tuberculous pleurisy-3; Bronchiectasis and inflammation of the lung-1; and no report-4. Nine patients had a positive skin test for paragonimus, and 5 patients were negative. The test was not done in 18.

Four patients had been treated for Paragonimus, and 12 for Tuberculosis, two of whom were known to have been sputum positive. Four additional patients had been treated for both Paragonimus and Tuberculosis.

Culture of the empyema cavity revealed a single organism in 13 patients with some variety of staphylococcus being the most common, (6 patients), followed by Pseudomonas, (5 patients). Culture from six patients grew two organisms, in combinations involving Staphylococcus, K. Aerobacter group, E. Coli, Gamma streptococcus, Pseudomonas, and Proteus. Three patients had cultures growing three organisms in combinations containing K. Aerobacter group, E. Coli, Proteus, Pseudomonas, Gamma streptococcus, and Hafnia. Cultures revealed no growth in eight patients, and in two patients cultures were not obtained. This is similar to the findings of others<sup>3, 5)</sup>.

Thirty five operations were performed in these 32 patients. These are shown in table #1. There was no operative death, but one patient was re-admitted to the medical service two months later and died of renal failure. There was a complication rate of

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62.5% with 20 of the 32 patients having some complication. These twenty patients had 27 complications among them, 12 minor and 15 major, which are tabulated in Table #2. Complications necessitated re-operation once in one patient, and twice in another patient.

**Results:** Excellent results were obtained in 25 patients or 80.7%. Overall results are in Table #3. Criteria for an excellent result are: 1) Total obliteration of the empyema cavity with successful closure of any fistula. 2) Good expansion of the lung into the residual thorax with minimal haziness on x-ray. 3) No residual chest wall infection or sinus tract. <sup>5</sup>Quite a few patients, classified as good or fair results immediately after operation, were later classified as excellent results because of progressive clearing of pleural haziness on the chest x-ray.

**Discussion:** Success in this operation depends on obliteration of the empyema cavity<sup>5</sup>. To do this the lung, chest wall, mediastinum, and diaphragm must be decorticated as completely as possible<sup>6</sup>.

When this has been done the lung usually expands to fill the thorax. If it does not do so, other measures must be taken to insure obliteration of the empyema cavity. The simplest of these is to crush the phrenic nerve, paralyzing the diaphragm, allowing it to rise to decrease the thoracic volume. We did this eight times. When this is still inadequate, then ribs must be resected to allow the chest wall to collapse against the lung and obliterate the space not filled by the expanding lung. We followed this latter course in 4 patients and were gratified to obtain an excellent result in each. Retrospectively, we believe that failure to perform a concomitant thoraco-

plasty was responsible for the one complete failure.

We also found that patients with a positive skin test for *Paragonimus*, and thus presumed to have had this disease, are usually easy to decorticate. The exception is when the empyema has been present for many years, and in which case the lung usually does not expand well. Of the eight patients with a positive skin test for *Paragonimus*, seven obtained an excellent result, and one a good result. The person getting a good result had a history of empyema going back over ten years.

Conversely, patients who have been treated for tuberculosis, or who have active tuberculosis either clinically at operation or by pathologic report, are more difficult to decorticate, do less well and are less likely to obtain an excellent result. Thus, of six patients requiring over 3500 ml. of blood at operation, five had been treated for tuberculosis. Of these five, only one gained an excellent result, three had a good result, and one was a failure. In the patient that failed there were numerous small caseous nodules in the pleural "peel" at operation.

It is essential to have a good steady source of intra-thoracic suction after operation<sup>7</sup>. We insert two, or sometimes three intra-thoracic tubes and attach them to constant suction equal to 20-40 cm. of water. Often there are numerous air leaks through tears in the pleura, and constant suction is necessary to pull the lung out and fill the thoracic cavity. The most common minor complication is a delay in the sealing off of these pleural tears, and one should not hesitate to continue suction for up to two weeks, before concluding that a broncho-pleural fistula has developed.

**Table #1**

Operations for Empyema-35 operations in 32 patients	
Decortication with closure of any fistula	28
Decortication, elevation of Diaphragm, and Rib Resection	1
Decortication and Rib Resection	2
Decortication and Resection of Portion of Lung	2
Resection of Ribs to Close Residual Pocket	2
<b>TOTAL</b>	<b>35</b>

**Table #2**

Complications in 32 Patients Undergoing Decortication			
Minor Complications 12 in 12 patients (37.5%)	Type of Complication	#	%
	Minor Wound Infection	4	12.5
	Prolonged Pleural Air-Leak (over 4 days)	8	2.5
Major Complications 15 in 8 Patients (25%)	Shock due to Hemorrhage	2	6.3
	Major Wound Infection	3	9.4
	Empyema	3	9.4
	Poor Expansion of Lung	7	2.2
OVERALL: 27 Complications in 20 Patients (62.5%).			

**Table #3**

Results in Decortication for Chronic Empyema					
Immediate Results: 32 patients			Final Results: 31 patients		
Status	#	%	Status	#	%
Failed	1	3.125	Failed	1	3.22
Fair	8	25.00	Fair	0	0.
Good	16	50.00	Good	5	16.13
Excellent	7	21.875	Excellent	25	80.65
<b>TOTAL</b>	<b>32</b>	<b>100.00</b>	<b>TOTAL</b>	<b>31</b>	<b>100.00</b>

**Conclusions:** Decortication, either with or without concomitant thoracoplasty is a very satisfactory procedure in dealing with chronic empyema. Acceptable results may be expected in almost all patients and an excellent result in a high percentage. In patients with tuberculosis or with a history of treatment for it, excellent results are more difficult to obtain.

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