

Treatment of post pneumonectomy pleural empyema by open window thoracostomy

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ABSTRACT: In 13 patients an open window thoracostomy (OWT) was performed for post pneumonectomy pleural empyema. The operation, and life with an OWT cavity, were tolerated well. Early closure of an OWT is not advisable because of a high chance of recurrence of the infection and, in lung cancer patients also the risk of tumour relapse within two years after tumour surgery.

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Post pneumonectomy empyema with or without a bronchopleural fistula represents a rare but, without doubt, serious complication of thoracic surgery.

In the majority of patients the infection will resolve after systemic antibiotics, adequate tube drainage and irrigation with or without lavage [1] and/or local instillation of antibiotics. In a small number of patients, however, the empyema persists or relapses despite intensive treatment.

In the past, the only available treatment in these cases was an, often poorly tolerated, strenuous and mutilating thoracoplasty [2]. In 1935 ELOESSER [3] reported the fenestration procedure, the performance of a skin-lined thoracostomy, to manage tuberculous empyema. In 1963 CLAGETT and GERACI [4] introduced an adopted procedure for managing post pneumonectomy empyema. By resecting part of a rib, a window into the infected pleural cavity is created and daily cleansing with a mild antiseptic solution is started. After 6-8 wks the window is closed again, after filling it up with a saline neomycin solution. This open window thoracostomy (OWT) procedure has been widely copied and improved [5].

In this report we describe 13 patients treated by OWT with a follow-up ranging from seven months to over ten years.

Methods

Under general anaesthesia, an incision is made into the thoracotomy scar at the place of the largest fluid retention (usually somewhere midaxillary or more dorsally), and about 10 cm of the underlying rib is resected. Through this window the exact size of the empyema cavity can be outlined and by resecting parts of adjacent ribs an opening is created which allows unobstructed and adequate drainage.

Subsequently the cavity is thoroughly cleaned from debris and necrotic tissue, whereupon the edges of the skin are sutured onto the edges of the parietal pleura. After a check for bronchopleural fistulae and filling of the cavity with moist gauze pads, the patient is extubated.

Twenty four to 48 h later, a start is made with irrigations of the cavity twice daily, initially by syringe and, after complete wound healing, either by putting the patient in a bath or by means of a shower head. After checking for fluid retention the cavity is again filled with sterile gauze pads. To prevent large airshifts during respiration and movement, the opening of the cavity is covered by a large gauze pad.

Patients

Characteristics of the 13 patients (12 male, 1 female) are described in table 1. Eleven patients were operated for lung cancer, and two patients had infections in cavities due to tuberculosis several years previously. At first, normal tube drainage, irrigation with antibiotics, and sometimes systemic antibiotic treatment had been attempted. If this was not successful, OWT was performed. In two patients staphylococci were found, in six the empyema contained Gram-negative rods, one culture was sterile, and for four patients culture results were not available.

Results

The length of time between the first thoracostomy and the subsequent OWT varied greatly; in four patients it was less than three months, in three patients the interval was between 3-12 months and in six patients there was a delay of 2 yrs or more (table 1).

Table 1. – Patient characteristics

Patient No.	Sex M/F	Age yrs	Diagnosis Treatment	T ₁	T ₂	Window closed	T ₃	Cause of death
1	M	68	Sq CLC L pneumonectomy	11 mth	1 yrs 6 mth	yes	3 yrs 6 mth	-
2	M	56	ALC R pneumonectomy	6 mth	>7 yrs	no	>7 yrs 6 mth	-
3	M	43	Sq CLC R pneumonectomy	8 yrs 2 mth	>8 yrs	no	>8 yrs	-
4	M	56	Sq CLC L pneumonectomy	7.5 mth	>10 yrs	no	10 yrs	-
5	M	64	Sq CLC L pneumonectomy + radiotherapy	2 yrs 5 mth	3 mth	no	3 mth	renal insufficiency pneumonia
6	M	58	Sq CLC R pneumonectomy	6 wks	9 mth	no	9 mth	local tumour progression
7	M	73	Sq CLC R pneumonectomy	6 mth	11 mth	no	11 mth	local tumour progression
8	M	56	Sq CLC R pneumonectomy	2 mth	12 mth	yes	1 yrs 8 mth	metastatic tumour progression
9	M	70	Sq CLC L pneumonectomy	2 yrs 6 mth	6 yrs	no	6 yrs	myocardial infarction
10	M	70	Sq CLC R pneumonectomy	2 yrs	6 yrs	no	6 yrs	respiratory failure
11	M	55	tbc R pneumonectomy	2 mth	7 mth	thoracoplasty	7 yrs 6 mth	cardiac failure
12	M	59	Sq CLC R pneumonectomy	6 wks	10 yrs	no	10 yrs	respiratory failure
13	F	40	tbc R pneumonectomy	7 yrs 8 mth		no		lost to follow-up 3 yrs after OWT

T₁: period between thoracostomy to first onset of empyema; T₂: length of time of opened window; T₃: survival after OWT; Sq CLC: squamous cell lung cancer; ALC: adenocarcinoma of lung; tbc: tuberculosis; mth: months; yrs: years; M: male; F: female; R: right; L: left; OWT: open window thoracostomy.

OWT did not give rise to any complication in the postoperative period; the production of pus diminished within days. After the operation the general condition of the patients improved rapidly with disappearance of the systemic symptoms of the empyema. Most patients could leave the hospital within 2–3 weeks.

Table 2. – Results of closure of the OWT from several reports

Patients n	Windows n	closed %	Failure		Reference
			n	%	
29	22	76	5	23	[6]
18	18	100	7	39	[2]
40	13	33	3	23	[8]
31	8	26	6	75	[9]
13	3	23	0	0	present study

In three patients the windows were definitely closed; two by means of mobilising adjacent skin and muscle, and one patient ended up with a limited thoracoplasty (because of a tuberculous manubrium fistula). Closure

was considered for another four patients but was not performed because of persistent infection. The time between OWT and (secondary) closure is noted in table 1.

Of the 13 patients, 4 are still alive (one with a closed window) and are doing well at home. The mean survival after the Clagett procedure was over 5 yrs (range 13 months to 15 yrs). Causes of death are listed in table 1. Four patients who died within 2 yrs after thoracotomy for lung cancer had a tumour-related death (Nos 5–8).

Discussion

In several reports [6–9], as well as in the present series, the OWT is tolerated well, without postoperative complications. Most of the patients in this report could leave the hospital within a few weeks and continued the daily irrigations and nursing of the cavity at home. This was so well tolerated that a prolonged stay in the hospital, as was implemented by GOLDSTRAW [6], makes the whole procedure unnecessarily expensive.

Definite closure of the OWT has been performed in several reports (table 2), however, the percentage of recurrence of the empyema, probably due to small and undetected fistulae or persistent infection, is rather high. In our institution we have been very conservative in closing the OWT, in only three patients has this been successfully performed.

Living with the OWT cavity is well tolerated by most patients and does not lead to a social handicap. Besides the risk of recurrence of the empyema, the moment of closure of the OWT is also disputable in patients operated for lung cancer. The risk of local tumour recurrence or distant metastases is rather high during the first two years after surgery for lung cancer. We therefore suggest that closure within that period is not advisable for these patients.

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- Traitement des empyèmes pleuraux après pneumonectomie par thoracostomie à fenêtre ouverte.* P.E. Postmus, J.M. Kerstjens, W.J. de Boer, J.N. Homan van der Heide, G.H. Koëter.
 RÉSUMÉ: Chez 13 patients, une thoracostomie à fenêtre ouverte a été réalisée en raison d'un empyème pleural consécutif à une pneumonectomie. L'opération a été bien tolérée, et les conditions de vie avec une cavité de thoracostomie ouverte ont été satisfaisantes. Il n'est pas à conseiller de refermer précocément la thoracostomie, en raison du risque élevé de rechute de l'infection, et chez les patients atteints de cancer du poumon en raison du risque de rechute tumorale au cours des deux premières années après la résection de la tumeur.
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