

A SURVEY OF THE LONG-TERM EFFECTS OF TALC AND KAOLIN PLEURODESIS

RESEARCH COMMITTEE OF THE BRITISH THORACIC ASSOCIATION
AND THE MEDICAL RESEARCH COUNCIL PNEUMOCONIOSIS UNIT*

Summary

Of 210 patients who underwent pleurodesis with iodized talc or kaolin 14 to 40 years previously, all but 11 were traced. There was no increased incidence of lung cancer and no case of mesothelioma.

INTRODUCTION

Exposure to high concentrations of talc dust in mining and processing in the USA has been shown to cause pulmonary fibrosis and a four-fold increase in the incidence of malignant tumours of the lung and pleura (Kleinfeld et al. 1967). However, this dust contained other silicates including tremolite and anthophyllite and the incidence of these malignant tumours fell and approached the expected mortality when dust levels were reduced (Kleinfeld et al. 1974). In a controlled study of Italian talc miners and millers exposed to a very pure type of talc Rubino et al. (1976) were able to show a lower than expected incidence of lung cancer, although the mortality rate amongst the miners exceeded the norm because of the high incidence of pneumoconiosis (silicosis) with or without tuberculosis. In Great Britain Henderson et al. (1971) described talc particles in association with carcinoma of the ovary and cervix, confirmed later by analytical electron microscopy (Henderson & Griffiths 1975). Jackson and Bennett (1973) reported a chest wall tumour of adenocarcinomatous type developing within three years of iodized talc pleurodesis for recurrent spontaneous pneumothorax but it is unlikely that the talc played any causative role in the development of this tumour. Animal studies using inhalation and intrapleural injection of an Italian cosmetic talc have failed to demonstrate a carcinogenic effect (Wagner et al. 1977).

Talc, which is mainly a hydrated magnesium silicate, is marketed in different grades, the higher grade being used for cosmetic and pharmaceutical purposes and the others in industry (Hildick-Smith 1976). Cosmetic talc consists of flake-like particles and is largely free of the long thin fibres of asbestos-like minerals (such as tremolite, actinolite and anthophyllite) which are closely related to it in the natural state. These contaminate some industrial talcs, however, and are possibly responsible for the fibrogenic and carcinogenic effects already referred to. In Britain talc has been used by intrapleural poudrage since 1935 to induce pleurodesis, usually for treatment of recurrent spontaneous pneumothorax. A follow-up of such patients should reveal any possible carcinogenic effects of talc and a subcommittee was set up by the British Thoracic Association and Medical Research Council Pneumoconiosis Unit to organize a survey.

* Members of the subcommittee were A. G. Chappell (chairman), A. Johnson (coordinator), J. Charles, J. C. Wagner, R. M. E. Seal, G. Berry and D. Nicholson.

Methods

In order to obtain a large number of index cases 11 thoracic centres were approached but only three were able to participate: Sully, Brompton and Harefield Hospitals. At each centre medical record indexes and surgical registers were reviewed and the notes scrutinized to identify patients who had received pleurodesis with talc or a like mineral such as kaolin (china clay, hydrated aluminium silicate) before January 1961 so that a minimum observation period of 14 years was possible. Tracing the patients proved a difficult and lengthy task. Methods used included direct written approaches to patients and general practitioners, family practitioner committees, the Office of Population Censuses and Surveys (OPCS) and foreign embassies. A large number of patients would have remained untraced without further assistance from two 'field' workers with experience of epidemiological studies who cross-checked information for accuracy and made visits to discover the present state of index cases not traced by letter.

The results were assessed by comparing the number of observed deaths with the number expected by the subject-years method (Case & Lea 1955) multiplying years of risk by death rates. The death rates for England and Wales were taken from tables compiled for studies of this kind (Institute of Cancer Research 1976). These tables give age-specific death rates with age in five-year groups and also calendar year in five-year groups up to 1966-70. The study extends beyond 1970 and the rates for 1966-70 were used for the later years. Deaths from all causes and also from cancer of the lung and pleura have been considered. Excess mortality has been tested by treating the observed number as a Poisson variable with expectation equal to the expected number.

RESULTS

Two hundred and ten cases were collected from the three centres (Table I). The Sully patients, many of whom had chronic lung disease such as chronic bronchitis, emphysema and pneumoconiosis, received intrapleural kaolin as treatment for spontaneous pneumothorax between 1956 and 1960. All the Brompton and Harefield patients received intrapleural talc over half having been treated before 1945. In 22 Brompton and 70 Harefield patients iodized talc was used to produce pleurodesis in patients with bronchiectasis and other non-malignant disorders before lung resections.

Table I. Outcome of the study

<i>Hospital</i>	<i>No. of patients (males)</i>	<i>Contacted, alive and well</i>	<i>Untraced but believed alive</i>	<i>Emigrated and untraced</i>	<i>Dead (lung cancer in parentheses)</i>
Sully	63 (50)	45	—	—	18
Brompton	43 (24)	26	—	3	14 (1)
Harefield	104 (54)	81	2	6	15 (2)
	210 (128)	152	2	9	47 (3)

One hundred and fifty-two patients have been contacted and are well whilst a further two are thought to be alive (OPCS) but have not been traced (Table I). Follow-up data are available on nine emigrants for periods ranging from 14 months to 24 years but attempts to locate them have failed.

There were 47 deaths including three from lung cancer (Table II). Two patients with lung cancer had a tumour on the side opposite to the pleurodesis with intervals of 18 months and 19 years between pleurodesis and death. The third case was a 61-year-old

Table II. Observed and expected mortality

Hospital	Sex	All causes*		Lung cancer†	
		Obs.	Exp.	Obs.	Exp.
Sully	Men	18	9.1	0	0.84
	Women	0	0.8	0	0.03
Brompton	Men	9	3.4	1	0.36
	Women	5	4.0	0	0.06
Harefield	Men	11	7.1	2	0.72
	Women	4	4.6	0	0.13
Total		47	29	3	2.14

* $P < 0.01$.† $P > 0.3$.

man with an oat cell carcinoma who died 32 years after pleurodesis. The site of the carcinoma is not known and at autopsy no tumour was found, but he had received radiotherapy. Although lung cancer deaths were no greater than expected, there was a significant excess of observed over expected mortality for all causes (the two untraced patients were assumed to be alive for the purposes of this calculation).

Table III shows that although follow-up was longer than 15 years in the majority of patients, 36 deaths occurred within 15 years of pleurodesis. The observed deaths in these three quinquennia were significantly more than expected. The probable explanation is the already high incidence of respiratory disease in these patients at the time of pleurodesis for 21 of the deaths were due to respiratory causes.

Table III. Duration of follow-up after pleurodesis

Duration of follow-up (years)	Deaths	Others
0-4	16	4*
5-9	9	2*
10-14	11	5†
15-19	6	70
20-24	2	7
25-29	0	3
30-34	2	45
35-39	1	27
Total	47	163

* Emigrated.

† Includes one emigrant.

DISCUSSION

This study was devised in 1974 because of the suggestion that talc might be carcinogenic. Later reports quoted in the introduction have not supported this view and asbestos-like contaminants were possibly responsible for the early reports of an increased incidence of carcinoma. Strict standards for the manufacture of cosmetic talc have been adopted only in recent years (Editorial, 1977). We have been able to ascertain that talc B.P.

was used at Brompton and Harefield Hospitals even before 1945. Indian Finex has been used extensively for this preparation in the past and is unlikely to have contained any fibrous amphiboles but we have no idea of the composition of other B.P. talcs over the past 40 years (Pooley 1978). It was decided to include patients treated with kaolin because of its chemical similarity to talc and its propensity for producing pulmonary fibrosis after prolonged and heavy exposure, even though no carcinogenic effect has been ascribed to the mineral. All the Sully patients received kaolin rather than talc for their pleurodesis, but even if they are excluded from the analysis of lung cancer deaths (Table II) the ratio of the observed to expected incidence is still not significant ($P=0.14$).

Tracing of patients proved very difficult, particularly those from Brompton and Harefield cases, over half of whom were treated prior to 1945. No attempt was made to examine or X-ray the patients, who were scattered throughout the country. It was felt that this would prolong the study and prove unrewarding as very few asymptomatic cases of mesothelioma would have been expected, for Elmes and Simpson (1976) in their study of 327 cases found a mean interval between onset of symptoms and arrival at hospital of only 3.4 months.

We have therefore found no increased incidence of lung cancer and no case of mesothelioma in the series of 210 patients, 88 of whom have been followed for between 15 and 30 years and 75 for 30–40 years after pleurodesis.

ACKNOWLEDGEMENTS

We are grateful to Miss C. Exall and Mrs B. Norman-Smith for their painstaking work in tracing many 'missing' patients, and Mrs B. Gamble and Mrs I. Speck for secretarial assistance.

REFERENCES

- CASE, R. A. M. & LEA, A. J. (1955) Mustard gas poisoning, chronic bronchitis, and lung cancer. *Br. J. prev. soc. Med.* 9, 62.
- EDITORIAL (1977) Cosmetic talc powder. *Lancet* 1, 1348.
- ELMES, P. C. & SIMPSON, M. J. C. (1976) The clinical aspects of mesothelioma. *Q. J. Med.* 45, 427.
- HENDERSON, W. J. & GRIFFITHS, K. (1975) Identifications of particles in ovarian tissue. In *Gynaecological Malignancy: Clinical and Experimental Studies*, ed. M. G. Brush and R. W. Taylor, pp. 225–40. London: Baillière Tindall.
- HENDERSON, W. J., JOSLIN, C. A., TURNBULL, A. C. & GRIFFITHS, K. J. (1971) Talc and carcinoma of the ovary, and cervix. *J. obstet. gynaec. Br. Commonw.* 78, 266.
- HILDICK-SMITH, G. Y. (1976) The biology of talc. *Br. J. indust. Med.* 33, 217.
- INSTITUTE OF CANCER RESEARCH (1976) *Serial Mortality Tables—Neoplastic Diseases, Vol. 1. Deaths and Death Rates by Sex, Age, Site and Calendar Period*. London.
- JACKSON, J. W. & BENNETT, M. H. (1973) Chest wall tumour following iodised talc pleurodesis. *Thorax* 28, 788.
- KLEINFELD, M., MESSITE, J., KOOYNAR, O. & ZAKI, M. H. (1967) Mortality among talc miners and millers in New York State. *Archs envir. Hlth* 14, 663.
- KLEINFELD, M., MESSITE, J. & ZAKI, M. H. (1974) Mortality experiences among talc workers: a follow-up study. *J. occup. Med.* 16, 345.
- POOLEY, F. D. (1978) Personal communication.
- RUBINO, G. F., SCANSETTI, G., PIOLATTO, G. & ROMANO, C. A. (1976) Mortality study of talc miners and millers. *J. occup. Med.* 18, 186.
- WAGNER, J. C., BERRY, G., COOKE, T. J., HILL, R. J., POOLEY, F. D. & SKIDMORE, J. W. (1977) Animal experiments with talc. In *Inhaled Particles IV*, ed. W. H. Walton, pp. 647–54. Oxford and New York: Pergamon.

Lung function 22–35 years after treatment of idiopathic spontaneous pneumothorax with talc poudrage or simple drainage

PETER LANGE, JANN MORTENSEN, STEFFEN GROTH

From Medical Department P and Chest Clinic and the Department of Clinical Physiology and Nuclear Medicine, Bispebjerg Hospital, Copenhagen, Denmark

ABSTRACT The long term effects on lung function of treatment of idiopathic spontaneous pneumothorax by talc poudrage or simple chest drainage were assessed in 114 patients. Subjects were studied 22–35 years after their first pneumothorax with measurement of static and dynamic lung volumes. Eighty patients had been treated with talc pleurodesis and 34 with simple pleural drainage. At the follow up examination 17 had died from what appear to be unrelated causes and two had emigrated. Of the remainder, 75 participated fully in the study, 14 completed a postal questionnaire, and six failed to respond. The group treated with talc poudrage showed a mild restrictive impairment of lung function with a mean total lung capacity (TLC) of 89% predicted. In subjects treated with simple drainage mean TLC was 96% predicted. One subject treated with talc poudrage had extensive pleural calcification and a substantial reduction in lung function (TLC 58% predicted) with some evidence of lung fibrosis. None of the subjects had developed a mesothelioma. We conclude that, although talc poudrage may cause a mild restrictive impairment of lung function and pleural thickening on the chest radiograph, the long term outlook is good.

Introduction

Idiopathic spontaneous pneumothorax is a relatively rare condition with an incidence of about four or five cases/100 000 people a year.^{1 2} It occurs in previously healthy young adults and is caused by a rupture of a small, often apically located, pulmonary bleb.³ The male to female ratio is about 6:1.

There has been some interest in the effect of pneumothorax on lung function at the time of the pneumothorax^{4 5} or shortly after resolution.^{6–9} There are few reports, however, on the long term effect of spontaneous pneumothorax on pulmonary function^{2 10} and insufficient patients have been studied to assess the impact of the initial treatment.

We studied lung function in subjects who were still alive 22 years or more after a first episode of idiopathic spontaneous pneumothorax. Results were related to the initial treatment, which was either talc poudrage or simple drainage. Particular interest was directed to

possible late effects of talc poudrage, including malignancy.

Methods

PATIENTS

The study population consisted of 114 consecutive patients treated at the chest clinics at Øresundshospitalet and Bispebjerg Hospital, Copenhagen, for their first episode of idiopathic spontaneous pneumothorax during 1951–63. The diagnosis was based on the presentation of a spontaneous pneumothorax in a patient with no prior history of pulmonary disease.

Ninety nine patients were men and 15 women. At the time of the first pneumothorax 99 (87%) of the subjects were under 41 years of age. The initial treatment was talc poudrage followed by drainage via an intercostal tube¹¹ in 60 patients and simple drainage via an intercostal tube in 54 patients. In the latter group 20 patients (37%) had an ipsilateral relapse and this was treated with talc poudrage in all instances. Among the 80 patients treated with talc poudrage for their first episode or for a relapse there was relapse at the side of treatment in two patients (2.5%).

The 80 patients treated with talc poudrage either for

Address for reprint requests: Dr Peter Lange, Medical Department P/ Chest Clinic, Bispebjerg Hospital, Bispebjerg Bakke 23, DK-2400 Copenhagen NV, Denmark.

Accepted 14 April 1988

the first episode of pneumothorax (60 patients) or for the recurrence of pneumothorax (20 patients) have been designated group 1 and the 34 patients treated with simple drainage only group 2.

In autumn 1985 all subjects were traced through the population register. Seventeen had died and two had emigrated. The remaining 95 were invited to undergo an interview and physical examination. Seventy five consented. Of the remainder, 14 filled in a questionnaire but did not wish to attend the examination centre, mainly for reasons of geographical distance; six failed to respond but we were able to ascertain that they had not been in contact with a local chest clinic recently.

PULMONARY INVESTIGATION

Forced expiratory volume in one second (FEV₁) and vital capacity (VC) were measured with a Pulmonet III (Gould) spirometer, the best of at least three recordings being used. Total lung capacity (TLC) and residual volume (RV) were measured by a closed circuit helium equilibrium method. The examinations were carried out according to the recommendations of the European Steel and Coal Union.¹² The results were converted to BTPS and related to predicted values.¹³ Chest radiographs in two projections were obtained. Medical details recorded after the first episode of spontaneous pneumothorax were noted.

ANALYSIS OF RESULTS

Results were analysed by Student's *t* test for unpaired data and the χ^2 test.

Results

Seventeen of the 114 subjects had died. Three had died from lung cancer but none of the remaining deaths was

due to respiratory failure or mesothelioma.

Mean values for TLC, VC and FEV₁ were lower than predicted (table), but the impairment was slight and in most subjects values were within the normal range. Subjects in group 1 (talc poudrage) had significantly lower TLC values than group 2.

Of the 75 patients who had a chest radiograph, 51 showed pleural thickening. There was no significant difference in the incidence of pleural changes on the chest radiograph between group 1 (76%) and group 2 (55%). Subjects with pleural thickening had significantly lower values for TLC (89% predicted) and VC (80% predicted) than those without pleural thickening (TLC 98% predicted and VC 88% predicted). The pleural changes were usually small but two subjects treated with talc poudrage had more extensive pleural thickening with calcification. One of the two subjects, a woman, was the only subject with severe restrictive impairment of lung function (TLC 58% predicted, FEV₁/VC 77%). She had had three pneumothoraces (one on the left side and two on the right) and had been treated with talc pleurodesis on the left side and hypertonic glucose pleurodesis on the right, but both treatments had been complicated by persistent pleural effusions requiring several pleurocenteses. Further investigations, including computed tomography of the thorax and measurement of transfer factor for carbon monoxide (9.6 ml/min/mm Hg: 48% predicted) and pulmonary epithelial permeability to inhaled technetium-99m labelled DTPA (3.9%/min: 450% predicted) suggested that she also had a moderate degree of pulmonary fibrosis.

The mean TLC in subjects with recurrent pneumothorax was significantly lower (88% predicted) than that in subjects with no recurrence (95% predicted).

Fourteen subjects had airflow limitation (FEV₁/

Mean (SD) lung function values

	TLC			VC			FEV ₁		
	Litres	% pred	<i>p</i>	Litres	% pred	<i>p</i>	Litres	% pred	<i>p</i>
Total studied (n = 75)	6.31 (1.05)	92 (15)		3.64 (0.81)	83 (15)		2.58 (0.78)	74 (19)	
Talc poudrage (n = 46)	6.31 (1.20)	89 (15)	} <0.05	3.68 (0.88)	82 (16)	} NS	2.54 (0.84)	72 (21)	} NS
No talc poudrage (n = 29)	6.30 (0.77)	96 (12)		3.57 (0.67)	85 (11.5)		2.63 (0.66)	78 (15)	
Pleural changes (n = 51)	6.14 (0.94)	89 (13)	} <0.01	3.55 (0.80)	80 (15)	} <0.025	2.51 (0.77)	72 (18)	} NS
No pleural changes (n = 24)	6.64 (1.18)	98 (15)		3.81 (0.80)	88 (13)		2.70 (0.80)	78 (20)	

VC \leq 65% and RV/TLV \geq 40%), and in five this was severe (FEV₁ \leq 50% predicted). All but two were lifelong heavy smokers.

Discussion

This study shows that idiopathic spontaneous pneumothorax may be followed by a mild restrictive impairment of lung function. This restrictive pattern was associated with pleural thickening.

In a five to six year follow up of 58 subjects with spontaneous pneumothorax Hallgrímsson found that four of the eight subjects with restrictive impairment of lung function (TLC \leq 80% predicted) had pleural adhesions.² A similar association between pleural thickening and a restrictive impairment of lung function has been suggested in other studies of the short term changes after spontaneous pneumothorax^{7 8} and in studies of pleural adhesions and pleural thickening after artificial pneumothorax.^{14 15} It has been suggested that spontaneous pneumothorax may be an early sign of pulmonary emphysema,^{7 8} but our results do not support this hypothesis.

In our study subjects treated with talc poudrage had slightly more impairment of lung function than those treated with simple drainage. The restrictive changes did not, however, cause symptoms except in one subject. In this subject the impairment of lung function that followed talc poudrage was probably not due to pleural thickening alone, as there was some evidence of lung fibrosis in addition.

Asbestos pollution of the talc has been suggested as a risk factor for the development of mesothelioma.¹⁶ This was not seen in this study despite our observation time of 22–35 years. As the latent period between asbestos exposure and the development of mesothelioma has been longer than 40 years in some studies our work does not entirely exclude the possibility of asbestos pollution of the talc.

When the choice is made between the greater risk of relapse associated with simple drainage and the transitory discomfort and slightly greater restrictive impairment of lung function with talc poudrage, it is comforting to know that, regardless of the choice, the long term prognosis with regard to lung function is good.

This study was supported by grants from the National Union for the Fight against Tuberculosis and Lung Diseases.

References

- 1 Melton LJ, Hepper NGG, Offord KP. Incidence of spontaneous pneumothorax in Olmsted County, Minnesota: 1950 to 1974. *Am Rev Respir Dis* 1979;**120**: 1379–82.
- 2 Hallgrímsson JG. Spontaneous pneumothorax in Iceland with special reference to the idiopathic type: a clinical and epidemiological investigation. *Scand J Thorac Cardiovasc Surg* 1978;**21**(suppl):9–85.
- 3 Kjaergaard H. Spontaneous pneumothorax in the apparently healthy. *Acta Med Scand* 1932;**43**(suppl): 1–159.
- 4 Gilmartin JJ, Wright AJ, Gibson GJ. Effects of pneumothorax or pleural effusion on pulmonary function. *Thorax* 1985;**40**:60–5.
- 5 Anthonisen NR. Regional lung function in spontaneous pneumothorax. *Am Rev Respir Dis* 1977;**115**:873–6.
- 6 Heckscher TH, Andree Larsen O, Lassen NA. A clinical method for determination of regional lung function using intravenous injection of Xe¹³³. *Scand J Respir Dis* 1966;**62**(suppl):31–9.
- 7 De Troyer A, Yernault JC, Rodenstein D, Englert M, De Coster A. Pulmonary function in patients with primary spontaneous pneumothorax. *Bull Eur Physiopathol Respir* 1978;**14**:31–9.
- 8 Williams MH, Kane C. Pulmonary function in patients who have recovered from spontaneous pneumothorax. *Dis Chest* 1965;**47**:153–6.
- 9 Baronofsky ID, Warden HG, Kaufman JL, Whatley J, Hanner JM. Bilateral therapy for unilateral spontaneous pneumothorax. *J Thorac Surg* 1957;**34**:310–9.
- 10 Fleetham JA, Forkert L, Clarke H, Anthonisen NR. Regional lung function in presence of pleural symphysis. *Am Rev Respir Dis* 1980;**122**:33–8.
- 11 Bethune N. Pleural poudrage—a new technique for the deliberate production of pleural adhesion as a preliminary to lobectomy. *J Thorac Surg* 1935;**4**:251–61.
- 12 Quanjer PH, ed. Standardised lung function testing. Report of working party of the European Community for Coal and Steel. *Bull Eur Physiopathol Respir* 1983;**19**(suppl 5):1–96.
- 13 Dirksen A, Groth S. Calculation of reference values for lung function tests. *Bull Eur Physiopathol Respir* 1986;**22**:231–7.
- 14 Patiala J, Karvonen MJ. Studies on pulmonary function after pneumothorax therapy. *Acta Tuberc Scand* 1954;**29**:193–210.
- 15 Autio V. The reduction of respiratory function by parenchymal and pleural lesions. *Acta Tuberc Scand* 1959;**37**:112–25.
- 16 Research Committee of the British Thoracic Association and the Medical Research Council Pneumoconiosis Unit. The survey of the long-term effects of talc and kaolin pleurodesis. *Br J Dis Chest* 1979;**73**:285–8.

THORAX

Lung function 22-35 years after treatment of idiopathic spontaneous pneumothorax with talc poudrage or simple drainage.

P Lange, J Mortensen and S Groth

Thorax 1988 43: 559-561
doi: 10.1136/thx.43.7.559

Updated information and services can be found at:
<http://thorax.bmj.com/content/43/7/559>

Email alerting service

These include:

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
<http://group.bmj.com/group/rights-licensing/permissions>

To order reprints go to:
<http://journals.bmj.com/cgi/reprintform>

To subscribe to BMJ go to:
<http://group.bmj.com/subscribe/>

DX9217.0004

Pneumologie

HEALTH SCIENCES LIBRARY

MAY 19 1989

Unter Mitarbeit von

Jürgen Meier-Sydow,
Frankfurt/M.
Udo Smidt, Moers
Peter v. Wichert, Marburg

Beirat

P. Endres, Sande
H. Fabel, Hannover
R. Felix, Berlin
G. Fruhmann, München
W. Hartung, Bochum
D. Hofmann, Frankfurt/M.
F. Kummer, Wien
H. Magnussen, Großhansdorf
J. A. Nakhosteen, Bochum
P. Satter, Frankfurt/M.
V. Sill, Hamburg
R. Wettengel, Bad Lippspringe

cos 18 Sea Ser

2

43. Jahrgang
Februar 1989
Seite 45-134

UNIVERSITY OF WASHINGTON

MAY 17 '89

LIBRARIES

HEALTH SCIENCES

Verhandlungsbericht

Thorakoskopie-Symposium

Berlin, Lungenklinik Heckeshorn, 18.-19. September 1987

Herausgegeben von:
R. Loddenkemper, Berlin

 **Thieme**

Georg Thieme Verlag Stuttgart · New York

Pneumologie ISSN 0934-8387

*This journal is regularly
listed in Science Citation
Index, Index Medicus
and Excerpta Medica.*

Georg Thieme Verlag, 7000 Stuttgart 10, Postfach 104853
E 6746 E Pneumo 2/89

DX9469.0001

Pneumologie

Organ der Deutschen Gesellschaft für Pneumologie und Tuberkulose, des Deutschen Zentralkomitees zur Bekämpfung der Tuberkulose, des Berufsverbandes der Pneumologen Deutschlands und des Forschungsinstituts Borstel.

Herausgegeben von

Rudolf Ferlinz, Mainz

Unter Mitarbeit von

Jürgen Meier-Sydow,

Frankfurt/M.

Udo Smidt, Moers

Peter v. Wichert, Marburg

Beirat

P. Endres, Sande

H. Fabel, Hannover

R. Felix, Berlin

G. Fruhmann, München

W. Hartung, Bochum

D. Hofmann, Frankfurt/M.

F. Kummer, Wien

H. Magnussen, Großhansdorf

J. A. Nakhosteen, Bochum

P. Satter, Frankfurt/M.

V. Sill, Hamburg

R. Wettengel, Bad Lippspringe

Inhalt

- 45 Loddenkemper, R.**
Thorakoskopie – Symposium 1987. Einführung
- 46 Brandt, H.-J.**
Geschichte und Entwicklung der Thorakoskopie
- 48 Newhouse, M. T.**
Thorakoskopie: Diagnostische und therapeutische Indikationen
- 53 Maaßen, W.**
Thorakoskopie: Chirurgische Technik
- 55 Viskum, K.**
Kontraindikationen und Komplikationen der Thorakoskopie
- 58 Cantó Armengod, A.**
Diagnostische Ergebnisse bei sekundären malignen Pleuraergüssen
- 61 Boutin, C.**
Thorakoskopie beim malignen Mesotheliom
- 66 Szüle, P.**
Diagnostik des tuberkulösen Pleuraergusses
- 69 Faurschou, P.**
Thorakoskopie beim rheumatoiden Pleuraerguß
- 72 Martensson, G.**
Voraussage der diagnostischen Zweckmäßigkeit der Thorakoskopie bei Pleuraerguß
- 76 Kaiser, D.**
Indikation zur Thorakoskopie beim Pleuraempyem
- 80 Frank, W., H. Großer, J. Mai, R. Loddenkemper**
Pleurodese mit Tetracyclin-Hydrochlorid
- 85 Gust, R., H. Fabel**
Fibrinkleber-Pleurodese bei rezidivierenden malignen Pleuraergüssen
- 88 Austgen M.**
Palliative Therapie tumorbedingter Pleuraergüsse mit Radioisotopen
- 92 Wieser, O., C. O. Wieser**
Indikationen zur Thorakoskopie beim sekundären Spontanpneumothorax
- 96 Boutin, C.**
Laseranwendung bei der Thorakoskopie
- 98 Großer, H., J. Mai, R. Loddenkemper**
Pleurodese mit Tetracyclin-Hydrochlorid beim Spontanpneumothorax
- 101 Kaiser, D.**
Fibrinklebung beim Spontanpneumothorax
- 105 Viskum, K., P. Lange, J. Mortensen**
Langzeitfolgen nach Talk-Pleurodese beim Spontanpneumothorax
- 107 Toomes, H., A. Linder**
Thorakoskopische Sympathektomie bei Hyperhidrosis

- 109 **Satter, P., U. Blum**
Thorakoskopie in der Behandlung des Asthma bronchiale
- 112 **Schaberg, T., A. Süttmann-Bayerl, R. Loddenkemper**
Thorakoskopie bei diffusen Lungenkrankheiten
- 116 **Dijkman, J. H.**
Thorakoskopie bei immunsupprimierten Patienten
- 119 **Greschuchna, D.**
Thorakoskopie bei Brustwandprozessen
- 122 **Mai, J., R. Loddenkemper, H.-J. Brandt**
Diagnostische Thorakoskopie bei mediastinalen Raumforderungen
- 126 **Referate**
- 131 **Tagesnachrichten**
- 132 **Mitteilungen**
- 134 **Buchbesprechungen**

Contents

- 45 **Loddenkemper, R.**
Thoracoscopy – Symposium 1987
- 46 **Brandt, H.-J.**
History and Development of Thoracoscopy
- 48 **Newhouse, M. T.**
Thoracoscopy: Diagnostic and Therapeutic Indications
- 53 **Maaßen, W.**
Thoracoscopy: Surgical Technique
- 55 **Viskum, K.**
Contraindications and Complications to Thoracoscopy
- 58 **Cantó Armengod, A.**
Diagnostic Results in Secondary Malignant Pleural Effusions
- 61 **Boutin, C.**
Thoracoscopy in Malignant Mesothelioma
- 66 **Szüle, P.**
Diagnosis of Tuberculous Pleural Effusion
- 69 **Faurschou, P.**
Thoracoscopy in Rheumatoid Pleural Effusion
- 72 **Martensson, G.**
Prediction of the Diagnostic Utility of Thoracoscopy in Pleural Effusion
- 76 **Kaiser, D.**
Indication for Thoracoscopy in Empyema of the Pleura
- 80 **Frank, W., H. Großer, J. Mai, R. Loddenkemper**
Pleurodesis with Tetracycline Hydrochloride
- 85 **Gust, R., H. Fabel**
Fibrin Adhesive Pleurodesis in Relapsing Malignant Pleural Effusions
- 88 **Austgen, M.**
Palliative Therapy of Tumour-Conditioned Pleural Effusions with Radioisotopes
- 92 **Wieser, O., C. O. Wieser**
Indications for Thoracoscopy in Secondary Spontaneous Pneumothorax
- 96 **Boutin, C.**
The Laser in Thoracoscopy
- 98 **Großer, H., J. Mai, R. Loddenkemper**
Pleurodesis with Tetracyclin Hydrochloride in Spontaneous Pneumothorax
- 101 **Kaiser, D.**
The Use of Fibrin Adhesive in Relapsing Spontaneous Pneumothorax

- 105 Viskum, K., P. Lange, J. Mortensen**
Long term Sequelae after Talc Pleurodesis for Spontaneous Pneumothorax
- 107 Toomes, H., A. Linder**
Thorascopic Sympathectomy in Hyperhidrosis
- 109 Satter, P., U. Blum**
Thoracoscopy in the Treatment of Bronchial Asthma
- 112 Schaberg, T., A. Süttmann-Bayerl, R. Loddenkemper**
Thoracoscopy in Diffuse Lung Diseases
- 116 Dijkman, J. H.**
Thoracoscopy in Immunosuppressed Patients
- 119 Greschuchna, D.**
Thoracoscopy in Chest Wall Processes
- 122 Mai, J., R. Loddenkemper, H.-J. Brandt**
Diagnostic Thoracoscopy in Mediastinal Masses
- 126 Abstracts**
- 131 New Items**
- 132 Communications**
- 134 Book Reviews**

Pneumologie

Impressum

Herausgegeben und redigiert von Prof. Dr. Rudolf Ferlinz, Langenbeckstraße 1, 6500 Mainz

Verlag

Georg Thieme Verlag Stuttgart · New York, Rüdigerstr. 14, D-7000 Stuttgart 30, Postfach 104853, D-7000 Stuttgart 10, Telefon (07 11) 8931-0, Telex 7 252 275 gvd, Telegrammadresse: Thiemebuch Stuttgart, FAX (07 11) 8931-298.

Erscheinungsweise

Die Zeitschrift „Pneumologie“ erscheint monatlich. Bezugspreise*: Jährlich DM 222,-, (Vorzugspreis für Mitglieder der erwähnten Gesellschaften DM 189,-, für Ärzte in der Weiterbildung zum Gebietsarzt DM 126,-, zuzüglich Versandkosten Inland DM 10,80, Ausland DM 18,-, Einzelheft DM 24,-, zuzüglich Versandkosten ab Verlagsort. Luftpostgebühren: Europa DM 26,40; USA/Kanada DM 43,80; übrige Länder DM 57,-. Falls gewünscht, bitte bei Bestellung angeben. (Preisänderung vorbehalten.) Die Bezugsdauer verlängert sich jeweils um 1 Jahr, wenn bis zum 1. Dezember keine Abbestellung erfolgt.

* unverbindlich empfohlene Preise.

Manuskripte

Alle Manuskripte sind in dreifacher Ausführung direkt an Herrn Prof. Dr. R. Ferlinz, Abteilung für Pneumologie der Univ.-Klinik Mainz, Langenbeckstraße 1, D-6500 Mainz 1, zu richten. Sie sollen einschließlich Literatur, Abbildungen und Tabellen einen Umfang von 15 Schreibmaschinenseiten nicht überschreiten und müssen eine deutschsprachige Zusammenfassung haben. Die Zusammenfassung in englischer Sprache kann vom Verlag erstellt werden.

Grundsätzlich werden nur solche Arbeiten angenommen, die vorher weder im Inland noch im Ausland veröffentlicht worden sind. Die Manuskripte dürfen auch nicht gleichzeitig anderen Blättern zum Abdruck angeboten werden.

Mit der Annahme des Manuskriptes erwirbt der Verlag für die Dauer der gesetzlichen Schutzfrist (§ 64 UrHG) die ausschließliche Befugnis zur Wahrnehmung der Verwertungsrechte im Sinne der §§ 15 ff. des Urheberrechtsgesetzes, insbesondere auch das Recht der Übersetzung, der Vervielfältigung durch Photokopie oder ähnliche Verfahren und der EDV-mäßigen Verwertung.

Den Mitarbeitern stehen 25 Sonderdrucke ihrer Arbeiten kostenfrei zur Verfügung.

Verantwortlich für den Anzeigenteil

pharmedia, Anzeigen- und Verlagsservice GmbH, Rüdigerstraße 14, Postfach 301120, 7000 Stuttgart 30, Telefon (07 11) 8931-0, Telex 07-23644, FAX (07 11) 8931-298.

Mitteilungsblatt der Süddeutschen Gesellschaft für Pneumologie und Tuberkulose, der Norddeutschen Gesellschaft für Lungen- und Bronchialheilkunde, der Rheinisch-Westfälischen Vereinigung für Lungen- und Bronchialheilkunde

Copyright

Die Zeitschrift und alle in ihr enthaltenen einzelnen Beiträge und Abbildungen sind für die Dauer des Urheberrechts geschützt. Jede Verwertung außerhalb der engen Grenzen des Urheberrechtsgesetzes ist ohne Zustimmung des Verlages unzulässig und strafbar. Das gilt insbesondere für Vervielfältigungen, Übersetzungen, Mikroverfilmungen und die Einspeicherung und Verarbeitung in elektronischen Systemen.

Fotokopien

Fotokopien für den persönlichen oder sonstigen Gebrauch dürfen nur von einzelnen Beiträgen oder Teilen daraus als Einzelkopien hergestellt werden. Die Aufnahme der Zeitschrift in Lesezirkel ist nicht gestattet.

Printed in Germany

Druck: Karl Gramlich GmbH, Karl-Benz-Straße 3, 7401 Pliezhausen. Buchbinderische Verarbeitung: Dollinger GmbH, Industrie- und Verlagsbuchbinderei, Max-Planck-Str. 29, 7430 Metzingen.

Wichtiger Hinweis

Medizin als Wissenschaft ist ständig im Fluß. Forschung und klinische Erfahrung erweitern unsere Kenntnisse, insbesondere was Behandlung und medikamentöse Therapie anbelangt. Soweit in dieser Zeitschrift eine Dosierung oder Applikation erwähnt wird, darf der Leser zwar darauf vertrauen, daß Autoren, Herausgeber und Verlag größte Mühe darauf verwandt haben, daß diese Angabe genau dem *Wissensstand bei Fertigstellung dieser Zeitschrift* entspricht. Dennoch ist jeder Benutzer aufgefordert, die Beipackzettel der verwendeten Präparate zu prüfen, um in eigener Verantwortung festzustellen, ob die dort gegebene Empfehlung für Dosierung oder die Beachtung von Kontraindikationen gegenüber der Angabe in dieser Zeitschrift abweicht. Das gilt insbesondere bei selten verwendeten oder neu auf den Markt gebrachten Präparaten und bei denjenigen, die vom Bundesgesundheitsamt (BGA) in ihrer Anwendbarkeit eingeschränkt worden sind. Benutzer außerhalb der Bundesrepublik Deutschland müssen sich nach den Vorschriften der für sie zuständigen Behörde richten.

Dieser Ausgabe liegt ein Prospekt der Dr. Karl Thomae GmbH, Biberach, bei.

© Georg Thieme Verlag Stuttgart · New York 1989

DX9469.0004

Long term Sequelae after Talc Pleurodesis for Spontaneous Pneumothorax

K. Viskum, P. Lange, J. Mortensen

Medical Department P/The Chest Clinic, Bispebjerg Hospital, Kobenhavn, Danmark

Langzeitfolgen nach Talk-Pleurodese beim Spontanpneumothorax

Nach Talk-Pleurodese, die zwischen 1954 und 1964 wegen Spontanpneumothorax während der Thorakoskopie durchgeführt wurde, wurden 99 Patienten nachuntersucht. Nur 2 Patienten hatten ein Pneumothoraxrezidiv. Die Entwicklung eine Mesothelioms wurde in keinem Fall beobachtet, röntgenologische Pleuraveränderungen waren mäßig und die Lungenfunktion zeigte keine Einschränkung von Bedeutung. Daraus wird gefolgert, daß das Verfahren effektiv ist und auch keine Nebenwirkungen nach längerer Beobachtungsdauer erkennen läßt.

Talc is a hydrated magnesiumsilicate ($Mg_3Si_2O_{10}(OH)_2$), which has found widespread industrial and medical use, i. ex. powder for surgical gloves, wound powder and it has been used to provoke pleurodesis for more than 50 years (1). The main indications for the latter use are recurrent effusion due to malignancy and recurrent pneumothorax.

Due to the harmful action of asbestos, which too is a magnesiumsilicate, there has been some anxiety, that similar effects could be proved by talc (2). So far we have no confirmation of this suspicion (3, 4). One reason could be that talc is not harmful, another that the observation time after pleurodesis was too short (5). We also have to observe, that talc in some cases has been contaminated with asbestos (6).

The short term influence of talc pleurodesis on lung function has previously been investigated (7), showing a transient reduction of lung function lasting approximately 2 months.

In order to examine the possible harmful long term effects of talc pleurodesis we have reinvestigated 99 patients, who due to spontaneous pneumothorax underwent thoracoscopy and talc pleurodesis in the years 1954 to 1964. Four patients had during the observation period experienced pneumothorax first on one side, later on the other and in these the procedure was performed bilaterally. The dosis of talc, which was given with a spray, was between 0,5 g and 4,9 g. On the average 3 g.

Summary

After talc pleurodesis performed between 1954 and 1964 because of spontaneous pneumothorax during thoracoscopy, 99 patients were followed up. Only 2 patients experienced a pneumothorax relapse. Mesothelioma was not observed in any case, X-ray changes in the Pleura were moderate, and lung function did not show any significant restriction. It is concluded therefrom that the method is effective and does also not produce any noticeable side effects on long-term observation.

The age and sex of the patients at the time of pleurodesis is seen in table 1.

In 1985 we reinvestigated the patients. From the central register we were informed, that 4 had left Denmark. They were not further investigated. Death certificates were obtained for 26 patients, who had died, and hospital files of these patients were obtained. Four patients did not want to participate in the investigation and 15 only allowed a telephone interview. The remaining 50 patients came to the hospital for an interview, chest X-ray and spirometry with residual volume determination using the steady state Helium dilution method.

Results

The time from pleurodesis to follow-up, emigration or death is seen in table 2.

Table 1 Age and sex for 99 patients at the time of talc pleurodesis for spontaneous pneumothorax.

Age in years	Women	Men
11-20	2	14
21-30	2	26
31-40	4	26
41-50	0	10
51-60	3	8
61-70		3
71-80		1
	11	88

Table 2 Observation time from talc pleurodesis to follow up or death or emigration.

Observation time	Alive	Dead or emigrated
< 15	0	11
15-20	0	11
21-25	49	8
26-30	19	0
31-33	1	0
	69	30

Among the 26 patients who had died, 7 died within 15 years after the pleurodesis, 11 between 15 and 20 years after and 8 more than 20 years after pleurodesis (range 1-27 years).

In 6 of these patients, death was due to pulmonary disease. One woman died 19 years after the pleurodesis from alveolar cell carcinoma, which developed on the contralateral side, and 2 men of planocellular carcinoma within 2 years after the procedure.

In the remaining 3 cases, death was due to pulmonary insufficiency. In all of them shortness of breath had been present at the time of pleurodesis.

Chest X-ray at follow-up

50 had a chest X-ray taken at follow-up. In 11 patients it was considered normal with a sharp sinus bilaterally and no pleural changes. In 37 (74%) cases light to moderate changes in the pleura were present like obliterated sinus or small pleural patches, sometimes partially calcified. Two patients had pronounced bilateral pleural thickening with calcifications.

Bilateral pleurodesis

Four patients had after pleurodesis contralateral pneumothorax, which was treated in the same fashion with intrapleural talc. One patient had, some years before her treatment by us, a contralateral pneumothorax, which had been treated elsewhere with hypertonic glucose infusion in the pleural space.

Spirometry

The results of spirometry were compared to the expected values. The results are shown in table 3.

In one individual moderate restrictive function impairment (TLC = 58% predicted) was observed. It was the patient treated with talc and glucose for bilateral pneumothorax.

Recurrence

During the follow-up period only two recurrences of pneumothorax were observed on the ipsilateral side of the treatment.

Table 3 Spirometric values of 50 patients at follow-up. The standard error of the mean is seen in parenthesis.

Total lung capacity		Vital capacity		Forced expiratory volume in one second	
1	% predicted	1	% predicted	1	% predicted
6,29	88	3,67	82	2,48	71
SE (1,25)	(16)	(0,88)	(16)	(0,86)	(22)

Subjective symptoms related to pleurodesis

63 patients gave information to this point. A sudden stabbing pain in the thorax on the side of pleurodesis was experienced by 13 patients, most often without known provoking factors. This symptom became less frequent with time and at follow-up it still occurred on occasion in only 5 patients.

Two patients complained of stiffness of the thorax, as if the chest wall would not expand during a deep breath. Both had pleurodesis performed bilaterally and presented pronounced pleural calcifications on chest roentgenographs. None of them were short of breath during daily life.

Conclusion

Talc pleurodesis for spontaneous pneumothorax seems not within the present observation time to carry any risk for the development of mesothelioma. Only moderate changes were observed in the pleura and no serious damage has occurred in ventilatory function, as judged from spirometry. Talc pleurodesis is highly effective in preventing relapses of pneumothorax also on long term basis.

References

- ¹ Bethune, N.: Pleural pouderage: New technique for the Deliberate production of pleural adhesion as preliminary to lobectomy. *J. Thorac. Surg.* 4 (1935) 251-261
- ² Barz, H., B. Beck: Pleuramesotheliom, Asbestose und Silikose nach langjähriger Talkumexposition. *Z. Erkr. Atmungsorgane* 160 (1983) 167-172
- ³ Research Committee of the British Thoracic Association and the Medical Research Council Pneumoconiosis Unit. A long term survey of the long term effects of talc and kaolin pleurodesis. *Br. J. Dis. Chest.* 73 (1979) 285-288
- ⁴ Weissberg, D.: Talc Pleurodesis: a controversial issue. *Poumon-Coeur.* 37 (1981) 291-294
- ⁵ Browne, K.: The epidemiology of mesothelioma. *J. Soc. Occup. Med.* 33 (1983) 190-194
- ⁶ Rohl, A. N., A. M. Langer, I. J. Selikoff et al.: Consumer talcums and powders: Mineral and chemical characterization. *J. Toxicol. Environ. Health* 2 (1976) 255-284
- ⁷ Knowles, J. H., R. Gorlin, C. F. Storey: Effects of pleural talc pouderage on pulmonary function. *J. Thorac. Surg.* 34 (1957) 250-256

Kaj Viskum, M. D.

Bispebjerg Hospital
Bispebjerg Bakke 23
DK-2400 Copenhagen NV
Dänemark