Talc Pleurodesis for the Treatment of Pneumothorax and Pleural Effusion*

Lisa Kennedy, M.D.; and Steven A. Sahn, M.D., F.C.C.P.

Key Words: pleurodesis; poudrage; slurry; talc

Early interest in the development of pleural symp-

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MS

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MgSi_4O_{10}(OH)_2, is rarely found as a pure entity in

nature because of frequent cation substitutions

therein magnesium is replaced by iron, nickel, chromium, or manganese. Furthermore, complex
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table impurities such as tremolite, chrysotile, and
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and the composition varies widely. Large North
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Talc as a Pleurodesis Agent

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thickening with fibroblast proliferation, macrophage infiltration, and foreign body reaction has been consistently reported in all animal models. Schepers and Durkan studied the tissue reaction to intravenously administered and inhaled talc particles; intrapleural administration was not performed. They noted that particle size was more important than particle composition and that tissue reaction was almost negligible when the talc particles were less than 3 μm in size. To our knowledge, the pleural reaction to talc related to the particle size has not been reported.

Iodine is occasionally included when talc pleurodesis is performed. Singer et al. noted no difference in the microscopic or macroscopic reaction to talc with or without iodine in rabbits. To our knowledge, there are no clinical or animal studies that compare the pleurodesis potential of talc to talc plus iodine. The efficacy of pleurodesis in those series in which iodine was used is 95 percent (222 of 234), which is similar to the efficacy reported in all other series (90 percent, 1,052 of 1,168). There is one report of an allergic reaction following the use of iodinated talc.

Preparation of Talc for Pleurodesis

Talc used for pleurodesis is United States Pharmacopeia (USP) asbestos free and must meet minimal criteria with regard to loss on ignition, acid-soluble substances, water-soluble substances, arsenic, lead, and heavy metals. Additional product specifications vary among manufacturers. Talc particle size depends on the nature and quantity of impurities as well as the manufacturing process. Particles are generally less than 50 μm in size; fine grades having particles no greater than 10 μm size may be purchased. Talc is available from most suppliers of scientific products and chemicals. Some of the larger suppliers are as follows: (1) Amend Drug and Chemical Company, Irvington, NY; (2) J.T. Baker, Phillipsburg, NJ; (3) City Chemical Company, New York; (4) Humco Laboratory, Texarkana, Tex; (5) Integra Chemical Company, Renton, Wash; (6) Spectrum Chemical Manufacturing Corporation, Gar- denia, Calif; and (7) American Drug Industries, Chicago. The price of talc ranges from $5 to $25 per pound.

While talc is not packaged sterilely by the manufacturer, limitation on the number of micro-organisms is a part of USP specifications and total bacteria count cannot exceed 500/g. Despite the long-term use of talc for pleurodesis, there is no standard method of sterilization. Dry heat sterilization is the most frequently noted method of sterilization. Three different temperatures and durations of sterilization have been reported: 160°C for 2 h, 125°C for 12 h, and 132°C for 6 h. Ethylene oxide gas sterilization has also been described but details have not been published. Most recently, Bubik recommended gamma irradiation. Protocols often involve either culture of the talc for bacterial pathogens or inclusion of biologic indicators during the sterilization process.

Talc poudrage may be accomplished by several different techniques; the most frequently described method is the use of an atomizer or bulb syringe at the time of thoracotomy or thoracostomy. A talc slurry results when talc is mixed in saline solution and then gently agitated. The volume of slurry is variable; 10 to 250 ml of normal saline solution has been used.

Talc in Pneumothorax

The experimental studies of the 1940s initiated widespread interest in the treatment of spontaneous pneumothorax of tuberculous and nontuberculous origin. Both slurry and poudrage were used, and talc quickly became the accepted pleurodesis agent. Anecdotal reports of greater efficacy with poudrage, as well as the frequent need for the surgical removal of blebs, led to less enthusiasm for talc slurry. In 1956, Gaensler advocated partial pleurectomy as the preferred treatment for spontaneous pneumothorax stating that "pleurodesis has also lost favor because of pain which is often worse than after major thoracotomy, febrile reactions, shock, the necessity for repeated treatments, and prolonged hospitalization which exceeds by far the period of recovery after surgery. Further, use of powder has resulted in talc embolism with hemiplegia both in man and experimental animals." The popularity of talc in the United States waned during the 1960s but remained the primary pleurodesis agent in Europe. The 1980s marked the return of talc poudrage for the treatment of pneumothorax.

Recent clinical applications have included the treatment of pneumothorax secondary to Pneumocystis carinii pneumonia, metastatic osteosarcoma, pleural endometriosis, lymphangioleiomyomatosis, and cystic fibrosis.

Table 1 summarizes the English literature publications reporting the use of talc in the treatment of pneumothorax. While talc slurry, has been used with success in the treatment of pneumothorax, poudrage at the time of thoracotomy, thoracostomy, and pleuroscopy is by far the most common method of administration. Various doses of talc have been used with 2 to 10 g being most common. Criteria for success varies. The effect of dose on success cannot be determined from the published data. Steele, whose success rate was only 57 percent (17 of 30), defined success as the inability to induce pneumothorax following pleurodesis. Most other authors, who use recurrence of pneumothorax as the marker of a failed procedure, report much higher success rates. The
Table 1—Talc Pleurodesis in the Treatment of Pneumothorax

<table>
<thead>
<tr>
<th>Source, yr</th>
<th>Method</th>
<th>Dose, g</th>
<th>Pneumothorax Classification</th>
<th>Success/Total (%)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steele,11 1947</td>
<td>Slurry</td>
<td>2</td>
<td>PSP, SSP</td>
<td>5/16 (31)</td>
<td>Secondary to tuberculosis; fever, pain reported</td>
</tr>
<tr>
<td>Steele,11 1947</td>
<td>Poudrage</td>
<td>3-10</td>
<td>PSP, SSP</td>
<td>12/14 (86)</td>
<td>Secondary to tuberculosis</td>
</tr>
<tr>
<td>Meade and Blades,32 1949</td>
<td>Dusting</td>
<td>N/A</td>
<td>PSP, SSP</td>
<td>6/6 (100)</td>
<td>Talc with sulfanilamide used</td>
</tr>
<tr>
<td>Shiffs et al,73 1954</td>
<td>Poudrage</td>
<td>N/A</td>
<td>PSP, SSP</td>
<td>33/33 (100)</td>
<td>...</td>
</tr>
<tr>
<td>Marrangosi et al,74 1955</td>
<td>Poudrage</td>
<td>N/A</td>
<td>PSP</td>
<td>25/25 (100)</td>
<td>Iodine used</td>
</tr>
<tr>
<td>Smith and Rothwell,21 1962</td>
<td>Poudrage</td>
<td>2-5</td>
<td>PSP, SSP</td>
<td>58/61 (95)</td>
<td>...</td>
</tr>
<tr>
<td>Jackson and Bennett,72 1969</td>
<td>Poudrage</td>
<td>10</td>
<td>PSP</td>
<td>1/1 (100)</td>
<td>Case report chest wall tumor following pleurodesis; iodine used</td>
</tr>
<tr>
<td>Crosby,36 1973</td>
<td>Poudrage</td>
<td>N/A</td>
<td>SSP</td>
<td>1/1 (100)</td>
<td>Secondary to thoracic endometriosis</td>
</tr>
<tr>
<td>Nandi,42 1980</td>
<td>Poudrage</td>
<td>“Large”</td>
<td>SSP</td>
<td>22/22 (100)</td>
<td>Secondary to systemic lupus erythematosus, chronic obstructive pulmonary disease, asthma and tuberculosis; 2 respiratory failure deaths</td>
</tr>
<tr>
<td>Dieter and Leisen,37 1981</td>
<td>Poudrage</td>
<td>N/A</td>
<td>SSP</td>
<td>1/1 (100)</td>
<td>Secondary to thoracic endometriosis</td>
</tr>
<tr>
<td>Tribble et al,50 1986</td>
<td>Poudrage</td>
<td>2</td>
<td>SSP</td>
<td>5/5 (100)</td>
<td>Secondary to cystic fibrosis</td>
</tr>
<tr>
<td>Bourke et al,36 1987</td>
<td>Poudrage</td>
<td>N/A</td>
<td>SSP</td>
<td>2/2 (100)</td>
<td>Secondary to metastatic osteosarcoma</td>
</tr>
<tr>
<td>Verschoof et al,75 1988</td>
<td>Poudrage</td>
<td>3</td>
<td>PSP, SSP</td>
<td>37/38 (97)</td>
<td>Iodine used</td>
</tr>
<tr>
<td>Almind et al,41 1989</td>
<td>Slurry</td>
<td>5</td>
<td>PSP, SSP</td>
<td>27/29 (93)</td>
<td>Fever, pain reported</td>
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<tr>
<td>Spector and Stern,40 1989</td>
<td>Slurry</td>
<td>10</td>
<td>SSP</td>
<td>5/5 (100)</td>
<td>Secondary to cystic fibrosis</td>
</tr>
<tr>
<td>Pouwels and Wouters,36 1989</td>
<td>Poudrage</td>
<td>3</td>
<td>SP</td>
<td>29/30 (97)</td>
<td>Fever, pain, and pneumonia reported</td>
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<tr>
<td>Daniel et al,33 1990†</td>
<td>Poudrage</td>
<td>2-10.5</td>
<td>PSP, SSP, IP</td>
<td>19/20 (95)</td>
<td>Secondary to cystic fibrosis, chronic obstructive pulmonary disease, and postoperative bronchopulmonary fistula</td>
</tr>
<tr>
<td>Tunon-de-Lara et al,34 1992</td>
<td>N/A</td>
<td>N/A</td>
<td>SSP</td>
<td>1/1 (100)</td>
<td>Secondary to Pneumocystis carinii pneumonia</td>
</tr>
<tr>
<td>Ohri et al,47 1992</td>
<td>Poudrage</td>
<td>2-5</td>
<td>SSP</td>
<td>15/15 (100)</td>
<td>Secondary to tuberculosis and chronic obstructive pulmonary disease</td>
</tr>
<tr>
<td>Warren et al,38 1993</td>
<td>Poudrage</td>
<td>N/A</td>
<td>SSP</td>
<td>2/2 (100)</td>
<td>Secondary to lymphangioleiomyomatosis</td>
</tr>
<tr>
<td>Van de Brekel et al,76 1993</td>
<td>Poudrage</td>
<td>N/A</td>
<td>SP</td>
<td>313/356 (88)</td>
<td>...</td>
</tr>
<tr>
<td>Kennedy et al,39 1994</td>
<td>Slurry</td>
<td>10</td>
<td>IP</td>
<td>3/3 (100)</td>
<td>Secondary to postoperative bronchopleural fistulas</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>617/681 (91)</td>
<td></td>
</tr>
</tbody>
</table>

*N/A=not available; PSP=primary spontaneous pneumothorax; SSP=secondary spontaneous pneumothorax; SP=spontaneous pneumothorax, unspecified etiology; IP=iatrogenic pneumothorax.
†Includes five patients previously described in article by Tribble et al.59 Results were not duplicated in total.

Overall success rate is 91 percent (620 of 684).

**Talc in Pleural Effusion**

In the first report of talc in the treatment of pleural effusion in 1958, Chambers,25 noted clinical success in 17 of 20 patients who received talc slurry for treatment of malignant pleural effusions. The literature that followed this initial report, until recently, dealt almost exclusively with the application of dry talc at the time of thoracotomy (dusting), thoracoscopy (insufflation), or through a series of chest tubes (Venturi propulsion).42 Recent reports,28 note the resurgence of interest in the use of talc slurry, which may be especially applicable to those patients in whom thoracoscopy poses a risk.

Talc has been used to produce pleural symphysis in patients with all types of effusions. While malignant effusions are most commonly treated, there are numerous reports of its use in the treatment of effusions secondary to radiation, chylothorax, yellow nail syndrome, systemic lupus erythematosus, empyema, Waldenstrom’s macroglobulinemia, Dressler’s syndrome, constrictive pericarditis, and congestive heart failure.9

The efficacy of talc in the control of malignant pleural effusions has been compared with several
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<th>Comments</th>
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<tr>
<td>Chambers, 1958</td>
<td>Slurry</td>
<td>7-14</td>
<td>19/22 (86)</td>
<td>1 bronchopleural fistula</td>
</tr>
<tr>
<td>Haupt et al., 1960 (\dagger)</td>
<td>Poudrage</td>
<td>N/A</td>
<td>19/19 (100)</td>
<td>See Prorok citation below (\dagger)</td>
</tr>
<tr>
<td>Camishon et al., 1962 (\dagger)</td>
<td>“Cream”</td>
<td>N/A</td>
<td>31/31 (100)</td>
<td>See Prorok citation below (\dagger)</td>
</tr>
<tr>
<td>Starkey, 1964</td>
<td>“Rubbed”</td>
<td>2-4</td>
<td>6/6 (100)</td>
<td>All chylothoraces; hypotension and cyanosis noted; iodine used</td>
</tr>
<tr>
<td>Ginsell, 1965</td>
<td>Poudrage</td>
<td>5</td>
<td>4/4 (100)</td>
<td></td>
</tr>
<tr>
<td>Pearson and MacGregor, 1966</td>
<td>Poudrage</td>
<td>N/A</td>
<td>15/17 (88)</td>
<td>1 operative death</td>
</tr>
<tr>
<td>Adler and Rappole, 1967</td>
<td>Poudrage</td>
<td>N/A</td>
<td>4/4 (100)</td>
<td>Pain and fever reported</td>
</tr>
<tr>
<td>Prorok and Nealon, 1968</td>
<td>N/A</td>
<td>40/60 (67)</td>
<td>3 perioperative deaths, 1 local infection, 1 bronchopleural fistula reported</td>
<td></td>
</tr>
<tr>
<td>Jones, 1969</td>
<td>Poudrage</td>
<td>5</td>
<td>20/22 (91)</td>
<td>Iodine used</td>
</tr>
<tr>
<td>Bloomberg, 1970</td>
<td>Slurry</td>
<td>1</td>
<td>12/12 (100)</td>
<td></td>
</tr>
<tr>
<td>Shedbaker et al., 1971</td>
<td>NA</td>
<td>19/25 (76)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adler and Sayek, 1976</td>
<td>“Dusting”</td>
<td>N/A</td>
<td>4/4 (100)</td>
<td>Transient hypotension reported</td>
</tr>
<tr>
<td>Adler and Sayek, 1976</td>
<td>Slurry</td>
<td>10</td>
<td>41/44 (93)</td>
<td>Two chylothoraces</td>
</tr>
<tr>
<td>Adler and Levinson, 1978</td>
<td>Slurry and poudrage</td>
<td>N/A</td>
<td>2/2 (100)</td>
<td></td>
</tr>
<tr>
<td>Harley, 1979</td>
<td>Poudrage</td>
<td>5-10</td>
<td>39/44 (89)</td>
<td>Iodine used</td>
</tr>
<tr>
<td>Weissberg et al., 1980 (\dagger)</td>
<td>Poudrage</td>
<td>2</td>
<td>31/35 (89)</td>
<td></td>
</tr>
<tr>
<td>Weissberg and Kaufman, 1980</td>
<td>Poudrage</td>
<td>2</td>
<td>35/39 (90)</td>
<td></td>
</tr>
<tr>
<td>Todd et al., 1980</td>
<td>Poudrage</td>
<td>NA</td>
<td>148/163 (90)</td>
<td>Empyema, respiratory failure and/or pneumonia, pulmonary embolus, myocardial infarction, and death reported in context of thoracotomy and poudrage</td>
</tr>
<tr>
<td>Fentiman et al., 1983</td>
<td>Poudrage</td>
<td>N/A</td>
<td>18/20 (90)</td>
<td>Subcutaneous emphysema, postoperative seizure, peroneal nerve palsy reported</td>
</tr>
<tr>
<td>Sorensen and Svendsen, 1984</td>
<td>Slurry</td>
<td>10</td>
<td>9/9 (100)</td>
<td>Empyema and staphylococcus bacteremia noted</td>
</tr>
<tr>
<td>Kaine, 1985</td>
<td>NA</td>
<td>1/1 (100)</td>
<td>Effusion secondary to systemic lupus erythematosus</td>
<td></td>
</tr>
<tr>
<td>Weissberg and Kaufman, 1986</td>
<td>Poudrage</td>
<td>N/A</td>
<td>5/5 (100)</td>
<td>Poudrage performed for the treatment of empyemas</td>
</tr>
<tr>
<td>Fentiman et al., 1986</td>
<td>Poudrage</td>
<td>N/A</td>
<td>11/12 (92)</td>
<td>Local infections, subcutaneous emphysema, and astylocic arrests reported</td>
</tr>
<tr>
<td>Hamed et al., 1989</td>
<td>Poudrage</td>
<td>5</td>
<td>10/10 (100)</td>
<td>Effusions secondary to Waldenstrms macroglobulinaemia, yellow nail syndrome, chylothorax, radiation, and malignancy</td>
</tr>
<tr>
<td>Daniel et al., 1990</td>
<td>Poudrage</td>
<td>2-10.5</td>
<td>18/20 (90)</td>
<td>Mesothelioma grew out of chest tube site; fever, breathlessness, and pain noted</td>
</tr>
<tr>
<td>Aelony et al., 1991</td>
<td>Poudrage</td>
<td>2.5</td>
<td>34/39 (87)</td>
<td>Effusions secondary to malignancy, yellow nail syndrome, empyema, chylothorax, Dressler’s syndrome, and radiation; 5 deaths reported</td>
</tr>
<tr>
<td>Ohri et al., 1992</td>
<td>Poudrage</td>
<td>2-5</td>
<td>35/39 (90)</td>
<td></td>
</tr>
<tr>
<td>Webb et al., 1992</td>
<td>Slurry</td>
<td>5</td>
<td>34/34 (100)</td>
<td>Effusions secondary to congestive heart failure, malignancy, and AIDS with Pneumocystis carinii pneumonia, Kaposi’s sarcoma, and tuberculosis; iodine used</td>
</tr>
<tr>
<td>Aelony, 1992</td>
<td>Poudrage</td>
<td>2.5</td>
<td>1/1 (100)</td>
<td>Secondary to radiation</td>
</tr>
<tr>
<td>Hartman et al., 1993</td>
<td>Poudrage</td>
<td>3-6</td>
<td>20/21 (95)</td>
<td>Fever, subcutaneous emphysema and chest pain reported</td>
</tr>
<tr>
<td>Kennedy et al., 1994</td>
<td>Slurry</td>
<td>10</td>
<td>35/44 (80)</td>
<td>Effusion secondary to malignancy and constrictive pericarditis; fever, pain, respiratory failure, empyema, arrhythmia, and hypotension reported</td>
</tr>
</tbody>
</table>

*Some patients treated with talc were not evaluated for success.

†Patients in these two studies also reported by Prorok et al \(\dagger\) and were not included twice in the total.

‡Patients in this study reported again by Weissberg and Kaufman \(\dagger\) were not included twice in the total.
different agents, including mustine,\textsuperscript{50} bleomycin,\textsuperscript{26,51,52} tetracycline,\textsuperscript{26,53} quinacrine,\textsuperscript{40} and tube thoracostomy alone.\textsuperscript{54} In all comparisons, talc was found to be superior.

Reports from the English literature that describe the use of talc for the treatment of pleural effusion are summarized in Table 2. Success was defined differently, primarily on the basis of clinical criteria or radiographic findings. In several studies, the complete and persistent absence of pleural fluid was the determinant of successful pleurodesis, while in others the lack of need for further pleural drainage was the sole criterion. Follow-up times were variable; some patients were followed up long term while others were evaluated for success only at 1 month after pleurodesis. Doses from 1 to 14 g have been used. It is problematic to determine the effect of dose on success since no head-to-head comparisons of similar patient populations have been made. Similar rates of success are noted with \( \leq 5 \text{ g} \) (221 of 241, 91 percent) or \( > 5 \text{ g} \) (85 of 97, 88 percent). Using success criteria reported by each author, an overall success rate of 91 percent (657 of 721) was noted. When analyzed by the method of administration, a success rate of 91 percent (151 of 166) was observed after talc slurry and 91 percent (418 of 461) after poudrage.

**SAFETY AND LONG-TERM SURVIVAL**

Several safety aspects should be considered with intrapleural talc: (1) short-term, procedure-related issues such as pain, fever, infection, systemic embolization, hemodynamic compromise, and respiratory failure; and (2) long-term effects on pulmonary function, survival, and risk of malignancy.

Most pleurodesis agents are associated with pain at the time of instillation into the pleural space. In a review of pleurodesis agents by Walker-Renard and colleagues,\textsuperscript{55} pain was associated with doxycycline, minocycline, tetracycline, bleomycin, cisplatin, cytarabine, doxorubicin, Corynebacterium parvum, mitomycin C, and talc. The degree of pain associated with talc has been variously reported from nonexistent to severe. Walker-Renard and colleagues\textsuperscript{55} reported pain with talc in 9 of 131 (7 percent) patients. To our knowledge, there are no controlled studies that compare talc-induced pain with that caused by other agents.

Fever following pleurodesis is common and has been noted following the administration of most agents.\textsuperscript{55} Fever following talc poudrage\textsuperscript{26,29,55,56} and slurry\textsuperscript{28,41} is common, occurring from 16 to 69 percent of the time. Fever characteristically occurs 4 to 12 h following talc instillation and may last for 72 h.

Empyema and local site infections are recognized, although infrequent, complications of thoracentesis and tube thoracostomy.\textsuperscript{57} Empyema has been reported with talc slurry from 0 to 11 percent of procedures,\textsuperscript{28,41,54,56} while poudrage is associated with a 0 to 3 percent incidence.\textsuperscript{8,20,58} Local site infection is uncommon.\textsuperscript{8,53}

Cardiovascular complications, such as arrhythmias,\textsuperscript{28,47} cardiac arrest,\textsuperscript{53} chest pain,\textsuperscript{26} myocardial infarction,\textsuperscript{55} and hypotension,\textsuperscript{7,28,46} have been noted. In many instances, it is difficult to ascertain whether the complications are a result of the surgical procedure or related to talc *per se*.

Both inhalation\textsuperscript{50,60} and injection\textsuperscript{60-62} of talc are associated with the development of pulmonary disease. Respiratory insufficiency has been reported with both talc poudrage and talc slurry. Rinaldo and colleagues\textsuperscript{55} reported the development of adult respiratory distress syndrome in three patients who received a 10-g talc slurry via a chest tube; two patients recovered. The mechanism of respiratory failure is unclear; however, the authors speculated that a systemic inflammatory response or talc impurity may have been responsible. Bouchama and associates\textsuperscript{54} reported a case of acute pneumonitis that followed closed pleural biopsy and 2-g talc slurry pleurodesis; they postulated that respiratory failure occurred from talc emboli to the lungs. Todd and colleagues\textsuperscript{58} reported respiratory failure/pneumonia in seven patients and Nandi\textsuperscript{62} reported two deaths secondary to respiratory failure at 3 days and 6 weeks, all in patients who had talc poudrage. In a recent report by Kennedy and colleagues\textsuperscript{28} three cases of respiratory failure were attributed to talc slurry pleurodesis. One patient who underwent bilateral, simultaneous talc pleurodesis procedures required mechanical ventilation while two other patients were treated with oxygen and corticosteroids alone. It is doubtful that the method of administration plays a major role in the development of respiratory failure, although the dose of talc may be important.

Death has been reported in several series in which patients underwent talc pleurodesis.\textsuperscript{27,40,42,58,63,65} The cause of death in each of these series was not definitively determined.

Lange et al\textsuperscript{66} noted lung function 22 to 35 years after treatment for pneumothorax with tube thoracostomy and talc poudrage. Those who received talc had a lower total lung capacity than those who received tube drainage alone, 89 vs 96 percent of predicted, respectively. There was no difference between the VC or FEV\textsubscript{1} when comparing the two groups. Short-term follow-up after talc poudrage\textsuperscript{57,68} revealed no difference in lung function when compared with other patients who have undergone thoracotomy. The use of talc in the treatment of patients with cystic fibrosis prompted a study that showed minimal impairment in pulmonary compliance in growing pigs who underwent poudrage.\textsuperscript{69}
Survival data on most patients who receive talc pleurodesis for the treatment of pleural effusion are limited because of the nature of their disease. Mortality has been primarily related to the progression of the underlying disease or in operative procedures involving debilitated patients. Case reports describing the use of talc in nonmalignant effusions support long-term survival without significant sequelae. Long-term follow-up of 240 patients who received talc or kaolin for the treatment of spontaneous pneumothorax revealed a higher death rate when compared with a control population. However, the higher death rate was attributed to a selection bias for patients with underlying pulmonary disease and was not attributed to the use of talc. The only other long-term follow-up available did not address mortality.

An association between talc and cancer has been described in those who mine and process talc; this association is attributed to asbestos, which is commonly found in association with talc. While there is a single report of a patient who developed an adenocarcinoma of the pleura 2 years following iodized talc insufflation for spontaneous pneumothorax, talc was not thought to be causative. Lange and colleagues noted the absence of mesothelioma 20 to 35 years after talc poudrage. Chappell and associates found no increase in lung cancer in another group of patients who were followed up long term. Although no animal studies have been conducted with regard to the carcinogenic potential of intrapleural asbestos-free talc, to our knowledge, there is currently no evidence to suggest that an increase risk of cancer exists in those who undergo talc pleurodesis.

Conclusions

Talc is a highly effective pleurodesis agent when administered either via poudrage or slurry in patients with pleural effusion or pneumothorax. Success rates are similar for the two primary modes of administration: 87 percent (189 of 217) for talc slurry and 93 percent (988 of 1,062) for talc poudrage. The overall success rate is 91 percent in the treatment of pneumothorax (570 of 621) and in pleural effusion (659 of 723). The short-term adverse effects include fever, pain, infection (local and empyema), and respiratory failure, the latter probably being dose related. Long-term safety does not appear to be an issue if the asbestos-free product is used. Since the success rate does not appear to be dose related and there is some evidence to suggest that adverse effects may be associated with larger doses, we recommend pleurodesis, via poudrage or slurry, with a 5-g dose of talc.

References

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