

# Efficacy and Safety of Cosmetic Talc in Pleurodesis for Malignant Pleural Effusion

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## ABSTRACT

**Background:** Malignant pleural effusion was a common complication of advanced malignancy and was associated with significant respiratory symptoms and impaired quality of life. Pleurodesis was used to prevent recurrent pleural fluid accumulation, and talc was considered an effective pleurodesis agent. However, concerns regarding the safety and complications associated with talc remained clinically relevant. Cosmetic talc provided a potentially accessible and economical alternative for pleurodesis.

**Objectives:** To evaluate the efficacy and safety of cosmetic talc in pleurodesis for malignant pleural effusion.

**Study Design & Setting:** Cross-sectional study conducted in the pulmonology ward of Shaikh Zayed Hospital, Post Graduate Medical Institute, Lahore from 8 April 2026 to 8 July 2026.

**Methodology:** A total of 75 patients aged 45–70 years with malignant pleural effusion were enrolled through non-probability consecutive sampling. Patients with a chest tube in situ and at least 75% lung expansion were included. Four grams of autoclaved cosmetic talc was administered as a slurry through tube thoracostomy. Patients were assessed for adverse effects during hospital stay and for pleural effusion recurrence over six weeks. Efficacy was assessed by successful pleurodesis and absence of recurrence on follow-up chest radiograph. Data were analyzed using IBM-SPSS version 26.0.

**Results:** Successful pleurodesis was achieved in 68 (90.7%) patients, while recurrence occurred in 7 (9.3%) patients. Fever was observed in 21 (28.0%) patients and pain in 18 (24.0%). Surgical emphysema occurred in 6 (8.0%), pleural infection in 3 (4.0%), ARDS in 1 (1.3%), and death in 1 (1.3%). Successful pleurodesis was achieved in 94.8% of patients with complete lung expansion compared with 76.5% with incomplete expansion ( $p=0.038$ ).

**Conclusion:** Cosmetic talc demonstrated a high rate of successful pleurodesis with a low frequency of serious complications in patients with malignant pleural effusion.

**Keywords:** Cosmetic talc, Efficacy, Malignant pleural effusion, Pleurodesis, Safety

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## INTRODUCTION

Malignant pleural effusion (MPE) is defined as the accumulation of a significant amount of exudate in the pleural space, accompanied by the presence of malignant cells or histopathological evidence.<sup>1</sup> Primary pleural malignancy is seen in 10% of malignant pleural disease while more than 90% of malignant pleural disease arises from metastatic spread. The term “pleurodesis” comes from the Greek word pleura (pleura) and desmos (bond). Pleurodesis is a procedure aiming at the adhesion of the visceral and parietal pleura that prevents the reaccumulation of MPE and subsequently improves the

symptoms. In the last 50 years, the palliative treatment of MPE has comprised the intrapleural administration of various substances to seal the pleural space and prevent subsequent reaccumulation of fluid.<sup>2</sup>

Pleurodesis can be performed by chemical sclerosants or by physical abrasion of pleural surface during thoracoscopy or thoracotomy.<sup>3</sup> The agents used have included talc, radioisotopes, antineoplastics (bleomycin), tetracycline derivatives (doxycycline), erythromycin, sodium hydroxide and silver nitrate. This treatment is considered effective, safe and cheap for these patients with advanced pleural disease.<sup>4</sup> A medical powder containing sterile talc, purified from contaminants and asbestos-free,

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became widely available on the market at a very high cost<sup>5</sup>. Talc is a commonly used substance in pleurodesis with high success rate in preventing recurrence of pleural fluid (85 to 98%).<sup>6</sup> The two main characteristics of the talc are its sterility and it being asbestos free, as exposure to asbestos leads to the risk of malignant mesothelioma.<sup>7</sup> Several systemic reviews and meta-analysis have demonstrated the efficacy of talc pleurodesis in managing MPE. A meta-analysis of 24 studies reported that talc pleurodesis was associated with significantly higher pleurodesis success rate compared with controlled group therapies and even superior outcome than other chemical sclerosants. These results support the efficacy of talc as a sclerosing agent in MPE management. Available evidence indicates that talc pleurodesis has an acceptable safety profile. Although individual studies have reported side effects/complications like fever pain and infection, no large safety signal was detected that offsets the clinical benefits when compared with control therapies. Pain and fever were identified as the most common complications following thoracoscopic talc insufflation, with incidence rates of 20% and 14% respectively and the incidence of empyema and ARDS was low (1% and 0% respectively).<sup>9</sup> Despite this strong evidence supporting the efficacy and relative safety of talc pleurodesis in MPE from meta-analysis and international studies, there remains a paucity of locally generated data, especially evaluating cosmetic-grade talc, its safety outcomes, and long term pleurodesis success in our population. The recommended talc for MPE is not readily available in our part of the world. We hypothesize that if we use the cosmetic talc sterilized through the autoclave method as a palliative measure to manage MPE, even if this sterilized cosmetic talc contains asbestos, the risk of developing malignant mesothelioma would be minimal. This is due to the long latent period (10-70 years) of malignant mesothelioma, and considering that patients with malignant pleural disease have a median survival rate of just 6 months. Therefore, the aim of this study is to evaluate the efficacy and safety of cosmetic talc in pleurodesis that is made sterile and cost effective as well.

This study aims to evaluate the efficacy and safety of cosmetic talc in achieving pleurodesis for MPE at low cost. However, Pakistan, and particularly in our setup, there isn't much information available on this topic. The body of knowledge will grow as a result of this study. The objective was to assess the efficacy and frequency of side effects of cosmetic talc in pleurodesis for MPE.

## METHODS

After permission had been obtained from the institutional review board, patients meeting the inclusion criteria were enrolled from the indoor ward of the pulmonology department, Shaikh Zayed Hospital, Lahore from 8 April 2026 to 8 July 2026. The study was designed as a cross-sectional study. Patients admitted to the pulmonology ward with malignant pleural effusion (MPE) at Shaikh Zayed Hospital, Post Graduate Medical Institute, Lahore, were included in the study. The sample size was calculated

using the online sample size calculator for proportion available at OpenEpi version 3.01, after inserting the expected recurrence rate of 5.1% following talc pleurodesis. At a 5% margin of error and 95% confidence interval, a minimum sample size of 75 patients was required for the study. Non-probability consecutive sampling was used. Patients of either gender, aged 45 to 70 years, who had malignant pleural effusion and whose chest tube was in situ with the lung expanded by 75% or more to the chest wall were included. Patients who did not provide consent, those with more than 25% trapped lung, and those with other comorbid conditions contributing to the volume of pleural effusion, including heart failure, renal failure, chronic liver disease, and pleural infection, were excluded.

Demographic information, including name, age, and sex, was recorded. The patients' medical histories were reviewed, and investigations and interventions performed for malignant pleural effusion were documented. Potential complications and outcomes following pleurodesis were also recorded. Cosmetic talc was sterilized from impurities by autoclaving. Patients underwent pleurodesis with 4 g of cosmetic talc slurry through tube thoracostomy, and the chest tube was clamped for three hours. The chest tube was subsequently unclamped to allow drainage of fluid, followed by a chest radiograph. Once the drainage volume had decreased to 150 mL or less per day, the chest tube was removed after 48 hours. The success rate, time to recurrence of malignant pleural effusion, and safety of the agent were assessed. All data were collected using the predesigned proforma.

Malignant pleural effusion (MPE) was defined as the accumulation of a significant amount of exudative fluid in the pleural space, accompanied by the presence of malignant cells and/or histopathological evidence of malignancy on pleural tissue biopsy. Cosmetic talc was defined as commercially available talcum powder (Tibet®), of which 4 g was taken, weighed using a weighing scale available in the pathology department, packed in sterile polythene bags, and sent for autoclaving at 121°C for 15 minutes. Talc pleurodesis was defined as the administration of a slurry containing 4 g of talc, 10 mL of 2% lignocaine, and 40 mL of normal saline into the pleural cavity to induce inflammation, adhesion, and obliteration of the pleural space and thereby achieve pleurodesis. The efficacy of cosmetic talc was evaluated by assessing the absence of recurrence of pleural effusion six weeks after pleurodesis on chest radiograph. Side effects of cosmetic talc were assessed by observing adverse events, including fever, pain, pleural infection (empyema), and acute respiratory distress syndrome (ARDS), within 24 hours of talc instillation in indoor patients. Fever was recorded as a body temperature >99°F, while pain was defined as pleuritic chest pain on the side of talc pleurodesis. Pleural infection (empyema) and acute respiratory distress syndrome were evaluated by repeat chest radiography.

The data were stored and analyzed using IBM-SPSS version 26.0. Counts and percentages were reported for

gender, smoking status, lung expansion, mode of diagnosis, and interventions performed for malignant pleural effusion. The efficacy and safety of cosmetic talc for pleurodesis in patients with MPE were reported using frequencies and percentages. Safety and complications were assessed during the patients' hospital stay, while success and recurrence were evaluated during the six-week follow-up period. The duration of intercostal chest tube placement and hospital stay was described using mean  $\pm$  SD. The efficacy according to the intervention method, including chest tube thoracostomy versus medical thoracoscopy, and lung expansion status was compared using the chi-square test or likelihood ratio test, as appropriate. Hospital stay and intubation time were also recorded. Bar diagrams and pie charts were used for the graphical presentation of study outcomes.

## RESULTS

The study included 75 patients with malignant pleural effusion. The mean age of the patients was  $57.8 \pm 7.1$  years. The majority of patients were 55–64 years old, accounting for 31 (41.3%), followed by 24 (32.0%) patients aged 45–54 years and 20 (26.7%) aged 65–70 years. Males were predominant, comprising 52 (69.3%) patients, while 23 (30.7%) were females. Regarding smoking status, 37 (49.3%) patients were smokers, 25 (33.3%) were non-smokers, and 13 (17.3%) were ex-smokers, as shown in Table 1.

**Table 1. Demographic characteristics of patients with malignant pleural effusion (n=75)**

| Variable              | Frequency (n) | Percentage (%) |
|-----------------------|---------------|----------------|
| <b>Age (years)</b>    |               |                |
| 45–54                 | 24            | 32.0           |
| 55–64                 | 31            | 41.3           |
| 65–70                 | 20            | 26.7           |
| <b>Gender</b>         |               |                |
| Male                  | 52            | 69.3           |
| Female                | 23            | 30.7           |
| <b>Smoking status</b> |               |                |
| Smoker                | 37            | 49.3           |
| Non-smoker            | 25            | 33.3           |
| Ex-smoker             | 13            | 17.3           |

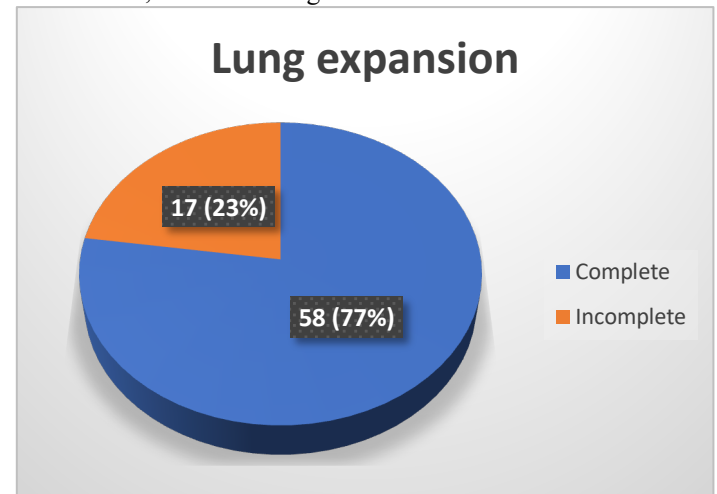
Among the 75 patients, lung malignancy was the most common type of malignancy, present in 49 (65.3%) patients, whereas 26 (34.7%) had other malignancies. The diagnosis was based on histopathology in 44 (58.7%) patients and cytology in 31 (41.3%) patients. Chest tube thoracostomy was performed in 56 (74.7%) patients, while medical thoracoscopy was performed in 19 (25.3%) patients, as given in Table 2.

**Table 2. Clinical and diagnostic characteristics of patients (n=75)**

| Variable                  | Frequency (n) | Percentage (%) |
|---------------------------|---------------|----------------|
| <b>Type of malignancy</b> |               |                |
| Lung malignancy           | 49            | 65.3           |
| Other malignancy          | 26            | 34.7           |
| <b>Basis of diagnosis</b> |               |                |

|                                                      |    |      |
|------------------------------------------------------|----|------|
| Histopathology                                       | 44 | 58.7 |
| Cytology                                             | 31 | 41.3 |
| <b>Procedure performed for pleural fluid removal</b> |    |      |
| Chest tube thoracostomy                              | 56 | 74.7 |
| Medical thoracoscopy                                 | 19 | 25.3 |

Complete lung expansion was achieved in 58 (77.3%) patients, whereas 17 (22.7%) patients had incomplete lung expansion. The mean percentage of lung expansion was  $88.4 \pm 8.7\%$ , as shown in figure 1



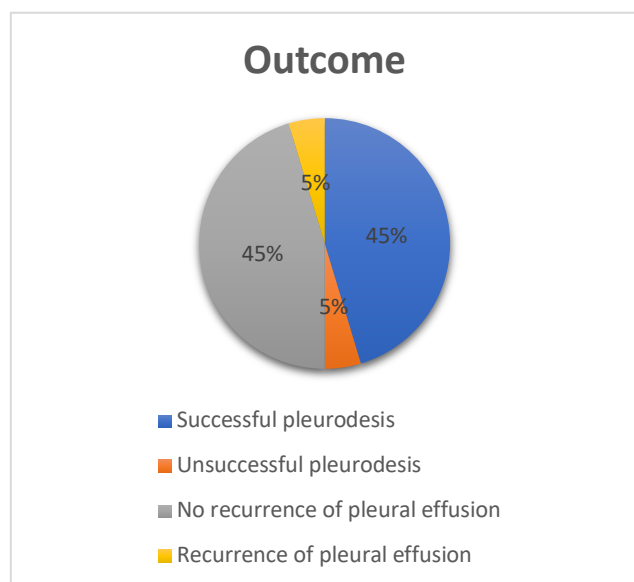
**Figure 1. Lung expansion status following pleural fluid drainage (n=75)**

Fever was the most frequently observed adverse effect following cosmetic talc pleurodesis and was recorded in 21 (28.0%) patients, followed by pain in 18 (24.0%) patients. Surgical emphysema occurred in 6 (8.0%) patients, while pleural infection/empyema was observed in 3 (4.0%) patients. ARDS developed in 1 (1.3%) patient, and 2 (2.7%) patients required intubation. Death was recorded in 1 (1.3%) patient, as presented in Table 3.

**Table 3. Adverse effects and complications following cosmetic talc pleurodesis (n=75)**

| Adverse effect/complication | Frequency (n) | Percentage (%) |
|-----------------------------|---------------|----------------|
| Fever                       | 21            | 28.0           |
| Pain                        | 18            | 24.0           |
| Surgical emphysema          | 6             | 8.0            |
| Pleural infection/empyema   | 3             | 4.0            |
| ARDS                        | 1             | 1.3            |
| Intubation required         | 2             | 2.7            |
| Death                       | 1             | 1.3            |

At six-week follow-up, successful pleurodesis was achieved in 68 (90.7%) patients, while pleurodesis was unsuccessful in 7 (9.3%) patients. Similarly, no recurrence of pleural effusion was observed in 68 (90.7%) patients, whereas recurrence occurred in 7 (9.3%) patients, as shown in figure 2



**Figure 2. Efficacy of cosmetic talc pleurodesis at six-week follow-up (n=75)**

Among the 7 patients who developed recurrence of malignant pleural effusion, recurrence occurred within 2 weeks in 2 (28.6%) patients, between 3 and 4 weeks in 3 (42.9%) patients, and between 5 and 6 weeks in 2 (28.6%) patients, as given in Table 4.

**Table 4. Time to recurrence of malignant pleural effusion among patients with recurrence (n=7)**

| Time to recurrence | Frequency (n) | Percentage (%) |
|--------------------|---------------|----------------|
| ≤2 weeks           | 2             | 28.6           |
| 3–4 weeks          | 3             | 42.9           |
| 5–6 weeks          | 2             | 28.6           |
| <b>Total</b>       | <b>7</b>      | <b>100.0</b>   |

The mean duration of chest tube insertion was  $71.6 \pm 18.4$  hours, with a range of 48–120 hours. The mean hospital stay was  $5.8 \pm 2.1$  days, ranging from 3 to 14 days. Among the patients who required intubation, the mean duration of intubation was  $38.0 \pm 11.3$  hours, with a range of 30–46 hours, as shown in Table 5.

**Table 5. Duration of chest tube insertion and hospital stay (n=75)**

| Variable                                                | Mean $\pm$ SD   | Minimum–Maximum |
|---------------------------------------------------------|-----------------|-----------------|
| Duration of chest tube insertion (hours)                | $71.6 \pm 18.4$ | 48–120          |
| Hospital stay (days)                                    | $5.8 \pm 2.1$   | 3–14            |
| Duration of intubation among intubated patients (hours) | $38.0 \pm 11.3$ | 30–46           |

Successful pleurodesis was achieved in 49 (87.5%) patients who underwent chest tube thoracostomy and in all 19 (100.0%) patients who underwent medical thoracoscopy. Unsuccessful pleurodesis occurred in 7 (12.5%) patients in the chest tube thoracostomy group,

while no unsuccessful cases were observed among patients undergoing medical thoracoscopy. The difference in efficacy according to the procedure performed was not statistically significant ( $p=0.109$ ), as presented in Table 6.

**Table 6. Association of pleurodesis efficacy with procedure performed and lung expansion status (n=75)**

| Variable       | Category                | Successful Pleurodesis n (%) | Unsuccessful Pleurodesis n (%) | Total | p-value |
|----------------|-------------------------|------------------------------|--------------------------------|-------|---------|
| Procedure      | Chest tube thoracostomy | 49 (87.5)                    | 7 (12.5)                       | 56    | 0.109   |
|                | Medical thoracoscopy    | 19 (100.0)                   | 0 (0.0)                        | 19    |         |
| Lung expansion | Complete                | 55 (94.8)                    | 3 (5.2)                        | 58    | 0.038   |
|                | Incomplete              | 13 (76.5)                    | 4 (23.5)                       | 17    |         |
| Total          |                         | 68 (90.7)                    | 7 (9.3)                        | 75    |         |

Recurrence of pleural effusion occurred in 3 (5.2%) patients with complete lung expansion and in 4 (23.5%) patients with incomplete lung expansion. No recurrence was observed in 55 (94.8%) patients with complete lung expansion and 13 (76.5%) patients with incomplete lung expansion. The difference in recurrence according to lung expansion status was statistically significant ( $p=0.038$ ), as shown in Table 8.

**Table 8. Six-week pleural effusion recurrence according to lung expansion status (n=75)**

| Lung expansion | Recurrence n (%) | No recurrence n (%) | Total | p-value |
|----------------|------------------|---------------------|-------|---------|
| Complete       | 3 (5.2)          | 55 (94.8)           | 58    | 0.038   |
| Incomplete     | 4 (23.5)         | 13 (76.5)           | 17    |         |
| Total          | 7 (9.3)          | 68 (90.7)           | 75    |         |

## DISCUSSION

Malignant pleural effusion is a common complication of advanced malignancy and frequently causes dyspnea, chest discomfort, and reduced quality of life. Recurrent pleural fluid accumulation often requires repeated drainage procedures, making definitive management important. Pleurodesis is an established treatment aimed at obliterating the pleural space and preventing fluid reaccumulation. Talc is widely used because of its strong pleurodesis-inducing properties and favorable efficacy. However, concerns regarding adverse effects and the cost or availability of pharmaceutical-grade talc may limit its use in some settings. Cosmetic talc may represent an accessible and economical alternative, but its efficacy and

safety in malignant pleural effusion require further clinical evaluation.

Our study evaluated the efficacy and safety of cosmetic talc pleurodesis in 75 patients with malignant pleural effusion and found that successful pleurodesis was achieved in 68 (90.7%) patients, while recurrence occurred in 7 (9.3%) patients at six-week follow-up. These findings indicated a high short-term success rate and were broadly consistent with previous evidence supporting talc as an effective pleurodesis agent. However, direct comparison should be made cautiously because our study used 4 g of autoclaved cosmetic talc, whereas most published studies used sterile or calibrated medical-grade talc, and differences in talc preparation, administration technique, patient selection, lung expansion and definitions of pleurodesis success could influence outcomes.

Kolschmann et al. studied 102 patients with recurrent malignant pleural effusion undergoing medical thoracoscopy and talc poudrage using an average of 8 g of sterile talc. At 180 days, successful pleurodesis was achieved in 38 of 46 surviving patients (82.6%), compared with the 90.7% success rate observed in our study at six weeks. Their success rate at one month was reported to be approximately 89.4%, which was also close to our 90.7% six-week success rate. Their study reported a 30-day mortality rate of 16.7% (17/102), whereas mortality in our study was considerably lower at 1.3% (1/75). Empyema occurred in only one patient in their cohort and no talc-induced ARDS was observed, while our study recorded pleural infection/empyema in 3 (4.0%) patients and ARDS in 1 (1.3%) patient.<sup>18</sup>

In the prospective randomized trial by Dresler et al., 482 patients with malignant pleural effusion were randomized to talc poudrage (n=242) or talc slurry (n=240). Among patients with initially adequate lung re-expansion, successful pleurodesis at 30 days was achieved in 78% with poudrage and 71% with slurry. Our overall six-week success rate of 90.7% was therefore higher than both reported rates, particularly the 71% rate observed with talc slurry. The difference may be related to differences in patient selection, definition of success, degree of lung expansion, follow-up methodology and talc preparation. In our study, 58 (77.3%) patients had complete lung expansion and 17 (22.7%) had incomplete expansion, and successful pleurodesis was achieved in 55 (94.8%) patients with complete expansion compared with 13 (76.5%) patients with incomplete expansion (p=0.038). This finding provides an important explanation for the high overall success rate because adequate apposition of the pleural surfaces is essential for effective pleurodesis. The recurrence rate of 9.3% in our study was also lower than would be expected from the 29% six-month failure rate reported in the later TAPPS trial, although our follow-up was only six weeks. Fever and pain were among the common adverse effects in the Dresler study, which was consistent with our findings, where fever occurred in 21 (28.0%) and pain in 18 (24.0%) patients.

Tan et al. subsequently synthesized the available evidence and reported that talc was significantly more effective than

control therapies beyond one month, with a pooled relative risk of successful pleurodesis of 1.35 (95% CI 1.07–1.69; p=0.010). For talc poudrage, the benefit was stronger (RR 1.74, 95% CI 1.11–2.73; p=0.015), whereas talc slurry alone did not demonstrate a statistically significant advantage over controls (RR 1.05, 95% CI 0.87–1.27; p=0.588). Their safety analysis also found no significant differences for fever (RR 1.15; p=0.589), pain (RR 0.74; p=0.360), emphysema (RR 1.35; p=0.596) or wound infection (RR 2.18; p=0.106). In comparison, our study demonstrated fever in 28.0%, pain in 24.0%, surgical emphysema in 8.0% and pleural infection in 4.0%. Thus, the pattern of adverse effects observed in our patients was compatible with the safety profile reported in the pooled literature, although our study was not designed with a control group and therefore could not calculate relative risks against another pleurodesis agent.<sup>17</sup>

Janssen et al. specifically examined the safety of talc pleurodesis in a large prospective cohort of 558 patients who underwent thoracoscopy and talc poudrage with 4 g of calibrated large-particle talc. No patient developed ARDS, corresponding to an ARDS frequency of 0% with a one-sided 95% confidence limit of 0–0.54%. Eleven patients (2%) died within 30 days and seven (1.2%) developed non-fatal post-thoracoscopy complications. In our study, ARDS occurred in 1 (1.3%) patient, death occurred in 1 (1.3%), and pleural infection/empyema occurred in 3 (4.0%) patients.<sup>15</sup>

Bhatnagar et al. in the TAPPS randomized clinical trial evaluated 330 patients, with 166 receiving thoracoscopic talc poudrage and 164 receiving talc slurry through a chest tube, using 4 g talc in both groups. At 90 days, pleurodesis failure occurred in 22% (36/161) of the poudrage group and 24% (38/159) of the slurry group, with no significant difference (OR 0.91, 95% CI 0.54–1.55; p=0.74). At 30 days, failure was 10% with poudrage and 14% with slurry, while at 180 days it was 29% and 28%, respectively. Our six-week failure rate of 9.3% was therefore very close to the 10% 30-day failure rate reported for poudrage and lower than the 14% failure rate reported for slurry at 30 days. However, our study had a longer six-week assessment compared with their 30-day endpoint but substantially shorter follow-up than their 90- and 180-day outcomes. The TAPPS findings also support the effectiveness of the slurry approach because its 90-day failure rate of 24% remained comparable with poudrage. In our study, the mean hospital stay was  $5.8 \pm 2.1$  days, whereas the TAPPS trial reported mean hospital stays over 90 days of  $12 \pm 13$  nights for poudrage and  $11 \pm 10$  nights for slurry. The difference may reflect differences in healthcare systems, patient characteristics, disease severity, discharge practices and the fact that TAPPS reported hospital stay over a longer 90-day period.<sup>16</sup>

Beltsios et al. later synthesized 24 studies in a systematic review and meta-analysis and found that talc pleurodesis was associated with significantly higher successful pleurodesis rates than all control treatments (RR 1.15, 95% CI 1.00–1.31; p=0.04), chemical controls (RR 1.26, 95% CI 1.13–1.40; p<0.0001) and bleomycin (RR 1.22,

95% CI 1.05–1.42;  $p=0.008$ ). At follow-up beyond one month, talc remained significantly superior to controls, with an RR of 1.62 (95% CI 1.15–2.27;  $p=0.005$ ), while sensitivity analyses confirmed the robustness of the findings. Our 90.7% six-week success rate was consistent with the overall direction of this evidence and, importantly, our six-week assessment extended beyond the one-month period in which the meta-analysis demonstrated a significant benefit of talc. However, because our study did not include a comparator group, the relative efficacy of cosmetic talc against another sclerosant could not be quantified.<sup>19</sup>

Most recently, Kastrati et al. evaluated talc slurry pleurodesis in patients with malignant pleural effusion and reported an 84.6% success rate at 30 days, with 33 of 39 patients achieving a successful response; among these, 19 (57.6%) had complete success and 14 (42.4%) had partial success. Six patients (15.4%) failed pleurodesis. Chest pain and fever were the most common adverse effects, and higher Karnofsky Performance Status and lower neutrophil-to-lymphocyte ratio were associated with better survival. Our six-week success rate of 90.7% was higher than their 30-day rate of 84.6%, while our failure rate of 9.3% was lower than their 15.4%. The adverse-effect pattern was comparable because fever and pain were also the most frequent complications in our cohort, occurring in 28.0% and 24.0%, respectively.<sup>20</sup>

## STUDY LIMITATIONS

The study had a relatively small sample size of 75 patients and was conducted at a single tertiary-care center, which may limit the generalizability of the findings. The follow-up period was limited to six weeks, so longer-term recurrence and delayed complications could not be assessed. As there was no control or comparison group, the outcomes could not be directly compared with other pleurodesis agents. The study also used non-probability consecutive sampling, which may have introduced selection bias.

## CONCLUSION

Cosmetic talc pleurodesis demonstrated a high rate of successful pleurodesis in patients with malignant pleural effusion. Most patients remained free of recurrent pleural effusion during the six-week follow-up, with relatively few serious complications. Cosmetic talc may therefore be considered a potentially effective and safe option for pleurodesis in appropriately selected patients.

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