
Talc for Pleurodesis

Hero or Villain?

To the Editor:

We read with interest the article by Fraticelli et al1 and its editorial,2 (December 2002). Talc has been considered the most effective agent to induce pleurodesis; however, reports of respiratory failure after the intrapleural use raises concerns about its safety.3 The experimental study of Fraticelli et al1 using calibrated talc (95% of particles > 5 µm) and observing that the migration of talc, if it occurs, is not significant, represents an important contribution to the understanding of the physiopathology of ARDS.

In our previous study4 with talc (85% of particles > 10 µm), we observed presence of talc in several organs. These findings suggest that the size of the particles should be decisive to the dissemination of talc. The controversy exists. Could the talc introduced into the pleural cavity migrate through the circulation with risk of respiratory failure? Would the size of the particles be decisive for the migration?

Several points should be considered: (1) the pulmonary re-expansion after drainage of large amount of fluid or after thoracoscopy modifies the permeability of the pulmonary vasculature producing accumulation of fluid; (2) the talc introduced into the pleural space releases inflammatory mediators inducing capillary vasodilatation, cellular migration, and stimulus of the extra cellular matrix; (3) the absorption of pleural fluid and particles from the pleural space occurs through the stomas described on the parietal pleura of animals (in rats, the medium area of the stomas is 12.9 ± 10.3 µm² [mean ± SD], suggesting that particles of talc could migrate through lymphatics in a normal pleura6); and (4) not only the size of the particles should be considered, the shape is very important; we can hypothetically accept that thin particles measuring approximately 20 µm² could migrate through lymphatics.

The irregular form of the particles and the probable changes in the mobility of the lymphatic produced by the pleural inflammation could modify the physiology of the pleural cavity. We believe that in the presence of pleural inflammation, the increment of the permeability could facilitate the migration of talc.

Sanchez et al7 (Fanadero’s group), studying the characteristics of talc used in Brazil (n = 9) and in Spain (n = 4) demonstrated that the specimens containing the highest percentage of small particles (< 5 µm) were associated with higher morbidity. In agreement with this author, not only the size, but also the shape of the particle seems to be a decisive factor in the absorption of the talc by the lymphatics. In this way, particles with axis < 5 µm are present in 21% of the Brazilian samples and in only 3% of the French talc.8 Consequently, to obtain a more accurate interpretation of the results, in future studies the physical and chemical characteristics of the talc should be specified.

Exaldis Marchi, MD, FCCP
Lisete R. Teixeira, MD
Francisco Vargues, MD
University of Siao Paulo, Medical School
Sao Paulo, Brazil

References


To the Editor:

We thank our colleagues from Brazil for their interest in reading our article devoted to the distribution of calibrated talc after intrapleural administration. This study was carried out after the publication by this team of experimental results showing talc particles in every organ of rats killed 24 h and 48 h after the talc was administered intrapleurally, which was very far from our clinical experience. The data we obtained using the same experimental design are not similar, clearly suggesting a difference between the two talc preparations. It is common sense, and we agree with Marchi and colleagues in assuming that the size and/or the shape of talc particles are the key factors for particle...
migration with potential local and general dissemination. The talc we used (Steritalc; Novatech; Plan-de-Grasse, France) has median particle size of 33.6 μm and a mean particle size of 31.3 μm, which is more explicit than to talk about an amount of 95% of particles with a size > 5 μm, and varies markedly by more than a factor of three in the physical characteristics of several talc preparations that are used intrapleurally in the United States, South America, Taiwan, and the rest of Europe. These preparations, which were previously shown to be associated with higher morbidity, 3 have demonstrated higher percentage of small particles in comparison to the talc we used. In the above-mentioned Brazilian experimental study, 2 the size of talc particles used is not detailed; however, the same team reported its 15-year thoracoscopic talc poudrage experience 4 using a talc with a particle size of 5 to 70 μm with no details concerning mean and median particle size. We can hypothesize that the same talc preparation was used for the experimental study. By the way, it is interesting to note that no respiratory complications were reported in their clinical experience in patients treated for spontaneous pneumothorax, ie, with normal parietal pleura.

We have to keep in mind, however, that all these experimental results concern studies carried out on small animals, ie, animals with a thin visceral pleura, and we may hypothesize that the migration of talc particles can vary from an animal to another including human. Indeed, the thickness of the pleura is variable among species. 4 For instance, in animals with thin pleura as mice, rats, dogs, and rabbits, the thickness of the submesothelial interstitium is equal for parietal and visceral pleura, averaging 20 μm. Conversely, in animals with thick pleura (sheep, pig, horse, and human), the parietal pleura is about five times thinner compared to the visceral pleura, where it can reach 100 μm. It is important to take into account this point and the possibility of a migration of talc particles through the visceral pleura of small animals after breaking the pleural mesothelium and/or damaging the lung after instillation. Such a hypothesis is supported by experimental results showing that the size of talc particles instilled in the pleural cavity and that of particles deposited in the lung or other organs was the same. 4 Therefore, the technique of intrapleural instillation of talc is questionable. Indeed, talc slurry is a blind method for pleural symphysis delivering a sclerosing agent under high pressure (as well as the use of spray canister during thoracoscopy procedure), which can damage the pleura and regional organs (lung, pericardium, diaphragm, and mediastinum, etc.) and allow the dissemination of talc. In our current clinical practice, we use a double-balloon insufflator (Richard Wolf; Knittlingen, Germany) during thoracoscopic talcage that allows under visual control a careful dissemination of talc particles into the pleural cavity, avoiding high intrapleural pressure; and we have never observed respiratory complications. 5

Pleural symphysis with talc is a very old procedure in Europe, and the absence of long-term side effects is now very well established. The present “talc saga” is due to scattered reports of ARDS in patients treated with different talc preparations and techniques of symphysis illustrated by experimental studies on small animals. Therefore the extrapolation in humans seems to be difficult. However, it is now clear that talc preparations are very different from one country to another, and that physical as well as chemical characteristics of the talc should be specified. We absolutely need to define the lower talc particle size, avoiding phagocytosis-related inflammation and physiologic absorption through the parietal pleura by designing experimental studies on big animals with better characterized talc preparations (particle size and shape distribution, elementary composition), and also to compare several techniques of intrapleural administration of talc that can influence the talc dissemination.

So far, European teams, using for several years small amounts of calibrated talc instilled under visual control during thoracoscopic procedure with a double-balloon device to obtain pleural symphysis in patients with recurrent pleurisy, have never reported respiratory complications and can say that talc is not dirt. 9

Philippe Astoul, MD, PhD
Anne Fratìcìci, MD
Hôpital Sainte-Marguerite
Andree Robaglia-Schlupp, MD
Pierre Cau, MD, PhD
Hôpital de La Conception
Marseille, France

REFERENCES