

formed talc poudrage using the catheter technique with the flexi-rigid thoracoscopy under local anesthesia. Chest radiography one month after pleurodesis showed successful symphysis.

The second case (Fig. 2e–h) had right pleural effusion caused by malignant mesothelioma, and the third case (Fig. 2i–l) had left pleural effusion caused by pleural dissemination of lung cancer. Since both pleural effusions were increasing and symptomatic, we performed talc pleurodesis. For both cases, talc poudrage using our catheter technique was successfully and easily performed under clear visualization.

#### 4. Discussion

To the best of our knowledge, this is the first report of talc poudrage using a catheter technique through a flexi-rigid thoracoscope. Talc poudrage using flexi-rigid thoracoscope was once reported by Lee et al. [9] previously, however, it was the procedure performed blindly using a bulb syringe through the trocar. The main advantage of our method is that both pleural fluid aspiration and talc insufflation can be performed under visualization with a single-port of entry, which is assumed more effective and less invasive. Our method for talc poudrage under local anesthesia without sedative drugs shortened the procedure time compared to the procedure with sedation. Many patients with malignant pleural effusion are in poor general condition, therefore, our method performed under local anesthesia without sedation may be helpful in these patients.

For thoracoscopy including diagnostic purposes and talc poudrage, rigid thoroscopes have commonly been used [4] as they provide excellent vision and allow larger biopsy specimens [10]. On the other hand, the flexi-rigid thoracoscope enables the operator to examine most of the pleural cavity as the tip of the scope bends vertically upwards and downwards [6, 7, 9]. We introduced the catheter technique for talc poudrage using a dedicated catheter, and found it easily performed by pulmonologists. With the technique of catheter and flexi-rigid thoracoscopy, we consider that talc can be easily insufflated even in narrow spaces, such as the pleural cavity with adhesion, or spaces close to the mediastinum.

The dedicated catheter we developed for talc poudrage has a 2.1-mm inner diameter and 2.55-mm outer diameter. Compared to the spray catheter we used for lidocaine administration with a 1.0-mm inner diameter and 1.9-mm outer diameter, the inner diameter of our catheter is much larger. In addition, as the surface of the catheter is coated with fluorocarbon polymers, it is unlikely to be obstructed inside by talc powder. One drawback of the procedure was that the catheter kinked easily at the proximal side of the working channel during the procedure. However, we solved this problem by carefully keeping it straight.

Although the gold standard technique for talc poudrage is still considered to be conventional medical thoracoscopy with a rigid thoracoscope, we were able to perform the procedure safely under local anesthesia, even in elderly patients, and also in patients with relatively poor performance status. We believe that our method is more tolerable for those in poor general condition than conventional

thoroscopic talc poudrage, therefore, the next step will be to compare talc pleurodesis with our method and by slurry for such difficult-to-treat patients especially from the safety point of view.

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**eComment: Talc pleurodesis by flexi-rigid thoracoscope under local anaesthesia: visual talc slurry?**

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We read with great interest the article by Ishida and colleagues [1] reporting a novel approach for talc pleurodesis by dedicated catheter through flexi-rigid thoracoscope. In the literature, talc is believed to be the safest, cheapest and most effective agent for promoting pleural symphysis [2] and, even as reported by the authors themselves, talc poudrage (TP) is the gold standard technique for efficient pleurodesis. Regarding single-port technique, Ishida et al. evidenced a new single-port method in order to insufflate talc into the pleural cavity by using a flexi-rigid thoracoscope in local anaesthesia. Concerning the operative management, the authors did not show any data about pleural adhesions or chambered spaces during the surgical procedures: when these conditions occur, the efficacy of pleurodesis is poorer due to failure of lung re-expansion.

According to our experience on 141 single access video-assisted thoracoscopy procedures, VATS allows to remove most of the false membranes and debris and to wash the cavity under direct visual control. Moreover, unlike the authors data, double lumen endobronchial tube permits lung exclusion

in order to offer adequate pleural space visualization and easier management in biopsy, pleural debridement and talc insufflation. In this article, the author did not report any information about patient position, kind of access and anaesthetic technique. In our opinion, this novel approach could be considered as a talc slurry 'under visual control'. It is well-known that, when compared with talc slurry (TS), thoracoscopic talc insufflation is associated with a reduction in recurrence and with a major successful rate [3]. As reported in a prospective not randomized trial comparing TS vs. TP by Stefani et al., chest pain was more common in the TS group and, in five patients initially selected for TS, severe chest pain with acute respiratory distress developed during, or shortly after talc instillation [4]. Anyway, further studies are mandatory to validate the approach proposed by the authors themselves.

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#### eComment: Talc pleurodesis using rigid thoracoscope

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We have read with interest the report by Ishida and colleagues on the treatment of uncontrolled and symptomatic pleural effusion using talc pleurodesis by dedicated catheter through a flexi-rigid thoracoscope under local anaesthesia [1].

In our centre we perform talc pleurodesis under local anaesthesia in complicated pleural effusions using the standard rigid thoracoscope 0° that we normally use in video-assisted thoracoscopic surgery (VATS) procedures [2]. If there are no adhesions we can proceed to talc pleurodesis, either with talc slurry using 4 g of talc and local anaesthetic, or with talc insufflation with almost the same method as the authors, using a small catheter provided by the talc company fixed at the tip of the thoracoscope with Steri-strips. In patients with adhesions we proceed to VATS pleurodesis and adhesiolysis under double lumen general anaesthesia.

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