New ideas - Thoracic oncologic

Novel approach for talc pleurodesis by dedicated catheter through flexi-rigid thoracoscope under local anesthesia

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Abstract

For pleurodesis, talc administered by poudrage is usually insufflated blindly from a single port of entry using the standard method with a small-diameter rigid thoracoscope. In order to visually perform talc poudrage from a single port, we introduced a catheter technique through a flexi-rigid thoracoscope. Patients with uncontrolled and symptomatic pleural effusion requiring pleurodesis underwent flexi-rigid thoracoscopy under local anesthesia for talc poudrage. A dedicated catheter with 2.1-mm inner diameter was connected to a talc atomizer and inserted through the working channel of the flexi-rigid thoracoscope to insufflate talc into the pleural cavity under visualization. Nine patients were included in this study. Three patients were >75 years old, and two were Karnofsky performance status 50. Three patients received propofol for sedation and six were not sedated. Mean operative time was 30.8 min for all patients, and 21.3 min for cases without sedation. All procedures were performed easily under clear visualization with no major complications or catheter obstructions. This novel approach for talc pleurodesis using a catheter was well-tolerated and seems feasible for patients with uncontrolled pleural effusion. We consider this technique useful even for difficult cases, such as elderly patients or those with relatively low performance status.

Keywords: Pleural effusion; Talc poudrage; Catheter; Medical thoracoscopy; Pleuroscopy; Semirigid thoracoscope

1. Introduction

Talc is the most effective pleurodesis agent, and has been used for several pleural diseases, such as malignant pleural effusion [1, 2] and pneumothorax [3]. When talc is administered by poudrage, a rigid thoracoscope is commonly used [4]. This technique is already well-established, and we have utilized a small-diameter rigid thoracoscope for talc poudrage since we commenced the procedure. However, one drawback to that procedure in this situation has been that talc has to be insufflated blindly if there is only a single-port of entry, otherwise talc insufflation with rigid thoracoscope under visualization requires a second port or puncture. In order to perform talc poudrage under visual control with a single-port of entry, we developed a catheter technique employing a flexi-rigid thoracoscope.

The flexi-rigid thoracoscope has a rigid shaft and a bidirectional flexible tip developed to examine the pleural cavity, and contains a working channel for suction and biopsy under direct observation [5, 6]. Using it under local anesthesia, we found it useful in the diagnosis of pleural effusion of unknown cause [6, 7]. The catheter technique we introduced for visually controlled talc poudrage with a single-port of entry was using a catheter inserted through the working channel of the flexi-rigid thoracoscope. As a catheter, we first used an endoscopic nasobiliary drainage tube in our preliminary test on goats. However, it was easily obstructed by talc powder because of its small inner diameter. After various attempts to determine the most suitable catheter for talc poudrage, we finally developed a dedicated catheter with a 2.1-mm inner diameter. The catheter has a larger inner diameter with fluorocarbon polymer coating, and there was no tube obstruction by talc.

Based on our preliminary tests, we applied the dedicated catheter for talc poudrage. In this report, we describe the technique and benefit of talc poudrage using a catheter through a flexi-rigid thoracoscope under local anesthesia for patients with pleural effusion.

2. Patients and methods

2.1. Patients

This was a prospective study provided for patients with uncontrolled and symptomatic pleural effusion requiring pleurodesis in a 1.5-year period. We included patients aged >20 years, and excluded those considered unable to tolerate thoracoscopy, such as patients with Karnofsky performance status (KPS) <50, having insufficient lung...
function parameters, uncontrolled bleeding tendency and severe heart failure. This study was approved by the Ethics Committee of St Marianna University School of Medicine, and prior written informed consent was obtained from all patients.

2.2. Methods

Thoracoscopy was performed under local anesthesia of the chest wall using 10 ml of 1% lidocaine and adding a maximum of 10 ml more, if needed. Then, a flexible trocar (MAJ-1058; Olympus; Tokyo, Japan) was placed, and the flexi-rigid thoroscope (LTF-240; Olympus), with a 2.8-mm working channel, was inserted into the pleural cavity. Any pleural fluid, if present, was aspirated as much as possible through the working channel of the scope under visual control. If necessary, pleural biopsy was performed. When patients complained of pain, 1% lidocaine was administered into the pleural cavity using a spray catheter through the working channel of the scope under visual control. If necessary, pleural biopsy was performed.

When patients complained of pain, 1% lidocaine was administered into the pleural cavity using a spray catheter under flexi-rigid thoracoscopy. If necessary, pleural biopsy was performed. When patients complained of pain, 1% lidocaine was administered into the pleural cavity using a spray catheter through the working channel of the scope under visual control. If necessary, pleural biopsy was performed. When patients complained of pain, 1% lidocaine was administered into the pleural cavity using a spray catheter through the working channel of the scope under visual control. If necessary, pleural biopsy was performed.

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Temporary fever of 38.5 °C or over was observed in two patients, in both of which the temperature decreased to the normal range within 24 h. There were no major complications. Complete response was achieved in eight cases, and one case was evaluated as partial response. No patient resulted in failure.

Table 1. Clinical characteristics

<table>
<thead>
<tr>
<th>No.</th>
<th>Age (years)</th>
<th>Gender</th>
<th>KPS</th>
<th>Background</th>
<th>Procedure side</th>
<th>Sedation</th>
<th>Procedure time (min)</th>
<th>Chest tube duration (days)</th>
<th>Complications</th>
<th>Efficacy</th>
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<tr>
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<td>80</td>
<td>Lung cancer</td>
<td>Right</td>
<td>Propofol</td>
<td>119</td>
<td>74</td>
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<tr>
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<td>80</td>
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<td>Left</td>
<td>Propofol</td>
<td>100</td>
<td>45</td>
<td>No</td>
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</tr>
<tr>
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<td>60</td>
<td>Lung cancer</td>
<td>Right</td>
<td>Propofol</td>
<td>39</td>
<td>30</td>
<td>No</td>
<td>Partial</td>
</tr>
<tr>
<td>4</td>
<td>82</td>
<td>M</td>
<td>70</td>
<td>Lung cancer</td>
<td>Left</td>
<td>None</td>
<td>41</td>
<td>20</td>
<td>No</td>
<td>Partial</td>
</tr>
<tr>
<td>5</td>
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<td>M</td>
<td>50</td>
<td>Primary systemic amyloidosis</td>
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<td>18</td>
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<td>80</td>
<td>Malignant mesothelioma</td>
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<td>F</td>
<td>50</td>
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<td>12</td>
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<td>Partial</td>
</tr>
<tr>
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<td>60</td>
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<td>Right</td>
<td>None</td>
<td>63</td>
<td>36</td>
<td>No</td>
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</tr>
</tbody>
</table>

1The time from the beginning of anesthesia to the end of chest tube placement. 2The time for pleural fluid aspiration, examination of pleural cavity, and talc insufflation. 3Duration of chest tube drainage after the procedure. 4Temporary fever ≥38.5 °C noted after talc poudrage. 5Complete, no recurrence was observed one month after talc pleurodesis; Partial, pleural effusion occupying less than one-third of the pleural space and not requiring drainage one month after the procedure. KPS, Karnofsky performance status.

Fig. 2 shows three cases. The first case (Fig. 2a–d) had increasing bilateral pleural effusion due to primary systemic amyloidosis despite systemic chemotherapy with melphalan and dexamethasone. Although right pleural effusion decreased only with chest tube drainage, as persistent left pleural effusion required frequent thoracentesis, we per-
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 infusion 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 thoracoscopes 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 thorascopic 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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References


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

Authors: Giovanni Leuzzi, Department of Thoracic Surgery, Catholic University of Sacred Heart, Rome, Italy; Stefano Cafarotti, Filippo Lococo, Maria Letizia Vita
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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 bronchial 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.

References


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 adhesion 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.

References
