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 effussion [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 flexi-rigid thoroscope, as previously described [8]. A dedicated catheter (Olympus) with a 2.55-mm outer diameter and 2.1-mm inner diameter was connected to a talc atomizer (Wolf Company, Knittlingen, Germany), and was inserted through the working channel of the flexi-rigid thoroscope (Fig. 1a). Under direct visualization, 4 g of sterile talc (Steritalc™; Novatech; La Ciotat, France) was then insufflated into the pleural cavity (Fig. 1b). At the end of the procedure, a 20 F chest tube was inserted and attached to an aspiration device. The tube was connected to −10 to 20 cm H2O suction for at least two days, and removed when <200 ml of fluid was drained per day.

2.3. Data collection and assessment

All data were collected prospectively. The time taken for the procedure, the duration of chest tube drainage after talc poudrage, complications related to the procedure, and efficacy of pleurodesis were recorded. For the procedure time, we measured the time from the beginning of administration of anesthesia to the end of chest tube placement as the total procedure time, and the time using the flexi-rigid thoroscope including pleural fluid aspiration, examination of the pleural cavity and talc insufflation as the operative time. For complications, chest pain requiring prescription for pain control, temporary fever of 38.5 °C or over, and any other complications requiring additional treatment or procedures were noted. Regarding evaluation of efficacy, cases in which the chest tube was successfully removed when fluid drainage decreased to <200 ml/day, and in which chest radiography one month after the procedure showed no pleural effusion were considered to be complete response cases. Cases in which the chest tube was successfully removed but chest radiography one month after the procedure showed pleural effusion occupying less than one third of the pleural space and without requiring further drainage were considered to be partial response cases. All other cases were recorded as failures.

3. Results

Table 1 shows the patients’ characteristics. There were five females and four males with a mean (± S.D.) age of 72.9 ± 7.0 years (range 64–82). There were four patients with KPS 80, one with KPS 70, two with KPS 60, and two with KPS 50. There were five patients with lung cancer, and one each with malignant pleural mesothelioma, ovarian cancer, liposarcoma, and primary systemic amyloidosis. Three patients were given sedation using propofol and six received no sedative drugs. With local anesthesia to the chest wall using 10 ml of 1% lidocaine administered routinely, the pain during the procedure was well controlled for all but except a patient who underwent the procedure without sedation. This patient complained of severe pain and we added 10 ml of 1% lidocaine for chest wall and sprayed 10 ml of 1% lidocaine on the pleura before biopsy. The mean (± S.D.) total procedure time and operative time were 56.1 ± 32.0 min (range 28–119) and 30.8 ± 19.3 min (range 12–74), respectively. For cases receiving sedation, the mean (± S.D.) total procedure time and operative time were 86.0 ± 41.8 min and 49.7 ± 22.4 min, whereas for cases without sedation, they were 41.2 ± 11.7 min and 21.3 ± 8.5 min, respectively. The mean (± S.D.) duration of chest tube drainage after talc pleurodesis was 5.1 ± 3.3 days (range 2–13).

All procedures were performed by pulmonologists, and none of the operators experienced difficulty. The catheter was never obstructed by talc powder. No patient complained of chest pain requiring prescription for pain control.
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>
<td>1</td>
<td>65</td>
<td>F</td>
<td>80</td>
<td>Lung cancer</td>
<td>Right</td>
<td>Propofol</td>
<td>119</td>
<td>3</td>
<td>No</td>
<td>Complete</td>
</tr>
<tr>
<td>2</td>
<td>73</td>
<td>M</td>
<td>80</td>
<td>Lung cancer</td>
<td>Left</td>
<td>Propofol</td>
<td>100</td>
<td>2</td>
<td>No</td>
<td>Complete</td>
</tr>
<tr>
<td>3</td>
<td>70</td>
<td>M</td>
<td>60</td>
<td>Lung cancer</td>
<td>Right</td>
<td>Propofol</td>
<td>39</td>
<td>13</td>
<td>No</td>
<td>Partial</td>
</tr>
<tr>
<td>4</td>
<td>82</td>
<td>M</td>
<td>70</td>
<td>Primary systemic amyloidosis</td>
<td>Left</td>
<td>None</td>
<td>41</td>
<td>5</td>
<td>No</td>
<td>Complete</td>
</tr>
<tr>
<td>5</td>
<td>82</td>
<td>M</td>
<td>50</td>
<td>Primary systemic amyloidosis</td>
<td>Left</td>
<td>None</td>
<td>38</td>
<td>6</td>
<td>No</td>
<td>Complete</td>
</tr>
<tr>
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<td>F</td>
<td>80</td>
<td>Malignant mesothelioma</td>
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<td>None</td>
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<td>5</td>
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<td>Complete</td>
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<tr>
<td>7</td>
<td>64</td>
<td>F</td>
<td>50</td>
<td>Ovarian cancer</td>
<td>Left</td>
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<td>40</td>
<td>5</td>
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</tr>
<tr>
<td>8</td>
<td>67</td>
<td>F</td>
<td>80</td>
<td>Lung cancer</td>
<td>Left</td>
<td>None</td>
<td>28</td>
<td>2</td>
<td>No</td>
<td>Complete</td>
</tr>
<tr>
<td>9</td>
<td>74</td>
<td>F</td>
<td>60</td>
<td>Liposarcoma</td>
<td>Right</td>
<td>None</td>
<td>63</td>
<td>5</td>
<td>No</td>
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</tr>
</tbody>
</table>

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.

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 sympysis.

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 thoracoscopy has 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. The coscope enables the operator to examine most of the pleural cavity as the tip of the scope bends vertically. The coscope enables the operator to examine most of the pleural cavity as the tip of the scope bends vertically. The coscope enables the operator to examine most of the pleural cavity as the tip of the scope bends vertically. The coscope enables the operator to examine most of the pleural cavity as the tip of the scope bends vertically.

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 anesthesia: visual talc slurry? A novel method for pleural anesthesia: a prospective cohort study. Lancet 2007;369:1535–1539.


Authors: Giovanni Leuzzi, Department of Thoracic Surgery, Catholic University of Sacred Heart, Rome, Italy; Stefano Cafarotti, Filippo Lococo, Maria Letizia Vita doi:10.1510/icvts.2010.263137A

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. demonstrated 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 thoracoscopic 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.

References


eComment: Talc pleurodesis using rigid thoracoscope

Authors: Michael Klimatsidas, 424 Military Hospital, Thessaloniki, Greece; Dimitrios Paliouras, Stavros Daliakopoulos doi:10.1510/icvts.2010.263137B

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
