How should talc be administered for chemical pleurodesis?

Prepared by UK Medicines Information (UKMi) pharmacists for NHS healthcare professionals

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Background

Malignant pleural effusion affects more than 175,000 people a year in the USA and more than 40,000 annually in the UK (1). One of the procedures used in the management of malignant pleural effusions is chemical pleurodesis (2). This is used to obliterate the pleural space, prevent fluid accumulation and improve breathing (3).

Talc, a magnesium silicate hydroxide, is the chemical sclerosant of choice for pleurodesis based on efficacy (2, 4-5). When used for intrapleural administration talc is sterilised effectively by dry heat exposure, ethylene oxide, and gamma radiation and promotes an inflammatory reaction in the local tissues through a metabolic / immunological response (2, 6). It may be administered in two ways: at thoracoscopy using an atomiser termed “talc poudrage” or via an intercostal tube in the form of a suspension termed “talc slurry” (2). When talc is administered as “talc slurry”, success rates (complete and partial response) have ranged from 81% to 100% (2).

The information provided in this document relates to intrapleural administration of “talc slurry”.

Answer

Pre-Medication

Intrapleural administration of sclerosing agents may be painful; significant pain is reported in 7% of patients receiving talc. Discomfort can be reduced by administering a local anaesthetic via the drain prior to pleurodesis. The most frequently studied local anaesthetic for intrapleural administration is lidocaine. Its onset is almost immediate which is why it should be administered just before talc (2).

The maximum dose of lidocaine is 3mg/kg (21ml of a 1% lidocaine solution for a 70kg male), with a maximum dose of 250mg (2). Table 1 provides STAT doses of intrapleural lidocaine which have been used in practice (7).

<table>
<thead>
<tr>
<th>Patient weight (kg)</th>
<th>Strength of lidocaine</th>
<th>Volume of lidocaine (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 75 kg</td>
<td>1 %</td>
<td>20 ml</td>
</tr>
<tr>
<td>Greater than 75kg</td>
<td>1 %</td>
<td>25 ml</td>
</tr>
</tbody>
</table>

Premedication should also be considered to alleviate anxiety and pain associated with pleurodesis (2). There are no studies to inform a recommendation on the use of premedication and sedation in non-thorascopic pleurodesis (2). In practice, provided that there is no clear contra-indication, an opiate of the clinician’s choice, e.g. morphine sulphate oral solution 10mg/5ml, may provide adequate analgesia. The dose to be administered is dependent on the individual patient and should be given about 30 minutes prior to the procedure (7).

Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), COX-2 Inhibitors and Oral/Intravenous Corticosteroids

Based on animal studies, the effectiveness of pleurodesis may be affected by NSAIDs although there is no evidence from human studies. Animal studies and limited human data have also indicated that corticosteroids may have a negative effect on pleurodesis (2). In practice, some clinicians advise that NSAIDs, COX-2 inhibitors and corticosteroids should not be administered to patients for 48hrs before...
and for up to 5 days after the procedure because of a possible reduction in the inflammatory reaction of the pleura to the talc (7, 8).

**Talc**

Since 1st January 2008, the Medicines and Healthcare products Regulatory Agency (MHRA) has classified sterile talc as a medicinal product (6). The form in which “talc slurry” is received by clinicians/nursing staff from hospital pharmacies varies in the UK. In some hospitals it is aseptically prepared in the pharmacy and in others it is done in the clinical area (7, 8).

Typically, the dose of talc used for intrapleural administration ranges from 2 to 5g, although doses of between 1 to 10g have been seen (9). Recently updated national guidelines recommend 4g or 5g of talc in 50ml sodium chloride 0.9% (2).

Once reconstituted, it is good practice to ensure that the syringe is suitably labelled to avoid inadvertent intravenous administration, e.g. For INTRAPLEURAL ADMINISTRATION ONLY. There has been one US case report where talc for pleurodesis was inadvertently administered intravenously (10).

**Medication Post-Procedure**

Analgesia should also be given to the patient after the procedure. Although there are no recommendations provided in national guidelines, an example of the analgesia that has been used in practice at one UK hospital is provided below (7):

- Paracetamol orally 1g four times daily (regular)
- Codeine orally 30mg four times daily (regular)
- Morphine oral solution 10mg/5ml when required for “breakthrough” pain (dose dependent on the individual patient).

**Administration procedure**

Premedication should be considered to alleviate anxiety and pain associated with pleurodesis (see pre-medication section). The following does not include infection control procedures and advice should be taken from the local infection control team.

- Administer the lidocaine intrapleurally just before talc administration (see pre-medication section) (2).
- Immediately prior to administering talc, shake the syringe to ensure thorough mixing. After administering the talc slurry flush the intercostal tube with 10 - 50 ml sodium chloride 0.9% (7, 8, 11).
- Following intrapleural administration, national guidelines recommend to clamp the intercostal tube for 1 to 2 hours (2). However, one specialist centre recommends clamping for 4 to 6 hours (8).
- National guidelines recommend that patient rotation is not necessary after intrapleural administration of sclerosant (2). However, in practice rotation of the patient is often suggested to ensure good spread of the talc slurry (7, 8, 12).
- Unclamp chest drain after 1 to 2 hours (2). However, one specialist centre recommends unclamping after 4 to 6 hours (8).
- If the lung remains fully re-expanded and there is satisfactory evacuation of pleural fluid on the chest radiograph, the intercostal tube can be removed within 24 – 48 hours of talc administration (2).

**Monitoring of the Patient**

Talc slurry is usually well tolerated and pleuritic chest pain and fever are the most common side effects observed. A serious complication associated with the use of talc is adult respiratory distress syndrome (ARDS) or acute pneumonitis leading to acute respiratory failure. This has historically been
due to the use of non-graded (small particle size) talc (2, 6). All suspected adverse effects to the use of talc should be reported to the MHRA via the yellow card scheme (6).

UK guidelines provide no recommendations for which parameters to monitor and the following suggestions are based on local practical experience.

<table>
<thead>
<tr>
<th>Monitoring Parameter</th>
<th>Action</th>
<th>Refs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory rate, temperature, pulse, oxygen saturation levels, blood pressure</td>
<td>Pyrexia of more than 24 hours may indicate the onset of infection. ARDS may develop following talc pleurodesis. The signs include hypoxia and dyspnoea.</td>
<td>2, 7, 8, 13</td>
</tr>
<tr>
<td>Chest pain</td>
<td>Patient may need additional analgesia</td>
<td>7, 8</td>
</tr>
<tr>
<td>Swinging of fluid</td>
<td>If this ceases then the tube may be blocked or may have migrated out of the pleural cavity</td>
<td>7</td>
</tr>
<tr>
<td>Persistent bubbling</td>
<td>This may be caused by an air leak which could indicate an underlying broncho-pleural fistula</td>
<td>7, 8</td>
</tr>
<tr>
<td>Colour of fluid</td>
<td>Heavily blood-stained fluid, i.e. frankly bloody or purulent appearance (latter suggesting the presence of an iatrogenic empyema)</td>
<td>7</td>
</tr>
<tr>
<td>Total amount of fluid in chest drain bottle</td>
<td>Where excessive fluid drainage persists (&gt; 250ml/day), repeat pleurodesis may be attempted with an alternative sclerosant.</td>
<td>2, 7, 8</td>
</tr>
</tbody>
</table>

The frequency of monitoring can vary between hospitals from every hour to every 4 hours (7, 8). Local practice may differ and clinical judgement should be used if more frequent monitoring is necessary.

Summary

- Malignant pleural effusion affects more than 40,000 people annually in the UK.
- Talc is the chemical sclerosant of choice for pleurodesis based on efficacy.
- Since 1st January 2008, the Medicines and Healthcare products Regulatory Agency (MHRA) has classified talc as a medicinal product.
- National guidelines recommend 4g or 5g of sterile graded talc in 50ml sodium chloride 0.9%.
- Intrapleural administration of sclerosing agents may be painful. Discomfort can be reduced by administering a local anaesthetic via the drain prior to pleurodesis. The most frequently studied local anaesthetic for intrapleural administration is lidocaine.
- Analgesia should also be given to the patient after the procedure; although NSAIDs, COX-2 inhibitors and oral/intravenous corticosteroids should not be administered to the patient for 48hrs before and for up to 5 days after the procedure as these may reduce the inflammatory reaction of the pleura to the talc.
- There are no recommendations provided by UK guidelines for which parameters to monitor. However, the following are suggested: respiratory rate, temperature, pulse, oxygen saturation levels, blood pressure, chest pain, swinging of fluid, persistent bubbling, colour of fluid and the total amount of fluid in the drain bottle.
- All suspected adverse effects to the use of talc should be reported to the MHRA via the yellow card scheme.

Limitations

- This document is based on published literature and local practice.
- No details are provided about the most suitable size of intercostal tube to be used.
- Details about the preparation of “talc slurry” for intrapleural administration are not discussed.
- Prescribing information should be consulted to determine the suitability of talc, lidocaine or other medicines described in this document for individual patients.

References

10. Anon. Talc misadministered IV. Hospital Pharmacy 2007; 42 (12): 1101-1102.

Quality Assurance

Prepared by
Mark Cheeseman, East Anglia Medicines Information Service

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Checked by
Victoria Gibson, East Anglia Medicines Information Service

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Search strategy
- In-house Databases including British National Formulary, Martindale, AHFS DI, DrugDex
- Embase: "(TALC/dt [dt=Drug Therapy] AND exp PLEURODESIS) [Limit to: Publication Year 2003-Current]"
- Medline: " (TALC AND PLEURODESIS)" [Limit to: Publication Year 2003-Current]"
- IDISWeb “Drug(s): ("talc 96000008") and Disease(s): ("or-pleura/media/diaphragm 34.") Between years 2003 – Current"
- NeLM Medicines Management: “Talc”
- Cochrane “Talc”
- British Thoracic Society website
- Medicines and Healthcare products Regulatory Agency website
- Karen Y Lee (Specialist Pharmacist - Surgery and Pain, Royal Brompton and Harefield NHS Foundation Trust.

From the NHS Evidence website www.evidence.nhs.uk