

Management of Loculated Pleural Effusion in a Regional Hospital – Medications an Alternative to Surgery?

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Objective

This case describes the intrapleural administration of alteplase and dornase alfa to manage a complex loculated parapneumonic effusion with empyema.

What Does the Literature Say?

Management of parapneumonic effusion involves sampling and culture of pleural fluid, drainage of fluid via a chest tube and commencement of antibiotic therapy. In patients who do not show improvement, surgical intervention is considered. Thoracic procedures that may be undertaken include video-assisted thoracoscopic surgery or thoracotomy and open drainage.¹

An additional approach suggested in the literature involves intrapleural administration of recombinant tissue plasminogen activator, alteplase, and recombinant human DNase, dornase alfa. Alteplase breaks down fibrinous adhesions and DNase reduces viscosity of pleural fluid, improving drainage.^{1,2} In the Multi-Centre Intrapleural Sepsis Trial 2 study, combined intrapleural administration of these agents reduced length of hospital stay and frequency of surgical referral.² This therapy is described as a management option in the therapeutic guidelines, however currently these medications are not listed in the Australian Register of Therapeutic Goods for this indication.^{1,3}

Presenting Complaint

- A middle aged female, presents to the emergency department (ED) with fever, shortness of breath (SOB), poor oral intake and right sided pleuritic chest pain.
- She reports a ten day history of lethargy, myalgia and productive cough with rusty sputum. She tested positive for influenza A following a swab conducted by her GP.
- On presentation to ED our patient is diagnosed with community acquired pneumonia (CAP) on background of influenza A.

Relevant Patient History

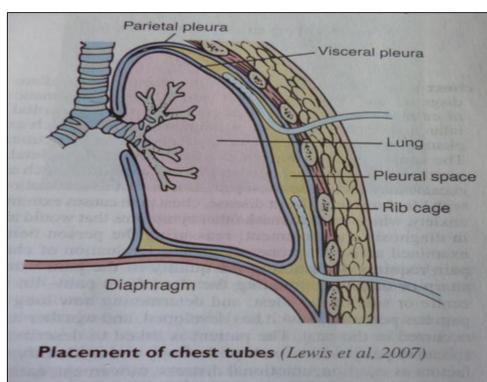
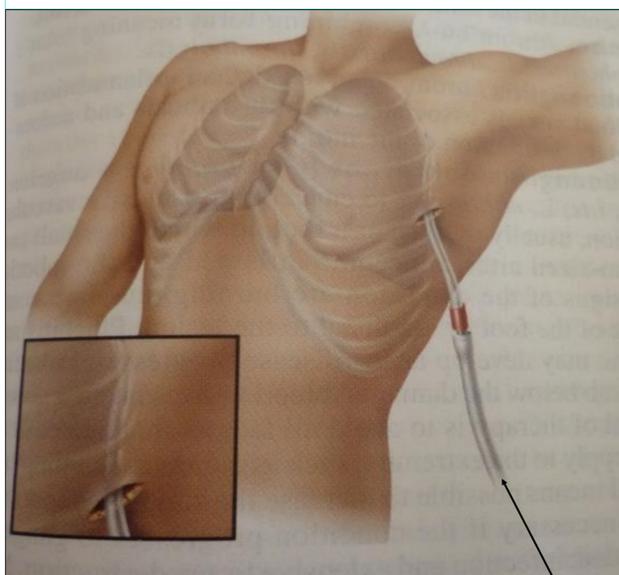
- Ex-smoker
- Obstructive sleep apnoea - not on CPAP

Case Progress

- Our patient is commenced on intravenous antibiotics to manage her pneumonia.
- She continues to complain of ongoing pleuritic chest pain and SOB.
- She becomes septic and is transferred to the critical care unit (CCU).
- A chest computed tomography (CT) is conducted showing a large complex right sided pleural effusion with thick internal septations and loculations.
- An intercostal catheter (ICC) is placed for drainage of pleural fluid and a sample of the fluid is taken for analysis.
- The ongoing pleuritic chest pain and ICC associated pain is managed by the acute pain service with simple + opioid analgesia, and ketamine.

Instructions for Intrapleural Administration

1. Draw up 10mg of alteplase in a syringe with 30mL of normal saline.
2. Clamp chest tube.
3. Flush chest tube with 10mL normal saline.
4. Administer intrapleural alteplase, then flush with 60mL of normal saline.
5. Wait for one hour.
6. Then draw up 5mg of DNase in 30mL sterile water.
7. Flush tube with 10mL of normal saline.
8. Administer intrapleural DNase, then flush with 60mL normal saline.
9. Wait for one hour.
10. Open tube and allow fluid to be drained.



**Alteplase 10mg bd in 30mL normal saline
AND
Dornase alfa 5mg bd in 30mL sterile water**

Intrapleural administration

Pharmacist Role

- Dedicated CCU pharmacist in a regional hospital.
- Participation in CCU ward rounds.
- Review for drug interactions.
- Timely supply of medication.
- Collaborate with medical team to ensure nursing team are confident with administration of medication via intrapleural route.
- Monitor for adverse effects: chest pain, allergic reactions, pleural haemorrhage.

Case Outcome

- 9 doses (4.5 days) of intrapleural alteplase and DNase are administered.
- Fluid drainage is improved.
- Patient does not require surgery.
- Patient does not require transfer to a tertiary hospital.
- On day 13, our patient is discharged on a four week course of oral amoxicillin/clavulanic acid 875/125mg bd.
- A follow up CT chest, 5 weeks post discharge, shows no evidence of pleural effusion.

References:

1. Respiratory Expert Group. Therapeutic Guidelines: respiratory. Version 5. Melbourne: Therapeutic Guidelines Limited; 2015.
2. Rahman NM, Maskell NA, West A, Teoh R, Arnold A, Mackinlay C, Peckham D, Davies CWH, Ali N, Kinnear W, Bentley A, Kahan BC, Wrightson JM, Davies HE, Hooper CE, Lee G, Hedley EL, Crosthwaite N, Choo L, Helm EJ, Gleeson FV, Nunn AJ, Davies R. Intrapleural use of tissue plasminogen activator and DNase in pleural infection. N Engl J Med [Internet]. Aug 2011 [cited Apr 2019]; 365(6):518-526. Available from: <https://www.nejm.org/doi/full/10.1056/NEJMoa1012740> DOI: 10.1056/NEJMoa1012740
3. Therapeutic Goods Administration. Australian Register of Therapeutic Goods [Internet]. Australia: Department of Health; 2019. Available from: <https://www.tga.gov.au/artg>
4. Images: Harris P, Nagy S, Vardaxis N. Mosby's dictionary of medicine, nursing & health professions. 2nd Edn. Australia: Elsevier; 2010.

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Northeast Health Wangaratta
Every patient, Every time

