Should pregnant patients with a recurrent or persistent pneumothorax undergo surgery?

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Abstract

A 29-year old woman at 26 weeks gestation (gravida 3 and para 0) presented with an acute left-sided pneumothorax. She had a 10 pack-year smoking history and no other relevant medical history. Over the next 3 weeks, she had three recurrences of her left-sided pneumothorax, each of which was managed by intercostal drain insertion. During the fourth episode of pneumothorax, after chest drain insertion there was a continued air-leak for 4 days. She was referred to the cardiothoracic service for further management of this problem. A best evidence topic was constructed according to a structured protocol to answer the question: in pregnant patients with a recurrent or persistent pneumothorax, is surgery safer compared with conservative treatment for the wellbeing of the patient and the foetus? The 2010 guidelines for the management of pneumothorax state that there is Level C evidence that simple observation and aspiration are usually effective during pregnancy, with elective assisted delivery and regional anaesthesia at or near term. The guidelines also state Level D evidence that a video-assisted thoracoscopic surgery (VATS) procedure should be considered after birth. Three hundred and eighty-four papers were found, and from these, four papers were identified describing 79 cases of pneumothorax in pregnancy to provide the best evidence to answer the question. Conservative treatment by observation alone with or without tube thoracostomy compared with surgical treatment by VATS or thoracotomy are the options used in the observed literature reviews. All reports observe no difference in outcome to the mother or foetus if a conservative approach (observation or tube thoracostomy) is used compared with surgery prior to the delivery of the baby. However, an initial conservative approach could lead to surgery after delivery for a persistent pneumothorax in as much as 40% of patients. A persistent pneumothorax after delivery that might require surgery delays discharge home and compromises the normal interaction between the mother and new-born child, which might be distressing. For informed consent, the implications of the risk of persistent pneumothorax requiring surgery after delivery where a conservative approach is used initially should be discussed with the patient and family to aid decision making.

Keywords: Pregnancy • Pneumothorax • Surgery

INTRODUCTION

A best evidence topic was constructed according to a structured protocol. This is fully described in the ICVTS [1].

THREE-PART QUESTION

[In pregnant patients with a recurrent or persistent pneumothorax] is [surgery] compared with [conservative treatment] safer for the [wellbeing of the patient and the foetus]?

CLINICAL SCENARIO

A 29-year old woman at 26 weeks gestation (gravida 3 and para 0) presented with an acute left-sided pneumothorax. She had a 10 pack-year smoking history and no other relevant medical history. This was aspirated and the lung re-expanded, and she was discharged. She presented a week later and was treated with a fine bore tunneled intercostal drain. Four days after insertion, the intercostal drain was removed after lung re-inflation was confirmed. After a further 48 h observation, she was discharged home. Over the next 3 weeks, she had three recurrences of her left-sided pneumothorax, each of which was managed by intercostal drain insertion. During the fourth episode of pneumothorax, after chest drain insertion there was a continued air-leak for 4 days. She was referred to the cardiothoracic service for further management of this problem.

SEARCH STRATEGY

OVID was searched from 1948 to January 2013 (exp Pregnancy/ or pregnancy.mp.) AND (exp Pneumothorax/ or pneumothorax.mp).
Three hundred and eighty-four papers were found using the reported search. From these, four papers were identified describing 79 cases of pneumothorax in pregnancy to provide the best evidence to answer the question. These are presented in Table 1.

### RESULTS

The 2010 guidelines for the management of pneumothorax [4] state that there is Level C evidence that simple observation and aspiration are usually effective during pregnancy, with elective assisted delivery and regional anaesthesia at or near term. The

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**Table 1: Summary of best evidence topics**

<table>
<thead>
<tr>
<th>Authors, date, journal and country Study type (level of evidence)</th>
<th>Patient group</th>
<th>Outcomes</th>
<th>Key results</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wong et al. (2006), Hong Kong Med J, Hong Kong [2] Retrospective cohort study (level 3)</td>
<td>Multicentre experience of 36 cases of antepartum pneumothorax</td>
<td>Intercostal drain only in 11 Surgery by thoracotomy in 9 Surgery by VATS in 2</td>
<td>There were no maternal or foetal complications reported with antepartum surgical intervention</td>
<td>Surgical management of recurrent pneumothorax during pregnancy is well tolerated</td>
</tr>
<tr>
<td>Gorospe et al. (2002), South Med J, Spain [3] Retrospective cohort study (level 3)</td>
<td>Multicentre experience of 41 cases of antepartum pneumothorax</td>
<td>Initial treatment was observation in 22%, tube thoracostomy in 75% and thoracotomy in 3%</td>
<td>Of those treated by observation only, 78% had resolution, compared with 40% of those treated by tube thoracostomy</td>
<td>The implications of a persistent pneumothorax (± intervention) after initial therapy must be discussed with the patient</td>
</tr>
<tr>
<td>MacDuff et al. (2010), Thorax, UK [4] Expert opinion (level 5)</td>
<td>Management of spontaneous pneumothorax: British Thoracic Society pleural disease guideline 2010</td>
<td>Level C evidence that simple observation and aspiration are usually effective during pregnancy, with elective assisted delivery and regional anaesthesia at or near term</td>
<td>Recommendations are for conservative treatment initially VATS is preferred surgical treatment at or near term</td>
<td>A randomized controlled trial would be ideal to determine best practice, but may not be practical</td>
</tr>
<tr>
<td>Sills et al. (2006), J Cardiothorac Surg, USA [5] Case report (level 5)</td>
<td>21-year old, three spontaneous left pneumothoraces during second pregnancy, having already experienced four right pneumothoraces in a prior pregnancy aged 19</td>
<td>Outcomes after pneumothorax treatment in pregnant patients</td>
<td>Initial management by chest drainage. VATS surgery performed after fourth right pneumothorax The series of left pneumothoraces culminated in VATS surgery</td>
<td>For both pregnancies, unassisted vaginal delivery was performed with no adverse perinatal sequelae</td>
</tr>
</tbody>
</table>
guidelines also state Level D evidence that a video-assisted thoracoscopic surgery (VATS) procedure should be considered after birth.

Significant pneumothoraces leading to hypoxia can be poorly tolerated by both pregnant mother and foetus [6]. Conservative treatment by observation alone with or without tube thoracostomy compared with surgical treatment by VATS or thoracotomy are the options used in the observed literature reviews. Literature review of 41 cases by Gorospe et al. [3] showed that, for patients treated by observation alone, 78% had resolution, compared with 40% of those treated by tube thoracostomy. Of the total group, 40% ultimately required surgery by thoracotomy for recurrence or persistence of the initial pneumothorax. This paper was from 2002, and according to current practices, surgery is performed by the VATS approach as indicated in the 2010 British Thoracic Society guidelines [4].

All reports observe no difference in outcome to the mother or foetus if a conservative approach (observation or tube thoracostomy) is used compared with surgery prior to the delivery of the baby. However, an initial conservative approach could lead to surgery for a persistent pneumothorax in as much as 40% of patients as shown by Gorospe et al. [3].

A persistent pneumothorax after delivery that might require surgery delays discharge home and compromises the normal interaction between the mother and new-born child, which might be distressing. A safe, definitive surgical procedure prior to delivery prevents this from happening.

1–2% of pregnant women require a general anaesthesia during pregnancy for surgery unrelated to the delivery [7]. Emergency surgery is performed regardless of gestational age, as preserving the life of the mother is the primary goal; otherwise surgery is safe but best delayed until the second trimester to prevent the risk of teratogeneity and miscarriage [8].

**CLINICAL BOTTOM LINE**

There seems to be no difference in outcome to the mother or foetus if a conservative approach (observation or tube thoracostomy) is used compared with surgery prior to the delivery of the baby. However, the implications of a persistent pneumothorax requiring surgery after delivery, on the interaction between mother and new-born child, should be discussed with the patient and family to aid decision making.

**Conflict of interest:** none declared.

**REFERENCES**