

context of severe asthma. Identifying the neutrophil survival factor(s) present in this patient group is clearly an important next step and, if targetable, may form the basis of a new therapeutic approach for this difficult-to-treat patient group.

While this study provides further evidence that neutrophil apoptosis may be deregulated in severe asthma, a number of key questions remain. We need to understand the dynamics of cell migration into and out of the airway wall and determine the true residency times and the relative contribution of apoptosis and, indeed, other non-apoptotic death mechanisms such as autophagy, NETosis<sup>28</sup> and cytolysis in granulocyte clearance. We also need to understand the signals that block apoptosis in the airway wall (yet seemingly not in the airway lumen) and to determine what drives the switch from eosinophil- to neutrophil-dominated inflammation. Drugs which target the removal rather than the arrival of granulocytes in tissues are now emerging,<sup>29</sup> and such agents may offer an important adjunct to current asthma treatments.

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# British Thoracic Society Pleural Disease Guidelines - 2010 update

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## INTRODUCTION

Pleural disease remains common, affecting over 3000 people per million population each year. It therefore presents a significant contribution to the workload of respiratory

physicians. These guidelines attempt to summarise the available evidence to aid the healthcare professional in delivering good quality patient care.

## AIMS AND OBJECTIVES OF THE GUIDELINE

Since the last BTS pleural disease guidelines were published in 2003<sup>1</sup> a large number of good quality primary research papers have been published and the guidelines need to reflect this new data. In addition, there was a need to develop new sections on local anaesthetic (LA) thoracoscopy and thoracic ultrasound to reflect changes in clinical practice.

## AREAS COVERED

The guideline is divided into the following sections:

1. Investigation of a unilateral pleural effusion in adults
2. Management of spontaneous pneumothorax
3. Management of a malignant pleural effusion
4. Management of pleural infection in adults
5. Local anaesthetic thoracoscopy
6. Chest drain insertion and thoracic ultrasound

## METHODOLOGY

A working party was established with representation from a range of professionals with an interest in pleural disease together with a lay representative. The guidelines are based upon the best available evidence. The methodology followed the criteria as set out by the AGREE collaboration in the document, The AGREE instrument, available on-line at: <http://www.agreecollaboration.org/instrument/>. The scope and purpose of the guideline had been agreed and defined in consultation with all potential stakeholders representing the medical and nursing professions, patient groups, health management and industry. Guideline members identified and formulated a set of key clinical questions in PICO (T) (Population, Intervention, Comparison, Outcome and Time) format to inform the search strategies for the literature search. The BTS commissioned a bespoke literature search using the search strategies shown in detail on the BTS website (<http://www.brit-thoracic.org.uk>). Searches were limited to English and adult literature. 19,425 potential papers were identified by the search. 17393 abstracts were rejected through the criteria outlined above and 2032 full papers were ordered for critical appraisal. A further 591 full papers were rejected because they fell outside the area of focus and scope of the guideline. Formal critical appraisal to assess clinical relevance and scientific rigor of 1441 papers were done independently by at least two guideline reviewers using the SIGN critical appraisal checklists. The guideline reviewers identified an additional 148 papers during the period of guideline development, which were added and critically appraised. The evidence in each study was graded using the SIGN formulated levels of evidence.

This guideline is strengthened by involvement from range of stakeholders and the final guideline is endorsed by 13 Royal Colleges and societies. We hope this

will increase its appeal and broaden its use across other specialities.

## MAIN RECOMMENDATIONS

### Patient safety

The key theme running across these guidelines are ways to improve and maintain patient safety. Issues with chest drain placement were highlighted by, among others, the National Patient Safety Agency alert who reported 12 deaths and 15 cases of serious harm related to chest drain insertion between January 2005 and March 2008.<sup>2-3</sup> Common factors related to the incidents included the lack of experience of the operator, an inadequate level of supervision, failure to follow the manufacturer's instructions, choice of a suboptimal insertion site and poor patient positioning, suboptimal imaging and a lack of familiarity with published guidelines. The use of thoracic ultrasound in pleural procedures (except pneumothorax) has been clearly shown to detect fluid more accurately than by chest radiography, to decrease the incidence of failed aspirations and the incidence of complications, and to be significantly better than clinical examination in choosing a site for safe aspiration or drain insertion. It is therefore highly recommended for all pleural fluid procedures.<sup>4-5</sup>

### Thoracic ultrasound and chest drain insertion

This new section describes the basics of the thoracic ultrasound technique and includes common findings and pitfalls. It clearly states that at least level 1 competency is required to safely perform independent thoracic ultrasound.<sup>6</sup>

A detailed description of the technique for Seldinger chest drain insertion has also been included. Written consent should be obtained for all chest drain insertions, except in emergency situations and the guideline also includes a standard patient information leaflet for chest drain insertion.

It also recommends that pleural procedures should only be performed in an emergency out side of normal working hours and that chest drains should be inserted in a clean area/room, using full aseptic technique, as it is noted that the iatrogenic infection rate is too high in many published studies.<sup>7</sup>

### Investigation of undiagnosed effusions

This document confirms that there is no place for Abrams needles in the investigation of suspected pleural malignancy due to its poor yield and complication rate.<sup>8</sup> When pleural tissue is required for diagnostic

purposed local anaesthetic thoracoscopy, surgical VATS or a radiology guided pleural biopsy are the methods of choice. The only exception occurs in regions with a high incidence of tuberculosis, as the diagnostic yield with Abrams needles, in TB pleuritis, remains high, but are still not as high as thoracoscopic biopsies.<sup>9</sup>

### Pneumothorax

These guidelines contain new sections on pneumothorax in pregnancy and in patients with cystic fibrosis as well as catamenial pneumothorax. They highlight important issues regarding chest radiograph interpretation with PACS and recommend a diagnostic PACS workstation should be used for image review if making decisions in a patient with a possible pneumothorax.<sup>10</sup>

There is now a new single flow diagram, combining the management pathway for both primary and secondary pneumothorax. This is now simpler for the end-user to use. The BTS has also arranged to send a wall chart of this flow diagram to every NHS accident and emergency department in the UK to help encourage best practice. This initiative has been warmly welcomed by the Society for Acute Medicine.

Other changes include the recognition that in carefully selected, asymptomatic patients with large primary spontaneous pneumothorax, observation alone is a possible treatment option. When intervention is required, simple aspiration remains the initial treatment of choice, but that if this fails once a further attempt at aspiration is unlikely to be helpful and a small bore chest tube should be inserted.<sup>10</sup>

### Management of malignant pleural effusions

These guidelines continue to recommend talc as the most efficacious agent for pleurodesis. However, they now emphasise that calibrated talc should be used to reduce side effects. Small bore chest tubes are recommended first line for pleural drainage as they are more comfortable for patients and no less efficacious.<sup>11</sup>

They also recognise that when the underlying lung is trapped, a previous pleurodesis attempt has failed or when pleural fluid production is very high, a tunnelled pleural catheter might be appropriate.<sup>11</sup>

### Local anaesthetic thoracoscopy

These new guidelines reflect the changing practice in the UK, which is now more in line with the rest of Europe reflecting easier access to thoracoscopy as a safe and

reliable way of obtaining a histological diagnosis and performing a pleurodesis. They discuss the current literature in detail and also provide a web-based repository for how the procedure is performed.<sup>12</sup>

### Pleural infection

This guideline emphasises the continuing high morbidity and mortality related to this condition. It continues to recommend chest tube drainage for sizeable effusions with pH<7.2 or loculation in the context of clinical signs of infection/sepsis. It states the lack of evidence for a large chest tube being more efficacious than a small one and notes patients are more comfortable with a smaller tube. Differences between community acquired and hospital acquired pleural infection is also highlighted with a need for different empirical antibiotics at presentation.<sup>13</sup>

### Future directions and audit

It is recognised that there remain number of key unanswered questions pertaining to pleural disease and its management, which require study. Some of these are listed at the end of guideline and include use of tunnelled indwelling pleural catheters in the management of chronic end stage non malignant pleural effusions, the role and position of novel biomarkers in the diagnostic pathway for undiagnosed pleural effusions and the efficacy of talc poudrage versus talc slurry in malignant effusions.

Finally, the importance of audit is emphasised in the management of pleural disease and BTS has developed an audit tool for pleural procedures which is available via the online BTS audit system.<sup>14</sup>

### Concluding comments

The Guideline Group hope that these guidelines will prove both popular and useful in assisting physicians managing patients with pleural disease. We recognise that the literature pertaining to pleural disease is not always of high quality but hope that we have used the data available to produce a robust evidence based guideline which safeguards patients and drives up standards in pleural disease management. We also hope that greater engagement and endorsement from other medical specialities will broaden its appeal.

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