Investigation and management of unilateral pleural effusions

Nawal Ibraheem, MBChB; Elizabeth Turley, BMBCh; Keiumars Maleki, MRCP

INTRODUCTION

Pleural effusions, the result of the accumulation of fluid in the pleural space, are a common medical problem. They can be caused by several mechanisms, including increased permeability of pleural membrane, increased pulmonary capillary pressure, decreased negative intrapleural pressure, decreased oncotic pressure, and obstructed lymphatic flow.

Audit standards

To compare the methods of investigation and management of unilateral pleural effusions at Furness General Hospital (FGH) with guidelines from the British Thoracic Society (BTS).[1]

The guidelines were previously published in the Journal *courtesy of BMJ Publishing.*[2]

METHODS

A re-audit was carried out of patients admitted to FGH from December 2008 to December 2009 with unilateral pleural effusions. Overall, 31 patients with unilateral pleural effusions were identified, plus five patients with bilateral pleural effusions, and four patients with previously investigated effusions.

RESULTS

From the clinical history and examination, there were 19% transudate, 68% exudate and 13% unsure.

Of the 31 patients identified with unilateral pleural effusion, 43% underwent a pleural tap as their initial investigation, 48% had a chest drain inserted, and 9% had no aspiration attempted because they were too ill or effusion was deemed to be small (see figure 1).

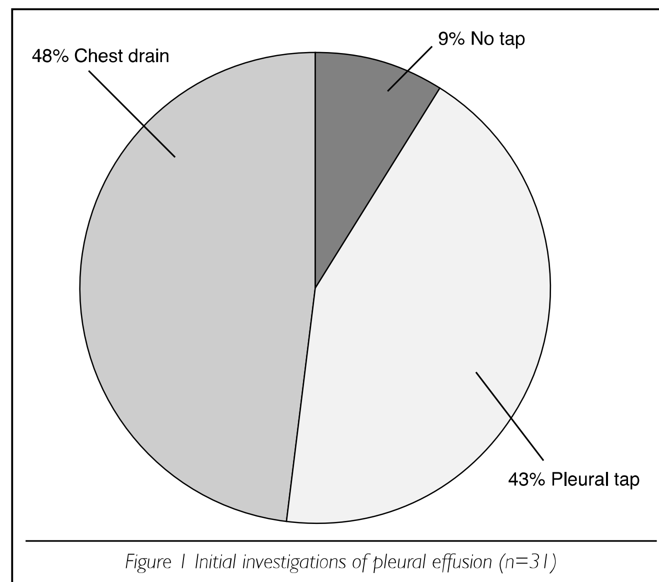
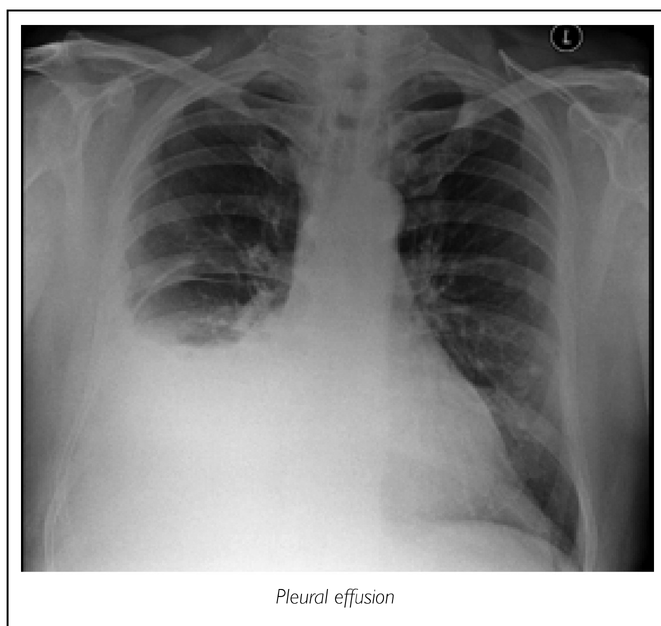


Figure 1 Initial investigations of pleural effusion (n=31)



Pleural effusion

The rate of documentation was 92% (last year, 89.7%), and documentation of fluid colour was 73% (last year, 73.1).

Eighty-eight percent of fluid samples were sent for protein level (85% last year), 96% for cytology (85% last year), 88% for microscopy, culture and sensitivity (85% last year), 96% for lactate dehydrogenase (LDH) level, 80.7% for acid fast bacilli AFB (75% last year), 76.9% for glucose (58% last year), 73% for PH level (52% last year), and 53% for gram stain (32% last year). (See figure 2.)

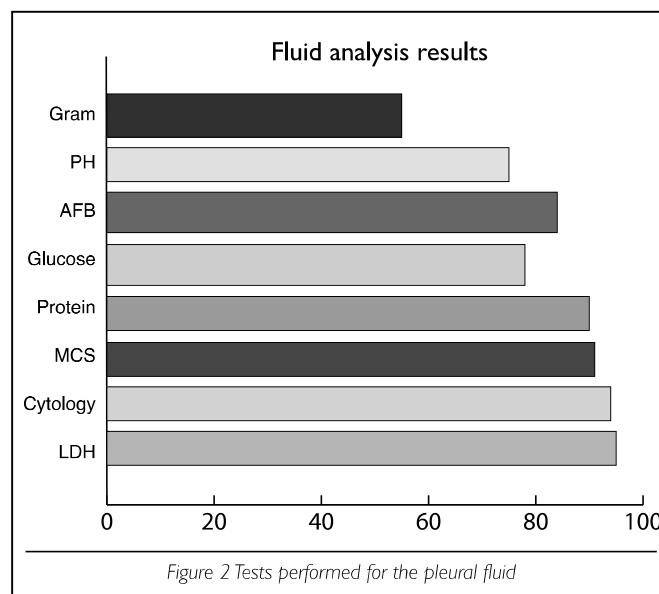


Figure 2 Tests performed for the pleural fluid

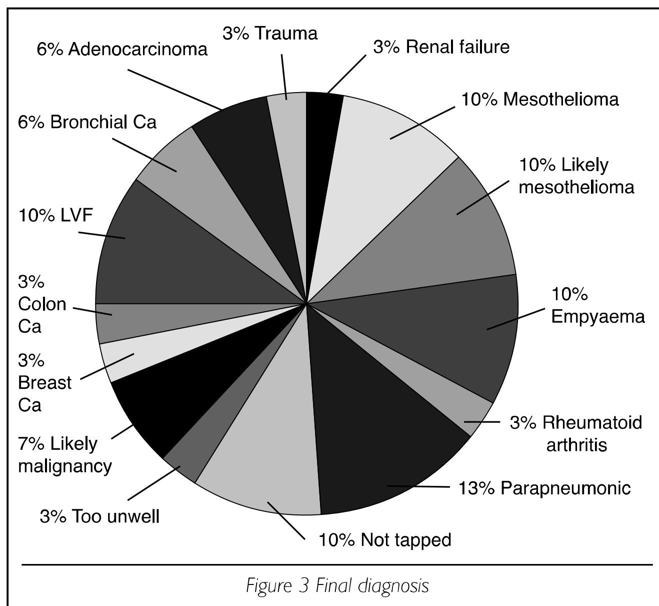


Figure 3 Final diagnosis

Following the initial tap, 13 patients had no diagnosis (last year 14 patients), all of them being referred to a chest physician (last year nine out of 13 patients were referred to a chest physician), and all of them had computed tomography (CT) scans of the chest.

See figure 3 for results of final diagnosis. Forty-two percent were confirmed, or very likely, cancers.

Only 33% of patients had all stages of their investigations performed according to BTS guidelines. Fifteen patients had their diagnosis following initial aspiration. Three patients were resolved, they had not been tapped.

CONCLUSION

There are improvements from last year, with more appropriate referrals to chest physicians. However, the majority of unilateral pleural effusions at FGH do not follow the BTS guidelines.

RECOMMENDATION

There is a need to increase awareness of the BTS guidelines amongst medical staff as this would reduce inappropriate initial investigations, such as chest drain insertion, and would expedite the processes involved in reaching a final diagnosis.

Pleural aspiration would be the appropriate initial investigation of a unilateral pleural effusion as it is less invasive and has a high success rate for achieving a diagnosis.

Malignant effusions can be diagnosed by pleural fluid cytology alone in only 60% of cases.

REFERENCES

1. Maskell NA, Butland RJA. British Thoracic Society guidelines for the investigations of a unilateral pleural effusion in adults. Thoracic 2003;58
   Available at:
   www.brit-thoracic.org.uk/Clinical Information/Pleural Disease/managementofpleuralDiseaseGuidelines/tabid/134/default.aspx

2. Lim C, Turley E, Maleki K. Investigation and management of unilateral pleural effusions. MBMJ 2009;5(12):375-6

> *“Only 33% of patients had all stages of their investigations performed according to BTS guidelines”*

Supervising author Dr Keiumars Maleki summarises the significance of this audit

Pleural effusion is the most common manifestation of pleural disorders. Pleural fluid accumulates when pleural fluid formation exceeds pleural fluid absorption. Pleural fluid analysis is very important because it may either give an instant diagnosis or will guide the clinician for further investigation.

The first step in analysing pleural fluid is to determine whether the effusion is a transudate or an exudates. Therefore, in all unilateral pleural effusion a sample should be sent to check for protein and lactate deghydrogenase (LDH). In this audit, a rate of 88% request for protein level is unsatisfactory. On the other hand, a 96% rate for LDH and an improving rate compared with a previous audit from 85% to 96% for cytology is encouraging. Overall, however, results from this second audit show investigation of pleural effusion still is not up to standards. The British Thoracic Society (BTS) standard is uncompromising: pleural fluid should **always** be sent for protein, lactate dehydrogenase, gram stain, cytology, and microbiological culture. Evidently we are not meeting these standards.

This re-audit has revealed that the BTS guideline for investigation of unilateral pleural effusion is still not followed by many clinicians. We are publishing this audit in order to attempt to address the problem. In order to improve consistency of investigation we should consider including the BTS algorithm for the investigation of a unilateral pleural effusion on the Trust's intranet in the hospital guidelines section. Another important advance step would be using ultrasound guidance at the bedside. Hopefully, this will improve the rate of successful pleural aspiration, less trauma and obtaining a better sample.