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DOCTORS IN TRAINING

What You Need to Know About: The Management of Malignant Pleural Effusion

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Abstract

Malignant pleural effusion (MPE) is a common complication of malignancy and is regularly seen on the general medicine take. Diagnosis of MPE is indicative of advanced or metastatic disease and carries a poor prognosis, with median survival ranging from 3 to 12 months. Despite recent advancements in systemic anti-cancer treatment, the goal of management in MPE remains the palliation of symptoms. This article reviews the current guidelines and evidence on the assessment and management of MPE. Assessment involves imaging techniques such chest X-ray and computed tomography (CT) scans, whilst thoracic ultrasound has a crucial role in guiding diagnostic procedures. Diagnostic pleural aspiration remains a cornerstone for establishing a tissue diagnosis, although its yield is variable depending on tumour type. Emergence of targeted immunotherapy has necessitated the need for large tissue samples for molecular testing, driving the need for pleural biopsies in relevant cases. Management encompasses therapeutic aspiration, chemical pleurodesis and indwelling pleural catheter insertion, each offering distinct benefits and considerations. Recent developments in equipment and combined approaches have enhanced patient outcomes and quality of life. The complexity of MPE requires a patient-centred approach to assessment and management and where possible patients should be managed with specialists in pleural disease on an outpatient basis.

Key words: malignant pleural effusion; diagnosis; imaging; pleural disease; symptomatic treatment; thoracentesis

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Introduction

Malignant pleural effusion (MPE) is defined as the accumulation of fluid in the pleural space, accompanied by the presence of malignant cells or tissue. It is a common presentation on the acute medical take, and as such, knowledge of current management strategies is important for the general physician.

Pleural effusion is a common complication of malignant disease, affecting around 15% of all cancer patients (Addala et al, 2022). The diagnosis of MPE is indicative of advanced or metastatic disease. On diagnosis, the prognosis is poor. Median survival ranges from 3 to 12 months (Bibby et al, 2018). Variation in survival rates depends on the underlying cancer, treatment options, and the patient's performance status.

Most cases of MPE are due to pleural metastases secondary to lung cancer, breast cancer, or lymphoma. Mesothelioma is the most common primary pleural

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malignancy, with MPE present in 70% of mesothelioma patients at presentation (Spella et al, 2015; Bibby et al, 2016).

Despite continued advances in systemic anti-cancer treatments, and an increase in overall cancer survival rates, the goal of management in MPE remains palliation of symptoms.

In the UK, there are an estimated 50,000 new cases of MPE diagnosed each year (Addala et al, 2022). As the incidence of cancer increases worldwide, this figure is predicted to rise. Therefore, it is important for general physicians to understand the management of MPE (Psallidas et al, 2016).

Presentation

MPE may be asymptomatic picked up as incidental finding on routine imaging or staging of the known primary cancer. Most patients however have a symptomatic presentation. The most prevalent presenting symptoms are breathlessness, chest pain and cough.

Breathlessness is the commonest symptom, affecting around 57% of patients with MPE (Fortin and Tremblay, 2015). Breathlessness usually progresses gradually over a period of weeks to months as the volume of fluid accumulated within the pleural space increases, impairing both gas exchange and diaphragmatic function.

Malignant disease invading the parietal pleura, chest wall and ribs can cause significant chest pain for patients. Chest pain can be especially challenging to manage in mesothelioma patients (Bibby et al, 2016).

Examination

The physical examination findings of a patient with a pleural effusion are reduced chest expansion, stony dullness on percussion and reduced breath sounds on the affected side. There may also be evidence of mediastinal shift if a pleural effusion is massive.

A thorough examination of a patient with a "new" pleural effusion is important as it may reveal findings relating to an underlying primary tumour.

Diagnosis

Imaging Techniques

There has been significant advancement in the imaging techniques used in the assessment of pleural effusion.

Chest X-Ray

Erect posterior-anterior chest X-ray (CXR) remains the initial imaging technique used in assessment of pleural effusion.

On CXR, the earliest sign of pleural fluid causes blunting of the costophrenic angle, and flattening of the hemidiaphragm (Fig. 1). These characteristic features typically occur when there is more than 200 mL of pleural fluid present. As the size of the effusion increases a "meniscus" forms at the upper border of the fluid (Fig. 2).

Eventually there can be complete opacification or "white-out" of the hemithorax with contralateral mediastinal shift (Fig. 3).

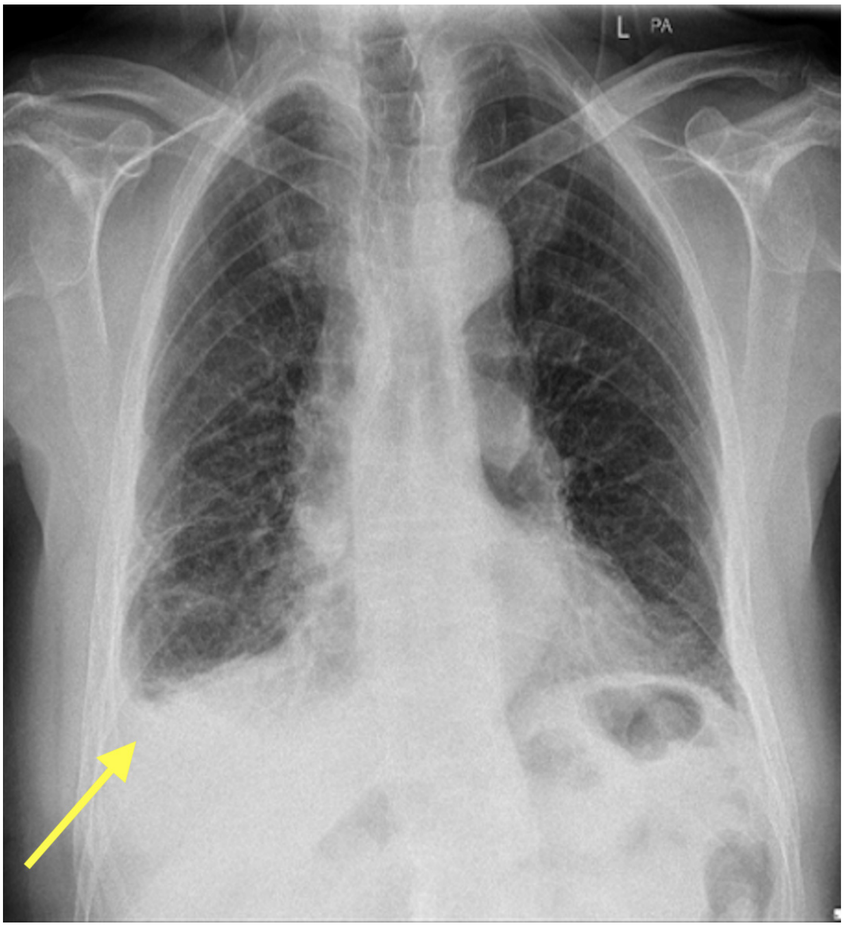

Fig. 1. Small right-sided pleural effusion with blunting of the right costophrenic angle, indicated by yellow arrow.

CXR does have its limitations when assessing pleural effusions. Small effusions and effusions where the fluid lies between the lung base the diaphragm (so-called 'sub-pulmonic' effusions) are difficult to detect. Malignant disease may also cause lobar collapse and can give the appearance of pleural effusion. In addition, it can be difficult to distinguish between fluid and solid pleural disease on CXR (Hooper et al, 2010).

CT Scan

Several of the issues with CXR can be overcome by CT imaging. A CT scan can detect much smaller pleural effusions and is more accurate at differentiating fluid from solid disease. CT imaging can also identify the probable primary cancer and therefore all patients with a suspected MPE should undergo CT imaging (Karkhanis and Joshi, 2012).

Contrast-enhanced CT imaging is required for optimal assessment of patients with suspected MPE, as contrast enhancement allows for easier detection of findings suggestive of cancer such as pleural thickening or nodules (Figs. 4,5).

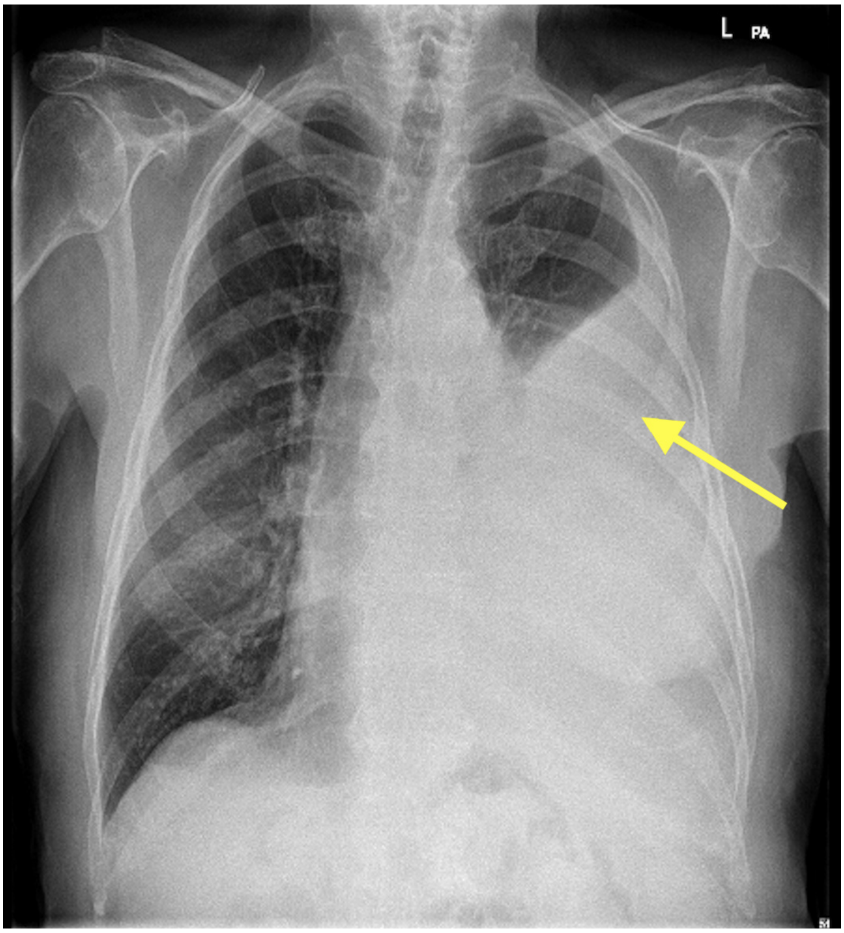

Fig. 2. Large unilateral left-sided pleural effusion with meniscus formation, indicated by yellow arrow.

The timing delay between contrast injection to scan has an impact on the difficulty to visualise pleural lesions. Delayed phase contrast-enhanced CT has been shown preferable to early phase for evaluating pleural lesions. Current British Thoracic Society guidance recommends a 60-second delay when imaging a patient with suspected malignant mesothelioma (Roberts et al, 2023).

CT pulmonary angiography has also been shown to be a more difficult modality for assessing pleural disease than thoracic CT scans performed in the venous phase (Arenas-Jiménez et al, 2018).

CT imaging can underestimate the complexity of the pleural effusions and can paradoxically overestimate the volume of pleural fluid that is present. Therefore, all patients with suspected MPE should still have ultrasound imaging prior to any pleural intervention.

Thoracic Ultrasound

The use of thoracic ultrasound by trained physicians can confirm the presence and quantify the volume of pleural fluid. Thoracic ultrasound is the most accurate imaging technique for characterising pleural fluid and has a better sensitivity for detecting septations within pleural fluid than CT imaging (Yang et al, 2024).

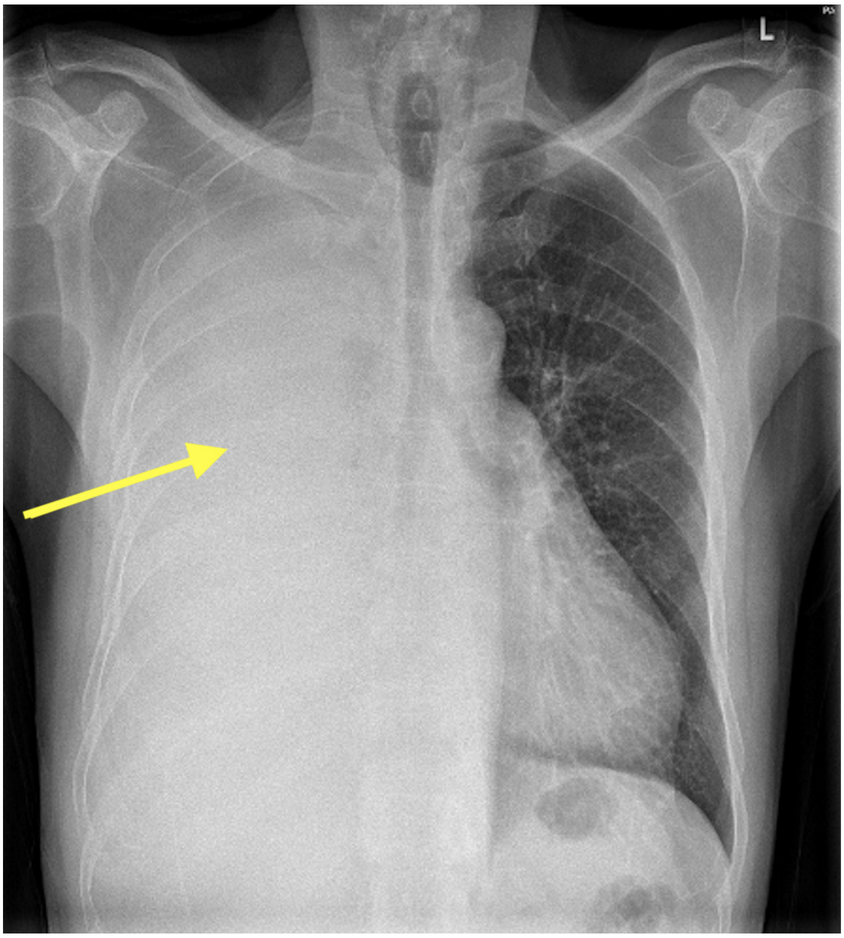

Fig. 3. Massive unilateral right-sided pleural effusion causing a "white-out", indicated by yellow arrow.

Ultrasound is the key tool for identifying a safe site for pleural aspiration and deciding what pleural intervention is most appropriate (Roberts et al, 2023).

Thoracic ultrasound can also be used to detect certain radiological features which are highly suggestive of underlying malignancy such as pleural or diaphragmatic nodularity, or thickening (Figs. 6,7) (Bhatnagar et al, 2016).

Current guidance recommends the use of ultrasound guidance when performing all pleural procedures, as it has been shown to reduce the rate of procedural complications, particularly accidental organ damage and pneumothorax (Hallifax et al, 2017).

Diagnostic Pleural Aspiration

Diagnostic aspiration should be routinely performed under ultrasound guidance. In addition to improving patient safety, thoracic ultrasound has been shown to increase the diagnostic yield of diagnostic aspiration and reduce the need for repeated attempts (Hooper et al, 2010).

Using an aseptic technique, a green needle (21G) attached to a syringe is inserted into the pleural space and a sample of pleural fluid is aspirated. Local anaesthetic is not often required for routine diagnostic aspiration.

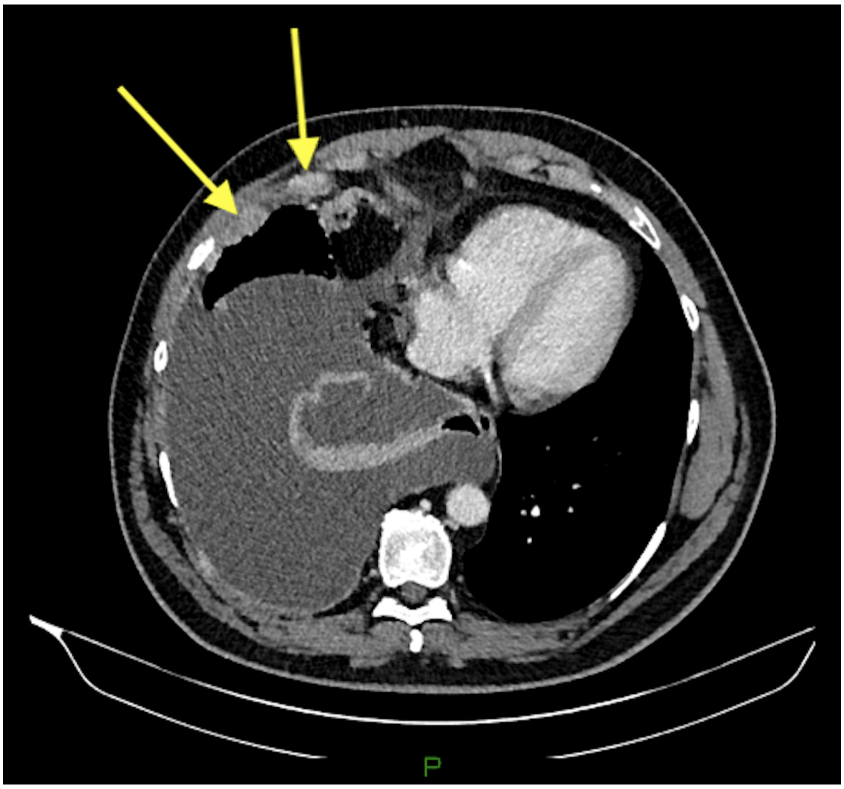

Fig. 4. Right-sided malignant pleural effusion. The yellow arrows show evidence of subtle pleural thickening.

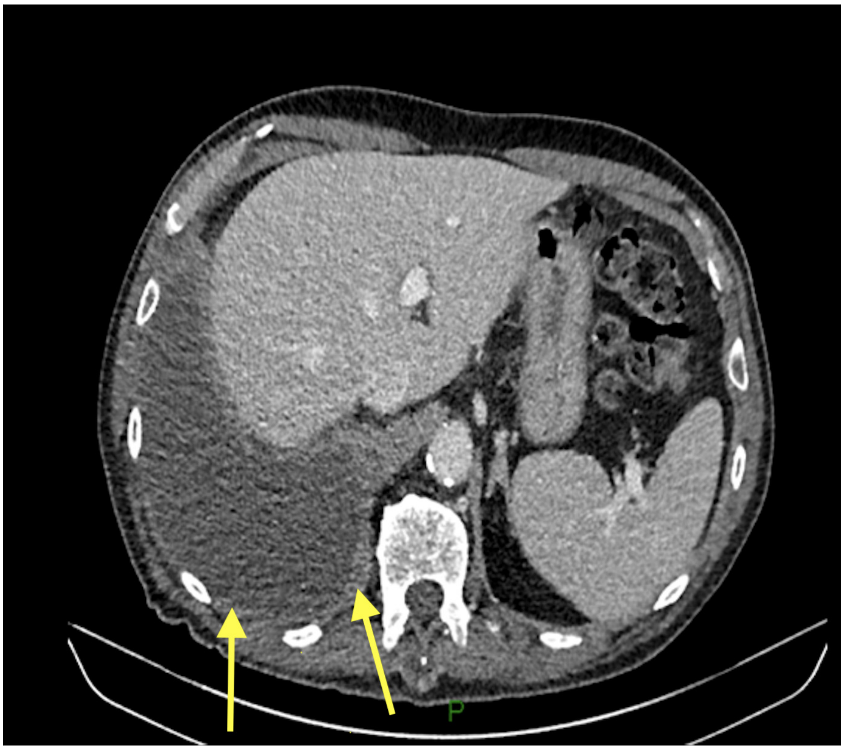

Fig. 5. Right-sided malignant pleural effusion with pleural enhancement, indicated by the yellow arrows.

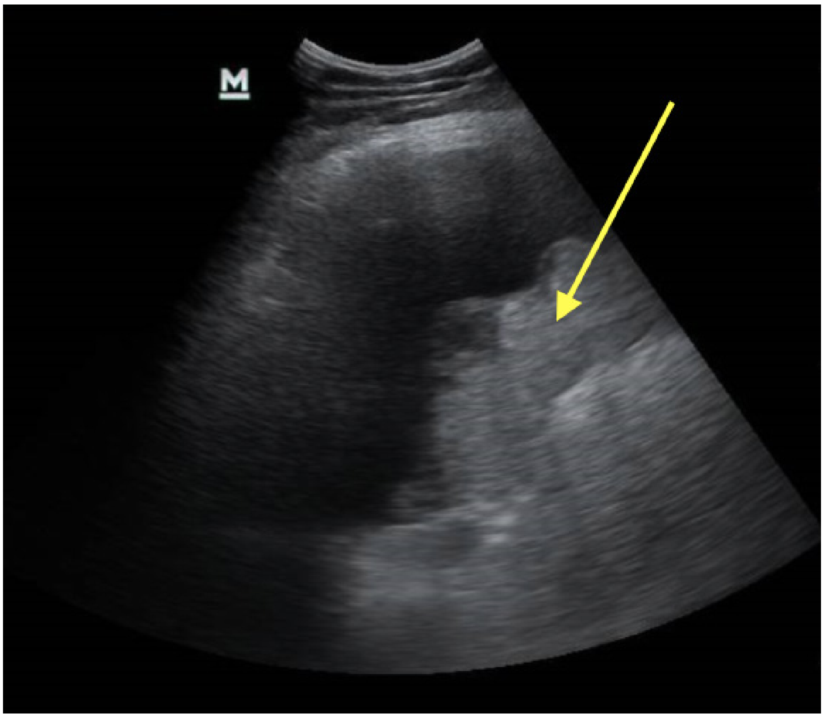

Fig. 6. Malignant pleural effusion with malignant diaphragmatic nodularity indicated by yellow arrow.

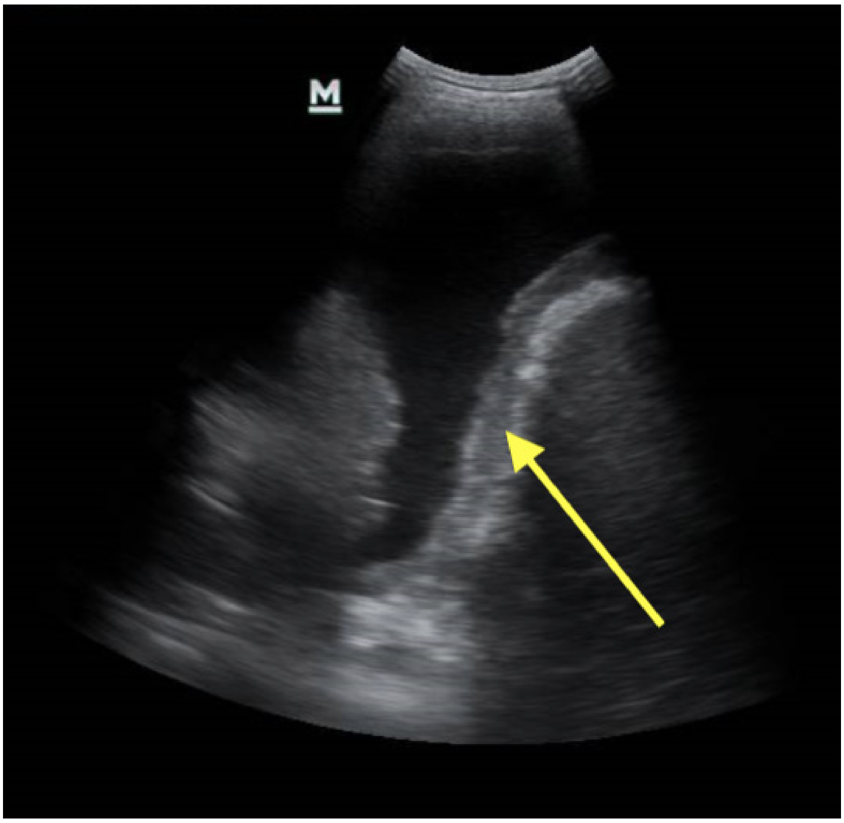

Fig. 7. Malignant pleural effusion with uniform diaphragmatic malignant pleural thickening indicated by yellow arrow.

A sample of pleural fluid (around 40–60 mL is recommended) should be sent for cytological analysis. In around 60% of cases of MPE, diagnosis can be made by pleural fluid cytology. Diagnostic yield of pleural fluid cytology depends on tumour type. Metastatic adenocarcinoma from any site has the highest diagnostic yield of the carcinomas. When considering other tissue types in lung cancer, squamous cell has very low yield in pleural fluid cytology alone. Some cancers can't achieve pathological confirmation from pleural fluid cytology alone such as mesothelioma and others like lymphoma have an extremely low yield. Pleural biopsy remains gold standard for diagnosis in mesothelioma (Psallidas et al, 2016). When the initial cytology result is negative, the diagnostic yield progressively decreases with repeated aspirations. One study reported that an initial diagnostic aspiration has a yield of 65%, a further second aspiration has a yield of 27% and third only 5% (Garcia et al, 1994).

The emergence of immunotherapy and targeted therapy against specific driver oncogenes (e.g., Epidermal Growth Factor Receptor (EGFR) mutation or Anaplastic Lymphoma Kinase (ALK) rearrangements) for lung cancer treatment has increased the requirement for larger tissue samples for molecular testing (Jose, 2016). Cellular pleural fluid samples can usually provide enough tissue for such molecular tests, but pleural biopsy may be required where this is insufficient.

The remaining pleural sample should be sent for biochemical analysis to distinguish between exudative and transudative effusions. Further samples should be sent for microbiological (5 mL) and possibly mycobacterial (5 mL) assessment (Hooper et al, 2010). Biochemistry can assist with characteristics in pleural infection (pH, glucose) or inflammatory causes but has little further role in diagnosis of MPE.

If pleural fluid appears "milky", chylothorax should be considered. Pleural fluid should be tested for the presence of chylomicrons and triglyceride levels should be measured. The presence of chylomicrons and pleural fluid triglycerides levels $>1.24\ \text{mmol}\cdot\text{L}^{-1}$ are diagnostic of chylothorax. Although most commonly a result of trauma to the thoracic ducts following thoracic surgery, chylothorax can be caused by lymphoma or other metastatic malignancies (Ur Rehman and Sivakumar, 2022).

Local Anaesthetic (or Medical) Thoracoscopy (LAT)

In cases where initial pleural fluid cytology has been inconclusive or more material is required for molecular testing, it is recommended to obtain a sample of pleural tissue for diagnosis. In this situation, Local Anaesthetic (or Medical) Thoracoscopy (LAT) is often considered the next investigation of choice.

LAT is a procedure performed with increasing frequency by respiratory physicians and is carried out under local anaesthetic with conscious sedation. Thoracoscopy allows for direct visualisation of the thoracic cavity by using either a rigid or semi-rigid thoracoscope. Pleural biopsies can then be taken from identified areas of concern. Definitive means of preventing re-accumulation (such as talc pleurodesis or pleural catheter insertion—see below) can also be performed allowing a combined diagnostic and therapeutic procedure.

It is considered a safe procedure and is well tolerated by patients. It has a high sensitivity for malignant pleural disease of over 90% (Karkhanis and Joshi, 2012).

Video-Assisted Thoracoscopic Surgery (VATS)

Performed under general anaesthetic usually by thoracic surgeons, Video-Assisted Thoracoscopic Surgery (VATS) has a similarly high diagnostic yield to medical thoracoscopy, and offers the same therapeutic options (Hooper et al, 2010).

It is not suitable for frailer patients who are unable to tolerate a general anaesthetic, but also has a relatively low complication rate. It is an important alternative in locations where medical thoracoscopy is not available. It may be a preferred option over LAT with smaller volume pleural effusions or predominantly solid disease.

Pleural Biopsy

Tissue diagnosis may also be obtained by image-guided pleural biopsy. Traditionally this has performed by radiologists under CT or ultrasound guidance, but advancements in thoracic ultrasound training in respiratory medicine have allowed physicians to adopt this technique. Trained physicians use thoracic ultrasound to identify pleural thickening or nodularity to take core biopsies from the affected areas.

Pleural biopsy is a minimally invasive procedure and can be performed as a day case. It is well tolerated and has low complication rates. It should be considered when patients are unsuitable for more invasive techniques or solid pleural disease is dominant. Pleural biopsy alone however does not offer the patient any therapeutic benefit and diagnostic yield is lower when compared to medical and surgical thoracoscopy (Bhatnagar et al, 2016).

Biomarkers

The gold standard for the diagnosis of MPE remains pleural fluid cytology and pleural biopsy. However, these methods are limited by their relative invasiveness and low sensitivity. This has prompted the advancement of the use of biomarkers as diagnostic tools in MPE (Kwok et al, 2023).

A study has shown that several tumour markers such as carcinoembryonic antigen (CEA) and cancer antigen 125 (CA 125), and proteins such as calprotectin, are elevated in pleural fluid from patients with MPE compared to those with non-malignant effusions (Zhang et al, 2021).

There is increasing evidence that abnormal DNA methylation is implicated in the development of malignancy. Further studies have investigated whether detecting methylation changes in DNA from pleural fluid samples could be used in the diagnosis of MPE. Increased methylation of certain genes found in pleural fluid has been shown to be associated with the presence of malignancy (Zhang et al, 2021; Bixby et al, 2024).

Tumour-associated macrophages (TAMs) are a subtype of macrophages found in the tumour microenvironment which suppress the immune response against the tumour and promote cancer development. Higher levels of TAMs and the presence of certain TAM subtypes have been found at higher levels in MPE than benign pleural effusion. TAMs appear to have a high diagnostic accuracy but the detection of TAMs in pleural fluid is done by flow cytometry which is expensive and time-consuming (Zhang et al, 2021).

At present the diagnostic accuracy of a single biomarker for MPE is relatively low and further research into a multi-marker strategy is required (Han et al, 2019; Zhang et al, 2021).

Therapeutic Interventions

A definitive pleural intervention is recommended in MPE and is defined as a procedure intended to give long-term symptomatic relief.

Therapeutic Aspiration (Thoracocentesis)

Large-volume therapeutic aspiration is a common first-line approach in MPE. It offers patients prompt symptomatic relief and allows time for a diagnosis to be established before considering definitive intervention.

Therapeutic aspiration is performed under ultrasound guidance using an aseptic technique and local anaesthetic. In recent years there have been significant improvement in the pleural catheter kits used in therapeutic aspiration. This has made the procedure less technically challenging and safer for patients (Walker et al, 2020).

Current guidelines recommend draining a maximum volume of 1.5 L. Higher drainage volumes are associated with an increased risk of re-expansion pulmonary oedema (RPO). RPO is a rare but potentially fatal complication resulting from the rapid expansion of the lung following the removal of fluid from the pleural space (Dias et al, 2010).

During drainage, it is important to monitor closely patients. One of the early symptoms of RPO is cough. Modern therapeutic aspiration kits have a three-way tap and drainage can be paused to allow coughing to settle. It is recommended to stop drainage before 1.5 L if the patient is continually coughing.

A post-procedure CXR should be performed when pleural aspiration has been challenging, required several attempts to locate the pleural space, the patient has become symptomatic or air has been aspirated (Hooper et al, 2010).

The use of therapeutic aspiration as a first-line approach in the management of symptomatic MPE allows the clinician to assess whether a patient's symptoms are improved by removing a large volume of pleural fluid. If they do not gain symptomatic improvement, then further pleural intervention is unlikely to benefit the patient. In this setting, non-expandable lungs should be considered alongside alternative contributors to the patients' symptoms (i.e., solid pleural or pulmonary disease, alternative diagnoses).

Following therapeutic aspiration, most patients at some point will experience fluid re-accumulation. How long this takes varies significantly between individuals and pathologies and can vary between a few days to a few months. Whilst repeated therapeutic aspiration is not considered a definitive option, for many patients this is a preferred management option, especially for patients with a short life expectancy, or a slow rate of fluid re-accumulation. This approach relies on centres to provide rapid access and ambulatory services to these patients.

For symptomatic patients with MPE caused by a malignancy likely to be responsive to the chemotherapy, systemic anti-cancer treatment should be combined with a definitive pleural procedure. Chemotherapy can reduce the production of malignant pleural fluid and patients undergoing chemotherapy treatment may find that the rate of fluid accumulation slows or stops indicating treatment response (Bibby et al, 2018).

Intercostal Chest Drain and Pleurodesis

Pleurodesis is defined as fusion of the parietal and visceral pleura with the aim of obliterating the pleural space thus preventing fluid re-accumulation. Chemical pleurodesis is the introduction of a chemical irritant into the pleural space to achieve this. It has been, historically, the first-line treatment option for the management of symptomatic MPE.

Several different agents, including doxycycline and bleomycin, have been trialled, but the most widely used and effective agent is medical talc (Bibby et al, 2018).

Talc is most commonly administered as a slurry through an intercostal chest drain. Pleural fluid is drained to dryness over a period of days to ensure pleural apposition before talc is instilled through the chest drain tubing. Talc slurry successfully achieves pleurodesis in fewer than 80% of cases (Psallidas et al, 2016) and is dependent on expertise.

The average length of inpatient stay for patients undergoing chest drain insertion and pleurodesis is 4 to 7 days. This is not an insignificant amount of time, especially in a population of patients with a poor prognosis (Bibby et al, 2018) and frailty. Talc pleurodesis may be hindered by drain failure, non-expandable lung or high-output pleural effusions.

Talc can also be administered as poudrage following a medical or surgical thoracoscopy. This was previously suggested to be the most effective method of achieving chemical pleurodesis, however, the data does not convincingly support the superiority of either method (Walker et al, 2020).

Talc pleurodesis causes an inflammatory response which may result in symptoms of fever and pain for patients. Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) have been historically avoided post-pleurodesis due to theoretical concerns that their anti-inflammatory effects would reduce pleurodesis success rate. A study has shown that there is no difference between high dose ibuprofen and opiates in pleurodesis success or pain (Walker et al, 2020) and therefore their avoidance is not required.

There are concerns about performing pleurodesis in an undiagnosed pleural effusion, if samples prove non-diagnostic, then repeat diagnostic procedures may be more difficult or impossible due to a destruction of the pleural space. This can result in patients not obtaining a diagnosis. It is therefore best practice to wait for pathological confirmation of malignancy or be sure you have achieved representative biopsy samples prior to performing a pleurodesis.

Indwelling Pleural Catheter

Indwelling pleural catheters (IPCs) are now routinely used to manage MPEs in an outpatient setting. Inserting an IPC is a similar procedure to intercostal chest drain insertion but does not usually require patients to be hospital inpatient stay.

An IPC is small bore silicone chest tube that is tunnelled through a 5 cm long subcutaneous tract. The catheter is inserted into the pleural space. Around 15 cm of tubing remains outside the body (Fig. 8). The proximal end of the tubing has an adapter which can be attached to a vacuum drainage bottle. When not in use, the adapter is capped off and the tubing is coiled away underneath a sterile dressing (Fig. 9).

Fig. 8. A patient with an indwelling pleural catheter (IPC).

The frequency of drainage is guided primarily by the patient’s symptoms, which can give patients a sense of control over their disease, but also the overall aim—is it to manage symptoms or achieve pleurodesis. In case of the latter, a more aggressive

Fig. 9. A patient with a dressing covering an IPC. The drain is curled beneath the dressing for the patients convenience.

drainage regime may be adopted. Drainage can be performed at home by a trained district nurse, or if given the proper education, by the patient or their relatives.

IPCs, and chest drain with pleurodesis, have both been shown to significantly improve symptom control and overall quality of life for patients with MPE (Fortin and Tremblay, 2015).

The second therapeutic intervention in malignant effusion trial (TIME-2) was a randomised controlled trial investigating whether IPCs were more effective than chest drain and talc pleurodesis at improving patient-reported breathlessness. At 42 days post-procedure there was no significant difference between the two management strategies at relieving breathlessness (Davies et al, 2012).

IPC insertions are associated with shorter inpatient stays and fewer further pleural procedures compared with pleurodesis via chest drain (Davies et al, 2012).

Unlike pleurodesis, however, IPCs require ongoing care such as drainages and dressing changes. Despite this requirement, studies have not demonstrated a significant adverse effect on patients' quality of life (Davies et al, 2012; Fortin and Tremblay, 2015).

With drainage alone, around 45% of patients achieve "spontaneous" pleurodesis, allowing for the removal of the IPC (Roberts et al, 2010). Talc can also be administered through the IPC. This combination technique was shown to double the chances of pleurodesis without an increase in adverse events (Fortin and Tremblay, 2015).

IPCs can also be inserted during thoracoscopy, this combination approach has been shown to result in patients being discharged from the hospital earlier than talc poudrage, whilst still providing patients with a definitive management option for patients (Freeman et al, 2013).

The most common complication of IPC is catheter blockage or pleural space loculation limiting drainage (Van Meter et al, 2011). There are several options in these situations including flushing the catheter or using intrapleural fibrinolytic agents. The use of IPC is associated with an increased risk of skin and pleural infections (Van Meter et al, 2011). The rate of infection is around 3% and is relatively low compared to other indwelling devices used for haemodialysis or peritoneal dialysis (Chee and Tremblay, 2011). Overall, IPC removal due to complications is required in around 9% of patients (Fortin and Tremblay, 2015). Chemotherapy has been shown not to increase the risk of IPC-related infection and should not be considered a contraindication to IPC use (Wong et al, 2016).

Non-expandable lung describes the situation when the lung is unable to fully expand to fill the hemithorax. Often this is due to tumour and associated adhesions preventing the re-expansion of lung following pleural fluid drainage. In cases of non-expandable lung, IPCs are usually considered a first-line therapy option, as chemical pleurodesis has limited success rates when pleural apposition is not achieved.

Current Guidelines

The most recent guideline on pleural disease published by the British Thoracic Society (BTS) in 2023 provided a practical framework and pathway to help clinicians manage patients with a confirmed diagnosis of MPE (Roberts et al, 2023).

The BTS makes clear that consideration must be given to patient preference, and whether a patient is likely to gain symptomatic benefit from any intended pleural procedure.

Once established that a patient will likely gain benefit from a pleural intervention, the pathway recommends that a patient's effusion is assessed using thoracic ultrasound. This allows for characterisation of the fluid, estimation of volume, and identification of whether pleural intervention is currently safe.

Patients with fluid deemed unsuitable for any pleural procedure on initial ultrasound should remain under follow-up as their effusion may enlarge and intervention may become appropriate at a later stage.

When fluid is amenable to intervention, a trial therapeutic aspiration is recommended to assess whether a patient gains symptomatic improvement from fluid removal and whether the lung is re-expandable.

The BTS suggests that patients who gain symptomatic benefits and have a re-expandable lung should be offered definitive management either as an inpatient with chest drain or thoracoscopy and pleurodesis, or as an outpatient with an IPC. Fibrinolytic agents should be considered in non-draining or septated effusions. Patients with non-expandable lungs but symptomatic improvement with therapeutic aspiration should be offered either an IPC or repeated therapeutic aspiration.

Prognosis

Despite the continued advancements in treatment, the prognosis for patients diagnosed with an MPE remains poor. Within patients with MPE however, there is a wide variability in fitness and length of survival. As both cancer and pleural treatments are associated with a significant risk of morbidity, it is important for clinicians to stratify a patient's prognosis at diagnosis and tailor treatments to the individual patient (Zamboni et al, 2015).

There are several prognostic scoring systems that can be used to predict outcomes for patients with MPE, the first system to be validated was the LENT (pleural fluid lactate dehydrogenase, Eastern Cooperative Oncology Group performance score, neutrophil-to-lymphocyte ratio and tumour type) score and was superior to the Eastern Cooperative Oncology Group (ECOG) performance status in predicting survival. The four components of this scoring system include Lactate dehydrogenase (LDH) in pleural fluid, ECOG performance status, neutrophil-to-lymphocyte ratio in blood and tumour type (Alawneh et al, 2024).

MPE patients can be divided in to low, moderate and high risk depending on their LENT score at time of presentation. Low-risk patients (0–1 points) have a median survival of around 319 days, moderate-risk patients (2–4 points) have a median survival of around 130 days and high-risk patients (5–7 points) have a median survival of around 44 days.

Another prognostic scoring system used for patients with MPE is the survival and pleurodesis response markers in malignant pleural effusion (PROMISE) score. In addition to ECOG performance status and cancer type, the PROMISE score also uses the following variables previous chemotherapy, previous radiotherapy, haemoglobin, white blood cells and C-reactive protein to categorise risk (Ermin et al, 2022).

PROMISE categorises patients into 4 groups depending on their risk of mortality at 3 months.

PROMISE scoring system has been shown to be superior to the ECOG and LENT scores in predicting survival in patients with MPE.

LENT and PROMISE scores help guide the clinician and the patient when deciding whether invasive management of MPE should be undertaken (Ermin et al, 2022).

Conclusion

MPE is a common complication of cancer and is regularly seen on the general medical take. The assessment and management should be tailored to the individual patient and should be patient-directed. A definitive procedure that provides long-term symptomatic relief should be sought. Where possible, patients should be managed on an outpatient basis in collaboration with specialists in pleural disease to help guide the patient to find the management best suited to them.

Key Points

- Malignant pleural effusion is a common complication of malignant disease indicative of advanced or metastatic disease. Most patients with MPE have a significant symptomatic burden and despite advancements in systemic anti-cancer treatments, the goal of management remains symptom palliation.
- Thoracic ultrasound is the most important imaging technique for assessing pleural fluid and detecting features suggestive of underlying malignancy. Ultrasound should be used for all pleural procedures as it improves patient safety and diagnostic yield.
- A definitive pleural procedure that provides long-term symptomatic relief should be performed in patients who are deemed fit enough to benefit from intervention and gain symptomatic benefit from therapeutic aspiration.
- Patients with MPE should be managed as outpatients by a pleural disease specialist, when possible, decisions regarding management strategy should be tailored to the individual patient.

Curriculum Checklist

- Senior Houseman (SH): Generic CiP 3—Communicates effectively and is able to share decision-making, while maintaining appropriate situational awareness, professional behaviour and professional judgement.
- Clinical CiP 3—Providing continuity of care to medical in-patients, including management of comorbidities and cognitive impairment.
- Clinical CiP 4—Managing patients in an outpatient clinic, ambulatory or community setting (including management of long-term conditions).
- Clinical CiP 5—Managing medical problems in patients in other specialties and special cases.

Availability of Data and Materials

All data and materials are included in the manuscript.

Author Contributions

HS and RP designed the research study. HS is the first author. HS drafted the manuscript. Both authors contributed to the important editorial changes in the manuscript. Both authors read and approved the final manuscript. Both authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

This study was conducted in accordance with the ethical regulations of the Declaration of Helsinki. The patients signed informed consent before participating in this study.

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Conflict of Interest

The authors declare no conflict of interest.

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