Insertion of intercostal chest drains: who, where and when?

Patients with symptomatic pleural disease requiring diagnostic and/or therapeutic procedures regularly present to hospital clinicians. Common conditions including pleural infection, malignant pleural effusion and pneumothorax are all increasing. The variety and availability of interventions (notably medical thoracoscopy and indwelling pleural catheters) for these patients have also grown rapidly over the past decade. Pleural disease is established as a subspecialty of respiratory medicine, and many centres offer rapid access clinics and procedural lists to optimize care for this population (Bhatnagar and Maskell, 2013).

Nonetheless, the frequency with which pleural disease occurs means that across the UK a heterogeneous group of clinicians – usually emergency and general physicians – provides an acute interventional service for these patients. The future direction of care for patients who require medical drainage or aspiration of the pleural space (as opposed to trauma or cardiothoracic surgical cases) is coming under increasing scrutiny for a variety of reasons.

Safety considerations

Pleural interventions such as intercostal chest drain insertion are largely safe when performed by appropriately trained individuals (Wrightson et al, 2009), but they can result in significant harm to patients. In 2008 the National Patient Safety Agency first reported widespread issues relating to chest drain insertion caused by complications of the procedure itself or inappropriate after care. Despite the publication of national guidelines for pleural disease and interventions (Havelock et al, 2010), subsequent surveys and audits reinforce the impression that many problems remain unsolved (Harris et al, 2010; Hooper et al, 2015).

These publications (National Patient Safety Agency, 2008; Harris et al, 2010; Hooper et al, 2015) all identified concerns that were directly related to a lack of experience or knowledge about how and when to intervene for a range of pleural conditions. This is supported by a study showing that iatrogenic complications could be reduced substantially by measures including limiting the physicians performing pleural interventions to those who did so regularly. These same individuals had also received appropriate training, including in the use of thoracic ultrasound (Duncan et al, 2009). The evidence base for thoracic ultrasound improving patient safety during pleural procedures is well established (Duncan et al, 2009; Mercaldi and Lanes, 2013) and accordingly recognized in national guidelines (Havelock et al, 2010).

Demonstrating and assessing competence

The concept of competency-based learning has become central to modern postgraduate medical training across all specialties in the UK. Clinicians develop skills and knowledge through experiential 'on the job' learning and didactic teaching. Procedural competence is most commonly assessed using the direct observation of procedural skills (DOPS) tool, allowing trainees to record their learning and continued proficiency in a particular area.

However, DOPS is a generic tool and may lack the specificity and sensitivity to reliably determine competence, particularly if the assessor is inexperienced in its use. In the future bespoke assessment tools for chest drain insertion may give a more reproducible appraisal standard to measure clinicians against (Salamonsen et al, 2015).

Clinicians are being trained to differing standards with respect to chest drain insertion. Respiratory physicians must demonstrate competence in thoracic ultrasound and chest drain insertion throughout their training, including DOPS on an annual basis (Joint Royal Colleges of Physicians Training Board, 2010). However, trainees in general internal medicine need only demonstrate some practical experience in chest drain insertion (including skills lab competence) with no requirement for regular assessment or any experience in thoracic ultrasound (Joint Royal Colleges of Physicians Training Board, 2012). This may lead to a two-tier system of experience and competence in chest drain insertion, and future training reforms should aspire to a single robust standard that ensures patients receive the best and safest possible care regardless of where, when and by whom they are treated. This and other issues pertaining to training and experience in chest drain insertion will affect not only physicians but others including radiologists, anaesthetists and emergency physicians.

The status quo

The majority of medical trainees are struggling to develop and maintain a broad procedural skill set that includes chest drain insertion. A survey by the authors (Corcoran et al, 2015) showed only 5% of registrars training in physicianly specialties other than respiratory medicine attained a self-imposed standard for competence in intercostal chest drain insertion. This reflects the changing face of medical training, as service pressures and shift working impact on consultant supervision and training opportunities for junior staff.

True procedural competence requires technical proficiency alongside the clinical knowledge and judgement to appreciate when an intervention is and, more importantly, is not necessary. In the authors' survey (Corcoran et al, 2015) the management of common pleural conditions by trainees in a series of best-of-five clinical scenarios was correct in only 51% of cases according to published guidelines as the gold standard. This reflects a lack of experience but also changes in how these patients are managed such that only a specialist might reasonably be expected to keep up to date. This continual evolution of practice means that for many pleural presentations, chest drain insertion is no longer needed and rarely required emergently (with notable exceptions, e.g. tension pneumothorax).

Emergencies are anecdotally cited as the reason that chest drain insertion remains a

core procedural skill for all general internal medicine trainees – the need for someone in the hospital to be responsible and/or competent should the situation arise. However, this idea is flawed – in an emergency is when any procedure is subject to the greatest pressure, when the risks of complications are highest, and when the individual performing the procedure should have as much experience as possible. It may be argued that the status quo, where this individual is the general internal medicine registrar on-call by default, is no longer sustainable.

The future of chest drain insertion

Inadequate practical experience and clinical understanding of pleural disease already have a negative impact on quality of care. Examples of this include inadequate use of thoracic ultrasound and written consent forms, inappropriate procedural choice and unnecessary hospital admission (Hooper et al, 2015). Available data imply that current models of care, while improving, are suboptimal for most patients with pleural disease who require urgent intervention for diagnosis and/or treatment. One solution is to ensure all clinicians who might be required to insert a chest drain during their working lives receive appropriate training to develop and maintain their knowledge and practical skills. However, this has significant resource implications.

The alternative is to restrict the number of clinicians trained in and expected to perform chest drain insertion. This benefits patient safety (Duncan et al, 2009) and a number of UK centres already optimize care via bespoke pleural services developed to meet local service needs (Bhatnagar and Maskell, 2013; Hooper et al, 2015). These teams are frequently multidisciplinary with both consultants and advanced nurse practitioners able to provide specialist in- and outpatient care. These professionals provide a stable focus for structured service delivery and training junior colleagues in pleural diseases, including procedural skills as required. Widespread adoption of this model will take time and raises questions about how to safely staff a 24-7 service, but this may be the safest model to ensure minimal risk and maximum patient benefit.

Conclusions

Intercostal chest drain insertion remains a key intervention for patients with symptomatic pleural disease. The procedure is relatively safe in expert hands, but can be associated with significant morbidity and even mortality. The need for chest drain insertion in many clinical scenarios is decreasing. This has impacted on the experience of medical staff. A disparity in postgraduate training requirements has exacerbated this problem and fails to protect patients or trainees, with the latter risking exposure to a procedure they are expected to perform but do not encounter regularly.

Pleural interventions, including chest drain insertion, should be performed by practitioners with the appropriate experience and training (including thoracic ultrasound), who carry out these procedures on a regular basis. This standard should be maintained regardless of when or where in the hospital such an intervention is required. Achieving this is likely to require a significant change in how both service and training are delivered nationally, regionally and in individual centres. BJHM

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KEY POINTS

- Chest drain insertion is currently seen as a core procedural skill for a number of hospital clinicians.
- Pleural disease is increasingly managed on an outpatient basis – this limits the number of patients seen and procedures performed by non-specialists.
- Most clinicians have no or limited access to structured training in thoracic ultrasound or pleural procedures, further restricting their clinical experience.
- There is inconsistency in how competency in chest drain insertion is determined for trainees across different specialties, encouraging variable standards of care.
- Limiting the number of clinicians permitted and/or expected to perform chest drain insertion can, in the right circumstances, improve patient safety and service provision.
- Reconfiguring service and training, including the development of specialist pleural services, will be necessary to ensure patients are managed safely and effectively.