Con: indwelling pleural catheters cause harm to patients

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Shareable abstract (@ERSpublications)
IPCs provide a safe, effective, ambulatory option for managing MPE, especially for patients with poor prognosis or non-expansile lung, while minimising the need for further intervention and improving symptom burden and quality of life https://bit.ly/3TrphVl

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Abstract

Indwelling pleural catheters (IPCs) have rapidly grown in popularity since their introduction for the management of recurrent pleural effusions. In malignant pleural effusions especially, there has been a shift away from measuring pleurodesis success and towards more patient-centred outcomes. Multiple randomised controlled trials have shown that despite lower rates of pleurodesis, symptom control and quality of life outcomes are comparable when compared to alternatives such as talc pleurodesis. IPCs have the added benefit of minimising inpatient hospital stays and reducing the need for recurrent pleural interventions, key priorities for patients with palliative disease. As a result, IPC treatment is associated with excellent patient satisfaction coupled with acceptably low complication rates. Furthermore, in patients with a short life expectancy they confer a cost benefit for the healthcare system.

Far from causing harm, IPCs are now recommended as first-line treatment by current clinical guidelines. In malignant pleural disease, guidance advocates IPCs should be offered as a first-line option with the focus on patient priorities and preferences. Ultimately IPCs provide a safe, effective, ambulatory option for managing recurrent pleural effusions.

Introduction

Indwelling pleural catheters (IPCs) are tunnelled catheters that can be inserted as a day case procedure, facilitating regular home drainage of recurrent pleural effusions. Since their introduction around 25 years ago, IPCs have rapidly become a popular treatment option in many parts of the world. This is particularly the case for malignant pleural effusions (MPE), in which most evidence relating to IPCs has been generated and which this article will predominantly focus on.

Malignant pleural disease represents a significant healthcare burden globally and this is expected to continue to increase [1, 2]. The median survival for a MPE is between 3 to 12 months, heavily influenced by tumour and patient characteristics [1]. While IPCs were initially intended to manage pleural effusions in cases of non-expandable lung (NEL) or following failed pleurodesis, they are now considered a first-line treatment option [2]. In the UK, IPC drainage is commonly performed by community nurses. In many other healthcare settings, the patient or a relative is trained to drain, dress and care for an IPC.

A reduction in inpatient hospital stays, low complication rates and quality of life measures comparable to alternative treatment options, such as talc pleurodesis, are the main drivers behind the expansion of their use [3]. We will argue that IPCs offer a safe long-term strategy to manage the symptoms of malignant pleural disease. Their growing popularity is propelled by patient desire for outpatient management and independence.

Quality of life and symptom control

A key goal of treatment in malignant pleural disease is the relief of symptoms that negatively affect quality of life for patients living with cancer. Chest pain and disabling dyspnoea, caused by the accumulation of

pleural fluid, are common yet challenging symptoms encountered. Traditionally, inducing pleurodesis was considered the most effective method of managing MPEs. However, multiple randomised controlled trials (RCTs) have since shown that, despite higher rates of pleurodesis with talc pleurodesis compared with IPC, there is no significant difference in dyspnoea or quality of life scores [3–5]. TIME2, an RCT comparing IPC to talc pleurodesis by measuring dyspnoea at 42 days on a visual analogue scale found no difference between the two treatment arms. Secondary outcomes examined change in dyspnoea scores from 42 days to 6 months and global quality of life scores using the EORTC QLQ-C30 questionnaire. Both groups saw an improvement in dyspnoea scores maintained up to 6 months and comparable quality of life scores. At 6 months, those treated with an IPC reported significantly less dyspnoea; however, the trial wasn't powered sufficiently to advocate IPCs were superior [3].

A more recently published RCT, the OPTIMUM trial, compared talc pleurodesis *via* a chest tube to talc pleurodesis *via* an IPC [6]. The primary outcome was EORTC QLQ-C30 quality of life scores at day 30 following talc administration, with secondary measures evaluating quality of life at 60 and 90 days, and dyspnoea scores at 30, 60 and 90 days. Despite significantly higher rates of pleurodesis failure in the IPC group at all time intervals, there was no significant difference in global health scores or dyspnoea [6].

The impact of using talc in treating MPE also differs from the early experience of having an IPC placed. Post-IPC, a patient rarely requires more than simple analgesia for a few days. By contrast, the brief but aggressive pleural inflammatory response trigged by talc instillation often causes significant transient side-effects, including pain, fever and gastrointestinal upset [5]. Patients therefore routinely require opiate analgesia and may also experience more pain because of the larger chest tubes preferred for pleurodesis [7]. Over the longer term, the ∼25% of patients who have been given talc but fail to achieve pleurodesis may also be more likely to develop complex, loculated collections, which may cause persistent symptoms and limit future treatment options.

When it comes to what is likely to matter most to patients (improving symptoms and maintaining quality of life), IPCs appear to be as efficacious as talc pleurodesis. Furthermore, this is supported by patient satisfaction data: when surveyed, 87% of patients agreed that their IPC improved their quality of life and 93% of patients reported it improved their breathlessness by 2 weeks [8].

Minimising admissions and repeated interventions

For patients with a poor prognosis, limiting how many of their remaining days are spent in hospital is a very important consideration. When surveyed by Mitchell *et al.* [8], 95% of patients treated with an IPC reported staying out of hospital while managing their symptoms was important to them. Prior to the introduction of IPCs, recurrent therapeutic aspiration was the only outpatient option to manage fluid re-accumulation. Except in patients with very limited prognosis, this is usually not recommended as a long-term option for managing MPE [1, 2]. IPCs can be inserted as a day case procedure without sedation, meaning total initial inpatient stay is typically 0–1 days, whereas admission for talc pleurodesis has a mean length of stay of 5–6 days [9]. The AMPLE study looked more holistically at total in-hospital days from randomisation to death or 12 months, again comparing IPC to talc slurry pleurodesis. Patients managed with an IPC spent 10 days in hospital, compared with 12 days for talc pleurodesis, which was a statistically significant difference [4].

The literature quotes the rate of successful pleurodesis following chest tube and talc administration to be as high as 80% [5]. However, the definition of pleurodesis is highly variable across studies. In clinical practice rates of pleurodesis are often lower, especially when allowing for patients with NEL [1, 5]. The incidence of pleurodesis failure also increases over time, leading to recurrent dyspnoea and typically necessitating further pleural intervention. A systematic review by Sivakumar *et al.* [10] found that, following talc pleurodesis or thoracoscopic talc poudrage, the incidence of pleurodesis failure, defined as the need for ipsilateral pleural intervention, was 40% by 12 months, whereas in patients treated with an IPC only 9% required a further invasive pleural intervention. Treatment with an IPC therefore offers the best option for patients wishing to avoid further pleural punctures and the associated visits to hospital.

Individualised care

While pleurodesis is not the primary goal when treating with an IPC, it can occur and be beneficial for patients. The likelihood of achieving pleurodesis with an IPC (termed autopleurodesis) is influenced by the drainage strategy employed. If drained every day, the ASAP trial showed autopleurodesis occurred in up to 47% of patients [11]. The AMPLE 2 study found no improvement in breathlessness scores with aggressive *versus* symptom-guided drainage. However patient satisfaction was greater in patients drained daily, with

88% willing to choose IPC treatment again compared with 75% in the symptom-guided drainage arm [12]. This likely reflects the positive impact of patient autonomy in terminal disease.

The IPC-Plus trial, which excluded those with significant NEL, saw rates of pleurodesis almost double when administered with talc slurry *via* their IPC after 10 days (27% in the control arm *versus* 51% in the treatment arm) [13]. This demonstrated that IPC and talc pleurodesis could safely be combined without an increase in adverse events, all while remaining an outpatient. Daily drainage can also potentially be combined with talc administration to give the best chance of early pleurodesis and IPC removal, which also reduces the likelihood of longer-term complications such as pleural infection. Conversely, for some patients, the presence of an IPC may offer reassurance that, should the fluid recur, drainage can simply be reinstated; in the OPTIMUM study, 23% of eligible patients opted not to remove their IPC after successful pleurodesis. The authors hypothesised this was due to anxiety over the effusion recurring [6]. Ultimately IPC management can be individualised to try and meet the goals of the patient.

IPCs are increasingly used in conjunction with other interventions. They can be inserted following medical thoracoscopy with or without talc poudrage. Retrospective analysis of this approach shows pleurodesis rates as high as 78% [14]. With the addition of an IPC at the time of thoracoscopy patients can benefit from both treatment modalities and same day discharge.

A safe intervention

Serious complications associated with IPCs when performed by an experienced clinician are, fortunately, minimal. IPC complications include chest pain, infection, tube blockage or dislodgement, pleural loculations and, on rare occasions, tract metastasis [15]. The incidence of all complications relating to IPCs varies widely in the literature, with different thresholds used to record adverse events. Neither TIME2 nor AMPLE found a significant difference in the incidence of serious adverse events when compared with talc pleurodesis [3, 4].

Many complications encountered are successfully managed with minimal intervention. Chest pain, although common, is typically mild and usually subsides by 2 weeks after intervention and studies show no significant difference in pain scores for IPCs compared with talc pleurodesis [3, 8]. Pleural loculations have been effectively managed with fibrinolytics *via* the IPC [16]. Finally, true tube blockage is uncommon, and managed initially with drain flushes, heparinised saline or fibrinolytics. In only very rare cases, the IPC may need to be replaced [2].

Infection related to IPCs is often a concern, particularly in those who may be undergoing chemotherapy or in whom the drain is in for longer periods. Despite this, overall reported infection rates are only 5%, and a number of studies have not shown any difference in pleural infection incidence between those undergoing chemotherapy and those who are not [15, 17–19]. Even in those who do develop pleural infection, the overwhelming majority can be treated with antibiotics alone, without removal of the IPC [15]. Indeed, in one study, the inflammatory pleuritis associated with pleural infection resulted in pleurodesis occurring in 62% of patients, and as many as 79% if *Staphylococcus aureus* was the causative bacteria [13]. Serious IPC-related infection is rare and mortality due to infection is reported to be <1% [15, 20].

Promoting independence

National guidelines highlight the importance of supporting patients and their relatives to complete their own IPC drainage [2]. Involving the patient or family member in drainage can, in the correct environment, promote a degree of independence and reduces the burden of waiting for community nurses to attend. With the support of the community nursing and pleural specialist nurses, even those without a healthcare background can be trained to drain the IPC at home themselves and be educated in minimising the risk of infection. After insertion, follow-up is typically remote, again reducing unnecessary hospital visits. Studies show that patient empowerment improves satisfaction rates and outcomes [21]. Although not frequently measured, when patient satisfaction is assessed, IPC treatment consistently scores highly [8, 11, 22].

Regardless of whether patients manage their own device, centres inserting IPCs should have robust systems in place to allow access to advice and urgent clinical review in the event of difficulties or complications occurring.

A cost-effective intervention

Supporting patients to manage their own IPC also has potential financial benefits. Using data from the TIME2 trial, Olfert *et al.* [23] conducted a cost analysis that showed, in patients with a short life expectancy (<14 weeks) who required <2 h per week of community nurse time, IPCs were a cost-effective

intervention balanced against improvements in quality of life. Shafiq *et al*. [24] also argue that receiving talc *via* the IPC further improves cost effectiveness.

Despite clinical experience and prognostic scores, predicting mortality remains challenging. An expected prognosis of more than 3 months is frequently an exclusion criterion in trials. Yet a systematic review by Sivakumar *et al*. [10], which included 17 studies and over 2500 patients, found an attrition rate of 48% at 3 months attributed to death and deteriorating health. In patients who are declining rapidly an IPC may be preferable to inpatient attempts at pleurodesis.

Conclusion

IPCs provide a safe and effective ambulatory option for managing recurrent pleural effusions. The impact for each individual patient should be considered, prompting discussions regarding patient values and expectations. In the correct patient groups, especially those with poor prognosis or NEL, IPCs allow outpatient treatment that minimises the need for further intervention and promotes independence and autonomy, while also improving symptom burden and quality of life.

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