

## Early experience of managing malignant pleural effusion with an indwelling pleural catheter in the Indian population

Sir,

Malignant pleural effusion heralds a poor prognosis with a median survival ranging from 3 to 12 months. These patients are mostly candidates for palliative therapy which includes alleviation of dyspnoea and facilitating the patient to spend the rest of their life at home with minimal hospitalisations. There are three main modalities of management in malignant pleural effusion, namely, repeated needle thoracentesis, intercostal tube drainage with chemical pleurodesis, and indwelling pleural catheter (IPC). Chemical pleurodesis has always been the first-line approach for malignant pleural effusions, but it requires apposition of pleural surfaces and a mean duration of hospital stay of 4 days.<sup>[1]</sup>

An IPC is a multi-fenestrated silicone tube which is inserted aseptically, allowing long-term access to pleural space. The catheter is tunneled through a short section of subcutaneous tissue and has a cuff that acts as a focal point for fibrous growth to allow the drain to remain in place. The catheter has a one-way access valve designed to be attached to a proprietary vacuum drainage bottle or a suction machine. The pre-vacuumed bottles provide the advantage of home drainage of the pleural fluid and are calibrated to drain only one litre of fluid, which prevents re-expansion pulmonary oedema during unsupervised drainage at home.

Even though there is large international data on the use and advantage of IPC, there is paucity of Indian data regarding the same with only one case report published to the best of our knowledge.<sup>[2]</sup> This is why we would like to report our early experience on managing poor performance malignant pleural effusion using IPC in the Indian population.

We inserted IPC in six patients with malignant pleural effusion who either had a moderate to high risk as per LENT score (LDH level in pleural fluid, ECOG performance scale, neutrophil lymphocyte ratio, tumour type) or had a trapped lung. IPCs were inserted aseptically on an out-patient basis, and patients were followed up for 3 months [Figure 1]. For the initial 1-week, daily drainage of the pleural fluid was carried out on an out-patient basis using a low-pressure suction pump, following which symptom-guided home drainage of the pleural fluid was performed using vacuum bottles. The daily visual analogue score (VAS) score (0–100) was recorded for the first 1 week, followed by 3, 6, 9, and 12 weeks. Patients were reviewed on an out-patient basis every third week, during which their dyspnoea was assessed using VAS and the catheter was inspected for any complications. During the 3 months follow-up or follow-up till death (whichever was earlier), the number and duration of hospital admissions for pleural effusion-related complaints and the number of auto-pleurodesis (defined as less than 50 ml drain for 3



Figure 1: Steps of IPC insertion

consecutive days with radiological apposition of the pleural surface and no evidence of loculated collection or catheter blockage) were noted.

Out of six patients who were managed with IPC, three were male and three were female. Metastatic lung carcinoma was the most common cause of pleural effusion in this group of patients ( $n = 3$ , 50%). Other causes of malignant pleural effusion were carcinoma breast, hepatocellular carcinoma, and angiosarcoma. The mean age of patients was 59 years (SD 19 years). All patients had symptomatic malignant pleural effusion with moderate to high LENT scores (mean 5, SD 1). One patient had a trapped lung. Five patients had unilateral pleural effusion, whereas one had bilateral effusion. During follow-up, two patients died, two patients had the IPC removed at the sixth and seventh weeks post insertion because of auto-pleurodesis, one patient had IPC removed at the sixth week because of pleural space infection, and one patient continued draining through IPC for 3 months. The median duration of catheter drainage was 60 days. Five out of six patients did not require any hospital admission for effusion-related complaints. One patient was admitted for 3 days in hospital, and IPC was removed and replaced with a large bore inter-coastal drainage tube because of pleural space infection. The mean breathlessness on presentation as per VAS was 80.83. Post IPC insertion and drainage, VAS dropped to a mean value of 45.83. This relief of breathlessness was maintained throughout the study period [Table 1]. Two out of the six patients had auto-pleurodesis. The patients who achieved auto-pleurodesis were an 88-year-old male and a 66-year-old female, both of whom had an adenocarcinoma lung with malignant pleural effusion. Auto-pleurodesis was achieved after a mean duration of 7 weeks of drainage.

The main advantage of IPC over chemical pleurodesis is the reduced number of days spent in hospital. Randomised control trial by Putnam *et al.*<sup>[3]</sup> showed the mean duration of

**Table 1: Degree of dyspnoea as per visual analogue scale before and after insertion of IPC**

	Descriptive Statistics				
	n	Minimum	Maximum	Mean	Std. Deviation
VAS D0 pre IPC	6	50	90	80.83	14.26
D0 post IPC	6	40	50	45.83	9.31
Day 1	6	30	50	40	5.77
Day 2	6	30	50	38.33	6.87
Day 3	6	30	40	34.16	4.48
Day 4	6	30	40	33.33	3.72
Day 5	6	30	40	32.5	3.81
Day 6	6	20	40	30.83	6.06
Day 7	6	20	40	30.83	6.06
Day 21	6	30	50	40.83	4.48
Day 42	4	30	60	47.5	7.5
Day 63	1	40	40	40	0
Day 84	1	30	30	40	0

hospital admission in chemical pleurodesis patients to be 7 days, whereas IPCs could be safely used as an out-patient procedure requiring no hospital admission. The second therapeutic intervention in malignant effusion trial (TIME 2 trial) and Australian malignant pleural effusion trial (AMPLE trial) also showed fewer effusion related hospital admissions post IPC insertion. In our experience, we were able to replicate these results with five out of our six patients requiring no hospital admissions. Patients were able to self-drain the effusion when symptomatic while at the comfort of their home. Even though a tunnelled tract of IPC, a cuff, and a one-way valve are designed to prevent ascending infection, catheter-associated pleural space infection can complicate IPC. A large multi-centre review of 1021 patients with IPC found an infection rate of 4.8%.<sup>[4]</sup> In our experience, one out of our six patients (with hepatocellular carcinoma as the cause of malignant pleural effusion) developed pleural space infection requiring hospital admission, replacement of IPC with a wide bore inter-coastal drainage tube, and antibiotics.

TIME 2 trial was the first to examine whether using an IPC or the instillation of talc slurry via a chest tube was effective at relieving dyspnoea. Dyspnoea improved in both groups, with no significant difference in the mean VAS. In our experience, all our patients had statistically significant symptom relief with IPC drainage which was maintained throughout the study with initial aggressive pleural fluid drainage and later symptom-guided pleural fluid drainage. In this way, IPCs offer the advantage of dyspnoea relief with symptom-guided at-home self-drainage using vacuum bottles.

One of the major limiting factors of IPC is cost. The catheter is much costlier than routine inter-coastal drainage, and there is recurring cost of single use pre-vacuumed bottles. Interestingly, a Dutch analysis of cost of IPC showed a mean cost of IPC comparable with that of chemical pleurodesis.<sup>[5]</sup> This is because of the cost of in-patient care which is reduced in IPC drainage. There are no studies regarding the same in the Indian population.

In conclusion, IPCs are a novel method for management of malignant pleural effusion which offers good symptom relief with the added advantage of reduced hospital

admissions, the option of which should be offered to all patients with malignant pleural effusion. Further studies in the Indian population are required to assess the improvement in quality of life and cost effectiveness as compared to conventional management.

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### Conflicts of interest

There are no conflicts of interest.

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