Ways to overcome non-draining indwelling pleural catheter in malignant pleural effusion

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SUMMARY

The indwelling pleural catheter (IPC) is a 16-Fr-multi-fenestrated catheter. It has become an accepted practice in the management of malignant pleural effusion, especially in patients with non-expandable lung. However, IPC blockage or not draining is common. A 53-year-old female with malignant pleural effusion presented to us with blocked IPC and symptomatic pleural loculation one month after IPC insertion. After failing saline flushing and low-pressure wall suction, intrapleural alteplase was instituted through the IPC with a favourable outcome, and she continued to drain daily thereafter. The present case highlights the safety of intrapleural alteplase via IPC in the non-expandable lung.

INTRODUCTION

Incidence of malignant pleural effusion (MPE) is 66 per 100,000 population. Eighty per cent of all MPE cases are caused by lung carcinoma, breast malignancy, lymphoma and ovarian carcinoma. Lung malignancy with MPE carries a poor prognosis (average 5.49 months)[1] and effort should be made to palliate the symptoms of the patients. The main symptom is dyspnoea, which is a primary indication of intervention. Various interventions can be done for malignant effusion ranging from conservative to talc slurry, talc insufflation, IPC and surgical intervention.[2] We describe a patient who had IPC inserted for malignant pleural effusion who had symptomatic loculation due to non-draining IPC secondary to debris within the fenestration. Possible causes of non-draining IPC is discussed and ways to overcome a blocked IPC.

CASE REPORT

A 53-year-old female, a lifetime non-smoker, presented with progressive dyspnoea for one month with significant loss of weight and appetite. Her Chest X-ray (CXR) revealed massive left-sided pleural effusion (Figure 1A). Pleuroscopy was performed, and biopsy of parietal pleura revealed metastatic adenocarcinoma of the lung, hence stage IVA lung cancer. Her EGFR mutational status was negative. Post pleuroscopy and chest drain insertion, the lung failed to expand (Figure 1B). A mutual decision was made for IPC insertion following a consultation with the family.

The patient was started on conventional chemotherapy of gemcitabine plus cisplatin. She was discharged well and continued to drain 150-250ml daily at home via catheter bag. In view of the cost involved, the vacuum bottle was not used. However, one-month post IPC insertion, the drainage was minimal and she became more dyspnoeic. Chest radiograph (Figure 2A) showed loculated effusion on the similar side.

After failing flushing (100ml saline) and low-pressure wall suction (-10cmH20), intrapleural alteplase was instituted via the IPC with favourable outcome (Figure 2B). She was given 10mg intra-pleural alteplase twice daily for a total of five doses and had a significant amount of effusion drained which relieved her dyspnoea. Apart from pleuritic chest pain, which needed opioid analgesic, there were no other adverse effects of intra-pleural alteplase, e.g., bleeding.

Her IPC remained patent a month later (Figure 2C), and she continued follow-up in oncology unit thereafter. She was planned for palliative maintenance chemotherapy because of her disease progression despite completing six cycles of chemotherapy.

DISCUSSION

MPE can be managed by either repeating therapeutic pleural aspiration, pleurodesis with instillation of the sclerosant or application of IPC. IPC had more advantages compared to other modalities in term of higher succeed rate, improvement in the quality of life, and dyspnoea score.[3-4]

IPC has become an accepted practice in the management of malignant pleural effusion, especially in patients with non-expandable lung. It provides effective drainage of pleural effusion which can be done at home at specific intervals. It provides lesser hospital stay and has a 50% rate of spontaneous pleurodesis (in fully expanded lung) at a mean duration of 60 days. Complications of IPC are minimal and include symptomatic loculation, infection, catheter tract metastasis, and fractured IPC on removal.

IPC has multiple fenestrations; however, catheter blockages can occur due to the formation of dense fibrinous tissue around and within the IPC. It is reported to be present in 5-14% of IPC-treated patients, and typically occurs at about two months after IPC insertion.[5]

Based on our institutional performance of 15 cases of IPC and literature review, there are few ways to overcome it:

1. Flushing the catheter under sterile technique with 100-200ml of NaCl and manipulation of the tube.
2. Connecting to a vacuum bottle.
3. Connecting to low-pressure wall suction

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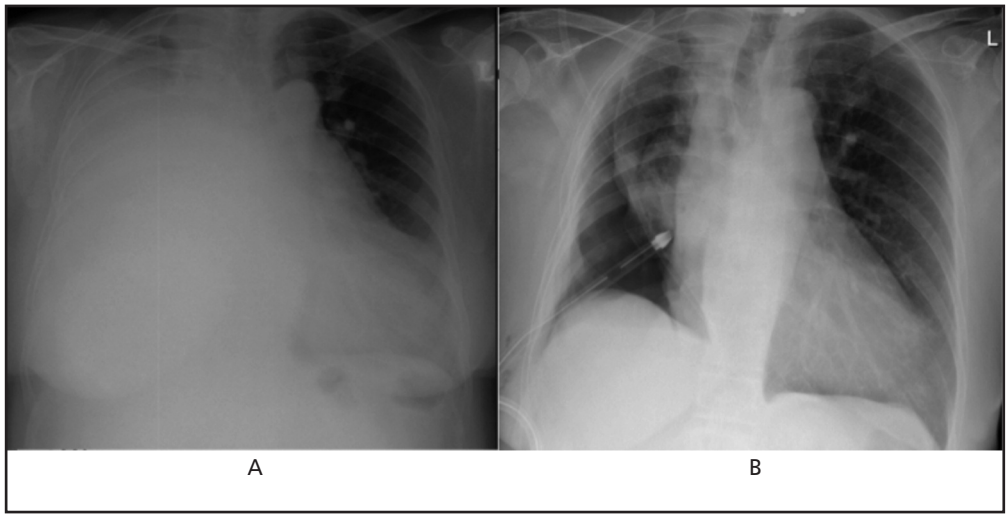

Fig. 1: Chest radiograph (A) showed massive right-sided pleural effusion. Chest radiograph (B) post pleuroscopy and chest drain insertion showed non-expandable lung.

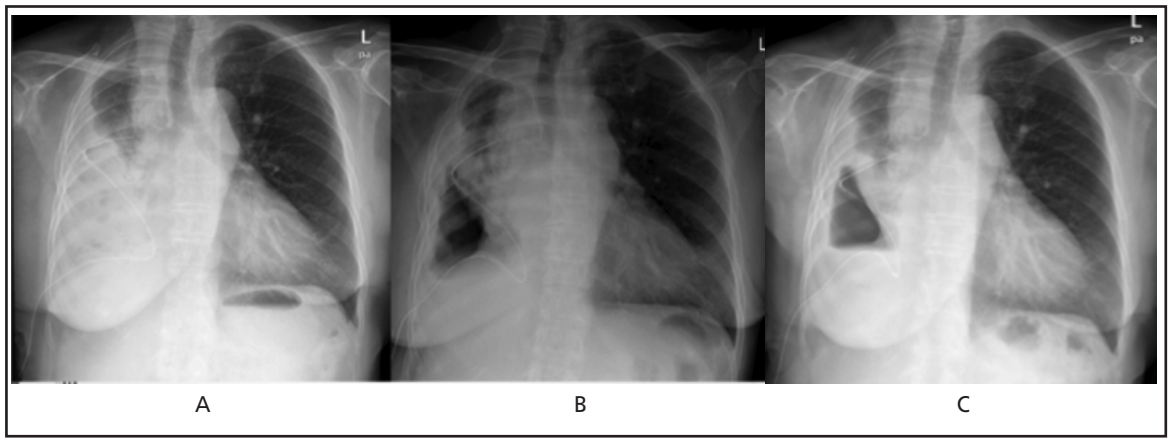

Fig. 2: Chest radiograph (A) showed loculated right pleural effusion with IPC tip in-situ. Chest radiograph (B) showed minimal effusion after 5 doses of alteplase instillation with non-expandable lung. Chest radiograph (C) post alteplase showed no recurrence of loculated effusion.

Those techniques (1-3) described above occasionally is successful in restoring tube patency as it removes the occluded debris in the catheter. Failure of those techniques above may require further intervention as below:

4. Intrapleural Alteplase 2mg in blocked the catheter (in cases without loculation). Technique: 2 mg of alteplase was reconstituted in 2 ml of sterile water and instilled into the catheter (dose based on estimated catheter volume and recommendations for its use in the management of occluded central venous catheters). This was followed by the installation of air with a syringe, pushing the column of fluid to the level of the skin to ensure that the full dose is administered to the affected distal fenestrated end. The catheter was then clamped for 60-120 minutes.
5. Intrapleural Alteplase 10mg twice daily in loculated effusion post IPC.
   Technique: 10mg alteplase dilute into 50mls NaCl instilled through the catheter and clamp for 45 minutes. This was repeated twice daily for five doses (1 ampule Alteplase=50mg in our institution)

If all the above technique failed, insertion of a new catheter may be required (case to case basis).

Intrapleural alteplase lyses the septation and allowing better drainage through the IPC. It is generally tolerable but in a patient with non-expandable lung, draining the remaining fluid may be painful; hence premedication with analgesia is recommended. Bleeding risk following intrapleural alteplase is low with the incidence of pleural bleeding in about 3%, which responded to blood transfusion without haemodynamic consequences or need for invasive interventions. Systemic bleeding is rare.
Post IPC care to prevent blockage includes proper patient or caretaker training in drainage of effusion and regular flushing with saline after draining.

CONCLUSION

IPC is a safe procedure that can be done as an outpatient, which can provide relief of symptoms, increase in quality of life, reduce hospital stay and avoid the invasive procedure. Complications of IPC are minimal and manageable in our institution. The use of intrapleural alteplase through the IPC is safe and tolerable.

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