



Early Experience with Outpatient Tube Drainage for Management of Pleural Collections

Les premières expériences de consultation externe tube de drainage à la gestion des collections pleurales

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ABSTRACT

BACKGROUND: Increasing cases of pleural effusion leads to pressure on bed spaces and a stretch of the limited facilities available for intervention in our centre. This therefore prompted a search for acceptable alternative way of treatment.

OBJECTIVE: To evaluate the use of ambulatory drainage system for chronic infectious and malignant pleural effusion on out-patient basis.

METHODS: Eight of 113 routinely performed closed tube thoracostomies drainage were converted to ambulatory drainage system at the time of patients' discharge to follow-up clinic. This was after the catheter care had been thoroughly explained to the patients and their relatives.

RESULTS: Eight patients (seven males and one female) had ambulatory outpatient tube management. Their mean age was 44.9 ± 18 years with a range of 22–70 years. Histologically confirmed causes of the effusion were; metastatic adenocarcinoma in two (25%) of the cases; chronic non-specific inflammation in another two (25%) and tuberculous empyema thoracis in three (37.5%) one of whom had TB/HIV co-infection and one (12.5%) of chronic bacterial parapneumonic empyema. One case each of metastatic adenocarcinoma and chronic non-specific suppuration had failed chemical pleurodesis before the outpatient drainage procedure. Half of the cases (including tuberculous and non-tuberculous) were successfully weaned off their catheters. Minor complications such as pain, discomfort, minimal stoma bleeding, and peri-catheter leak were recorded. Rapid fluid re-accumulation prevented weaning in two (25%) of the cases.

CONCLUSION: Out-patient chest tube drainage is effective for the management of both malignant and suppurative pleural effusion. This approach would reduce the ever increasing cost of hospital care for this group of patients. *WAJM 2009; 28(6): 364–367.*

Keywords: Pleural effusion, outpatient tube drainage, management.

RÉSUMÉ

CONTEXTE: L'augmentation des cas d'épanchement pleural conduit à une pression sur les espaces de lit et un tronçon de l'insuffisance des moyens d'intervention disponibles dans notre centre. Cette donc suscité une recherche de manière alternative acceptable de traitement.

OBJECTIF: Évaluer l'utilisation du système de drainage chronique ambulatoire pour épanchement pleural malin sur infectieuses et en ambulatoire.

MÉTHODES: Huit de 113 réalisé en routine fermée thoracostomies tube de drainage ont été convertis au système de drainage ambulatoires au moment de la sortie des patients à un suivi clinique. C'était après les soins du cathéter a été bien expliqué aux patients et leurs proches.

RÉSULTATS: Huit patients (sept hommes et une femme) avaient ambulatoire de prise en charge ambulatoire tube. Leur âge moyen était de $44,9 \pm 18$ années avec une gamme de 22-70 ans. Histologiquement confirmé les causes de l'épanchement étaient; adénocarcinome métastatique sur deux (25%) des cas, l'inflammation chronique non-spécifique dans un autre deux (25%) et thoracis empyème tuberculeux sur trois (37,5%) dont l'un avait la tuberculose /VIH co -infection et une (12,5%) de l'empyème bactérienne chronique parapneumonic. Un cas d'adénocarcinome chaque métastatique et chroniques non spécifiques suppuration avait échoué pleurodèse chimiques avant que la procédure de drainage externe. La moitié des cas (notamment tuberculeuses et non tuberculeuses) ont pu être sevrés de leur cathéters. Des complications mineures telles que douleur, l'inconfort, des saignements stomie minime, et péri-cathéter fuites ont été enregistrés. Un réemploi rapide accumulation de liquide empêche le sevrage en deux (25%) des cas.

CONCLUSION: Out-patient tube de drainage thoracique est efficace pour la gestion de l'épanchement pleural tumoral et suppurative. Cette approche permettrait de réduire le coût croissant des soins hospitaliers pour ce groupe de patients. *WAJM 2009; 28(6): 364–367.*

Mots-clés: épanchement pleural, de drainage tube externe, gestion.

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Abbreviations: HIV, Human immunodeficiency virus; MPE, Malignant pleural effusion; PTB, Pulmonary tuberculosis; TB, Tuberculosis; UWSD, Under-water-seal drainage

INTRODUCTION

The ability to drain the pleural cavity has improved the practice of thoracic surgery over the years. While Scultetus advocated drainage tubes and irrigation for established pleural infection in the 17th century, the principle of water-seal was introduced by Playfair in 1872.¹ Tube thoracostomy with under-water-seal drainage (UWSD) has been of immense value in the management of patients with pleural collection irrespective of the aetiology. While early resolution of collection may be expected in traumatic and most parapneumonic collections, other aetiologies such as malignancy and chronic inflammatory disease like tuberculosis may result in protracted drainage, recurrent collection or failure/inadequate lung re-expansion. For such patients, maintenance of UWSD will translate to impaired mobility, prolonged hospital stay, increased cost of treatment and reduction in quality of life.

Prior to year 2006, no patient was allowed home on chest tube drainage in our institution. We therefore evaluated our experience in the use of ambulatory drainage system with home management in selected patients.

SUBJECTS, MATERIALS, AND METHODS

Patients were selected for outpatient tube management with the following criteria in the two-year study period (July 2006–June 2008).

- Persistent pneumothorax, pleural effusion or empyema thoracis despite minimum of two weeks of effective drainage by tube thoracostomy.
- Failure of chemical pleurodesis after two attempts in patients with malignant pleural effusion (MPE).
- Failure of adequate lung re-expansion after minimum of two weeks of institution of tube thoracostomy drainage (Fig. 2).
- Educated patient or attending relative or care giver.

At commencement of outpatient tube management, the Argyl chest tube was replaced with a size 24 Fr Foley's urethral catheter inserted through previous stoma and connected to a leg urine bag (Romsons® – India) – (Fig1).

The patient/care giver is taught to empty the bag and measure the effluent on daily basis. When pneumothorax is present, a crucifix incision was made on both lateral angles of the upper edge of the bag the same side to permit egress of air. Patient was discharged and reviewed every two-four weeks at the out-patient clinic. Drainage volume, character of effluent, and roentgenographic changes were documented. Catheter and bag were changed when necessary and complications noted. Patients were weaned if drainage stopped or reduced to about 5–10mls per day and roentgenogram demonstrated adequate lung re-expansion. The catheter was removed and a colostomy bag was applied over the stoma which then healed spontaneously. A period of stoma dressing was sometimes necessary till wound epithelialised.

Expected outcomes were either to achieve lung re-expansion with pleural symphysis or as end stage palliative care in cases of neoplastic aetiology.

Patient's biodata, aetiology of pleural collection, and outcome of management were documented.

RESULTS

Over the two-year study period a total of 113 patients had tube thoracostomy out of which eight (7.1%) were offered ambulatory outpatient tube management (Table 1). Seven (87.5%) patients were males. Age range was 22–70 years with a mean of 44.9±18 years. Four (50%) had pleural effusion (of which two were haemorrhagic), three (37.5%) had empyema and one (12.5%) had pyopneumothorax. Aetiology included three (37.5%) with pulmonary tuberculosis (PTB), two (25%) each with metastatic adenocarcinoma and chronic non-specific inflammation and one case of pneumonia. Two patients had failed chemical pleurodesis before commencement of ambulatory drainage. Four (50%) patients were completely weaned off their catheter. Three patients (37.5%) (two malignant and one chronic non-specific inflammatory effusions) died on the management. Two patients died at home while other patient was readmitted three days before he died. Minor complications recorded from two

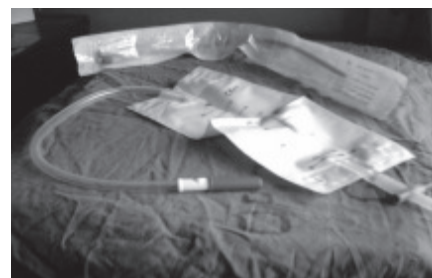


Fig 1: Leg urine bag with Foley's Catheter.

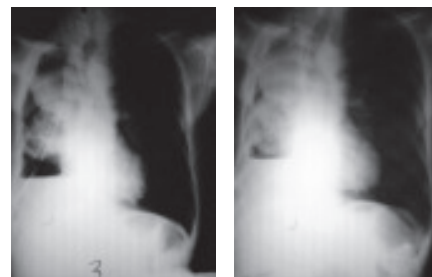


Fig. 2: Chest X-ray of patient 1 showing Argyl tube in situ with collapsed lung system (left panel) and same patient with Foley's catheter (right panel).

(25%) patients included pain or discomfort from the tube, peri-catheter leak and bleeding from the stoma after a tube change which stopped after partial deflation of catheter balloon. There was no incidence of accidental dislodgement of the tube. Two patients (25%) were reverted to catheter drainage after an attempted wean to colostomy bag failed due to re-accumulation of pleural fluid demonstrated by copious drainage from stoma and increased fluid level on chest roentgenogram. They eventually died on catheter care.

DISCUSSION

Most reports on ambulatory chest tube drainage have been in the management of MPE or malignant pneumothorax. The average survival of patients with MPE is four to six months². A prompt and sustained relief of the effusion will alleviate the attendant cough, dyspnoea and chest discomfort which diminishes the overall quality of life of the patient.

Options in the management of MPE vary and include repeated thoracocentesis, tube thoracostomy with or without sclerotherapy, pleuroctomy, pleuro-peritoneal shunt and ambulatory

Table 1: Patients Managed on Outpatient Tube Drainage

| S/No. | Age | Sex | Diagnosis | Complications | Duration on Argyl Tube Drainage | Duration on Ambulatory Drainage | Outcome |
|-------|-----|-----|--|-----------------------------|---------------------------------|---------------------------------|-------------|
| 1 | 70 | M | Malignant Pleural Effusion (Metastatic Adenocarcinoma) | Pain, Peri-catheter Leakage | 4 | 32 | Died |
| 2 | 24 | M | Tuberculous Pyo-pneumothorax | None | 13 weeks | 6 weeks | Weaned |
| 3 | 48 | M | Parapneumonic Empyema Thoracis | None | 2 weeks | 13 weeks | Weaned |
| 4 | 38 | M | Tuberculous Empyema Thoracis | None | 4 weeks | 5 weeks | Weaned |
| 5 | 62 | M | Malignant Pleural Effusion (Metastatic Adenocarcinoma) | None | 14 weeks | 16 weeks | Died |
| 6 | 22 | M | Hemorrhagic Pleural Effusion (Chronic non-specific Inflammation) | None | 21 weeks | 13 weeks | Died |
| 7 | 35 | M | Tuberculous Empyema Thoracis, HIV-positive | None | 6 weeks | 26 weeks | On drainage |
| 8 | 60 | F | Hemorrhagic Pleural Effusion (Chronic non-specific Inflammation) | Pain, Bleeding | 10 weeks | 3 weeks | Weaned |

drainage system.²⁻⁴ Whichever option is selected, the goal is to achieve effective palliation by a single, reliable and safe modality which would cause little discomfort, avoid prolonged hospitalization and provide lasting relief of symptoms.^{4,5} Tube thoracostomy with instillation of sclerosing agent is most widely performed.² Talc provides the highest success rate with values of 72 – 100% after single administration and low recurrence rates of 3–8% after 30 days.^{2,4} However, in some patients, sclerotherapy is either unsuccessful or not an option.⁶ Patients in this category include those with unexpanded lung from disease or “trapped” lung and those with recurrent effusion/pneumothorax.^{3,4,7}

Various catheter-based techniques have been reported which permit outpatient care while constantly evacuating the pleural space. Van Le et al presented the successful application of pigtail catheter in two patients.⁶ L. Saffran *et al* also adopted this for outpatient pleurodesis.⁸ Others have employed silastic catheter (Pleurx).^{3,9-12} The advantages reported from the use of these fine-bore tubes include the ease of insertion, short hospital stay, and minimal

discomfort at the site of insertion. Home management improves the overall quality of life of the patients.

Due to non-availability of these catheters in our institution we have employed Foley’s catheter for home management. The soft consistency of the catheter and smaller calibres compared to the Argyl tubes reduce discomfort to patients. The balloon provides a self-retaining mechanism which eliminates the need for anchoring sutures. Prolonged anchor sutures cause necrosis at tube site with subsequent wound infection and tube dislodgement. As a substitute to vacuumed bags recommended for use with pleurx catheter, we used the leg urine bag which has a non-return valve. The non-return valve acts like a Heimlich valve which makes it suitable for pneumothoraces.⁷ Its short length aids ambulation and handling. We have also found use for this management option in inflammatory conditions particularly in PTB. In active PTB complicated with pleural collection, effective pleural space drainage is required while medical treatment is instituted. This may prevent formation of a cortex which traps the lung.

All patients weaned successfully had inflammatory aetiology. One patient had been on admission for about three months on UWSD before this treatment option was adopted in our institution. While on UWSD he was depressed, refusing feeds and medications. On discharge, he improved psychologically and gained 10 Kg of body weight in one month. Ambulatory management improves respiratory excursion thus improving the chance of lung re-expansion. Another advantage of this management option is that it decongests the hospital beds. The management was well tolerated with minor complications recorded in two patients (25%). Tunneling as reported by Smart and Tung³ may prevent peri-catheter leakage as observed in patient one.

We conclude that outpatient chest tube drainage is suitable for our environment. In the developing country, use should not be limited to MPE or MP alone but also for chronic inflammatory conditions particularly PTB. It is however necessary to define the criteria for selecting patients and to prospectively compare this treatment modality with others previously stated.

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