

Audit on bedside chemical pleurodesis in a palliative care setting: Brunei experience

Abstract

Background: Malignant pleural effusion typically is a sign of aggressive and advanced disease with generally short life expectancy. This causes a lot of burdens symptomatically to patients with advanced malignancy. Hence, a lot of patients are made known early to palliative service to help optimise patients' symptomatology. One of the procedures to help prevent the recurrence of symptomatic malignant pleural effusion is bedside chemical pleurodesis following thoracentesis. This audit aims to assess the efficacy and safety of doing the above procedure in a palliative setting.

Patients and methods: Retrospective electronic records of patients were reviewed from January 2020 until March 2022. Malignant pleural effusion was confirmed by cytological assessment of pleural fluid following chest tube drainage. Chemical pleurodesis was done by pleural fluid instillation of bleomycin, performed bedside by palliative physicians.

Results: Twenty patients were identified out of which 7 were male and 13 were female. The mean age was 69.2 with 55% of them suffering from lung malignancy. Complete response is seen in 45% and partial response is seen in 20%. The failure rate is at 35%. The complications were minimal with only 5% of patients having fever and 10% having pleuritic pain.

Conclusions: The audit shows bedside chemical pleurodesis performed by palliative physicians is as efficacious and safe compared to when it is done by other specialities. It helps improve symptoms in 65% of patients and thus improves the quality of life.

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Key words: malignant pleural effusion, pleurodesis, palliative care

Introduction

Malignant pleural effusion (MPE) is a common but distressing condition in patients with advanced malignancy. It affects up to 15% of patients with cancer and is most common in lung, breast, lymphoma, gynaeco-

logical malignancies and malignant mesothelioma [1]. It also indicates that the disease is now advanced and life expectancy is generally short with a median prognosis of 3–12 months [2]. Hence, a lot of patients are now known early to palliative services to help optimise patients' quality of life with treatment goals concerning

Address for correspondence:

Muhammad Yusuf Shaharudin

RIPAS Hospital, Jalan Putera Al-Muhtadee Billah, BA1710, Bandar Seri Begawan, Brunei Darussalam

e-mail: usopan@gmail.com



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relieving dyspnoea, restoration of near-normal activity and function and reducing the need for inpatient care.

Treatment options for the recurrence of MPE comprise repeated therapeutic thoracentesis, chest tube drainage, chemical or surgical pleurodesis, thoracoscopy and insertion of an indwelling pleural catheter (IPC). However, this is limited by the availability and resources available in each centre. Pleurodesis is an intervention that's designed to get the two layers of the lung's lining (the pleura) to stick together to prevent the recurrence of pleural effusion. The procedure is traditionally performed by respiratory, cardiothoracic or medical oncology physicians. However, chemical pleurodesis can be done at the bedside by palliative care physicians with appropriate training and is thought to be the best palliative treatment for recurrent effusions of end-stage malignancies [3].

Palliative care is a relatively new speciality in Brunei which only started in 2009. Since then there has been a development of both in-patient, out-patient and community services. Annually there are on average 420–450 new cases of in-patients and about 550–600 out-patients. 80% of referrals that were received were advanced malignancies. One of the services that were offered as in-patient care is bedside chemical pleurodesis for MPE as more and more advanced cancer patients are being referred early to a service to optimize their symptoms and their quality of life. The agent that was in the authors' practice is bleomycin. This study aimed to audit the practice of doing chemical pleurodesis for malignant pleural effusion.

Patients and methods

A retrospective electronic record of patients with malignant pleural effusion who were referred to palliative care service, at the hospital, the main tertiary centre in Brunei Darussalam for chemical pleurodesis from January 2020 until March 2022 was reviewed. All patients had documented evidence of malignant pleural effusion from pleural cytology following thoracentesis. The level of pleural effusions was also documented to be at least moderate to severe before thoracentesis was done.

All patients were also subjected to the standard technique of chest tube insertions. This was done either by radiologist colleagues or by respiratory physicians in the ward. The drainage pleural effusion was followed daily until it became less than 150 cc in 24 h. Subsequent chest X-rays were done to demonstrate complete pleural drainage with full lung expansion before chemical pleurodesis was performed. Following the above, 5–10 cc of lidocaine was administered before the instillation of 45 units of bleomycin dissolved

in 50 cc of sterile normal saline solution into the pleural space via chest tube. The chest tube was then clamped for 4 hours and the patient's position was rotated to prone, supine, left lateral and right lateral decubitus respectively for every 30 minutes. Thoracotomy tubes were removed when the daily drainage achieved less than 150 cc. The patients were subsequently followed up in the outpatient clinics at 1, 3 or 6 months following the chemical pleurodesis or until patients were readmitted again.

Procedure success and complete response to treatment were defined based on Rafei et al. [4] works in 2015. Complete response is defined as the absence of fluid accumulation that requires repeated thoracentesis/chest tube drainage in the follow-up imaging (chest X-ray or CT thorax). Partial response is defined as a small amount of fluid re-accumulation (less than 50% of initial radiograph) but not requiring repeated thoracentesis/chest tube drainage. Failure to respond is defined as fluid re-accumulation causing clinical symptoms and/or requiring repeated thoracentesis/chest tube drainage [4]. Data were entered into Excel and analysed using descriptive statistics.

Results

There were 20 patients identified. The median age was 69.2 and the majority was female making up about 67% of them. All the patients had documented at least moderate to severe pleural effusion before thoracentesis was performed. Upon admission, 94.4% of patients presented with shortness of breath, 38.8% complains of chest pain or heaviness and 22.2% suffers from dry cough before diagnosis. The mean duration of time from diagnosis of effusion to thoracentesis was 5.8 days while the median duration of time from thoracentesis to chemical pleurodesis was 9 days. The average length of stay for these patients was 18 days (Table 1).

The most common site of the primary tumour is lung adenocarcinoma with about 55% of them followed by both ovarian and renal cell carcinoma at 15% (Table 2, 3). The complete response towards chemical pleurodesis was seen in 45% of patients and partial response in 20%. Failure to treat is at the rate of 35% (Figure 1). 5% died shortly after pleurodesis.

In terms of complications, 70% of patients did not report any issue, while 1 out of 20 patients reported fever and 2 of them had chest pain following chemical pleurodesis. After 6 months of follow-up, 6-months survival was 45%. None of those with failed pleurodesis survives after 6 months. Among those who did respond to pleurodesis, either be a partial or complete response, 69% alive after 6 months.

Table 1. Participants’ demographic and in-patient characteristics

Mean age	69.2
Male	72.5
Female	66.9
Gender	
Male	35%
Female	65%
The average length of stay	18.0 (range from 5 to 51) in days
Median of time from thoracocentesis to pleurodesis	9.0 (range from 3 to 15) in days
Mean of time from pleural effusion diagnosis to thoracocentesis	5.8 (range from 1 to 17) in days

Table 2. Primary tumour sites and response to treatment

Type of primary cancer	Partial response	Complete response	Failure	Total
Lung				
Adenocarcinoma	3	4	3	10
Mesothelioma		1		1
Breast			1	1
Ovarian		2	1	3
Renal	1	1	1	3
Gastric		1		1
Chronic lymphocytic leukaemia			1	1
Total	4 (20%)	9 (45%)	7 (35%)	20

Table 3. Response to treatment and 6 months survival

	Partial response	Complete response	Failure	Total
Death within 6 months	2	2	7	11 (55%)
Alive after 6 months	2	7	0	9 (45%)

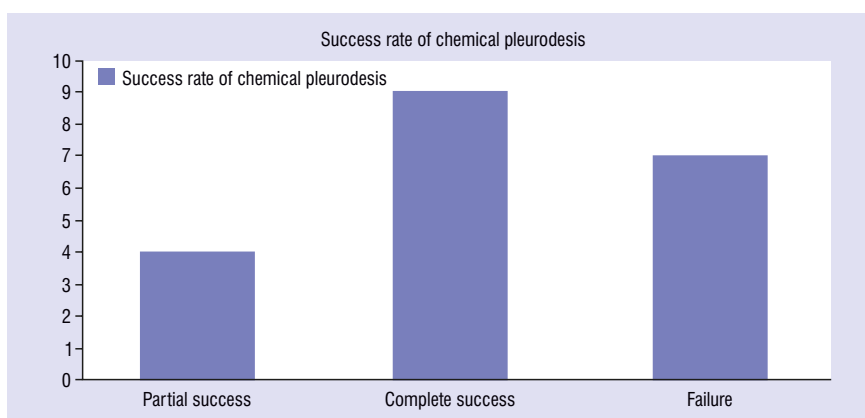


Figure 1. The success rate of chemical pleurodesis

Discussion

Malignant pleural effusion (MPE) causes a lot of distress for patients suffering with advance malignancy hence affecting patient function and quality

of life. This is especially important as MPE may likely recur after the initial thoracocentesis or pleural drainage. There are a few treatment options that can be offered to the patient to prevent the recurrence of MPE. However, not all centres have the resources to

offer long-term tunnelled indwelling pleural catheter or VATS procedures for example to help patients suffering from recurrent MPE. The study centre in Brunei also does not have the resources above to offer to the patient. However, a relatively simple procedure such as chemical pleurodesis can be offered bedside by the palliative care team to prevent the recurrence of pleural effusion. Pleurodesis is traditionally performed by the respiratory or cardiothoracic team. As MPE is an indicator of advanced and aggressive disease, many patients are being referred early to Palliative services for holistic care. Hence, it is increasingly important now for the palliative care team to be able to offer such a procedure bedside as technically it is not a difficult procedure and it may help achieve a quality of life in patients suffering from recurrence symptomatic MPE. This study aims to review practice in doing bedside chemical pleurodesis with bleomycin.

In the present study, the mean age of patients was 69.2 years old of which 35% were male and 65% were female. These demographics comparatively are almost similar to most of the studies of chemical pleurodesis being performed largely by the respiratory or cardiothoracic team. The median age in their studies was more than 60 years old and female was in higher proportion than male. Zimmer et al. study [5] has 33 patients (14 with bleomycin and 19 with talc) with male to female ratio of 4 to 10, Ong et al. [6] collected data for 38 patients (20 with bleomycin and 18 with talc) while Nikbakhsh et al. [7] has 50 patients where 62% were female in their study [5–7]. The main limitation of the present study would be the number of cases studied as the authors managed to collect the data over 2 years. Nikbakhsh et al. [7] collected their data for around 5 years with 50 patients included while Zimmer et al. [5] collected around 3 years with 33 patients included in their research. Pleurodesis for malignant pleural effusion is not a frequently performed procedure and this is apparent in the number of patients accrued in different studies.

In terms of types of cancer, 55% of patients in the present study suffer from lung cancer with lung adenocarcinoma constituting the predominant number with 10 out of 11 patients suffering from it. In both Ong and Zimmer studies, lung cancer also constitutes a large portion of their cases with 9 cases in Ong study bleomycin group and 8 cases in Zimmer study bleomycin group. Nikbakhsh et al., however, have breast carcinoma as their predominant cancer at 40% while lung adenocarcinoma at 22%.

In the present study, a complete response to treatment was seen in 45% while 20% had a partial response. Response failure is at a rate of 35%. This gives a total response to treatment (complete and

partial response) of about 65%. This is comparable to Ong's study in which 70% of patients in the bleomycin group have treatment success, 79% success rate in Zimmer's study and 88% in Nikbakhsh's study. Other older studies in the literature gave almost similar success rates with bleomycin around 64% in Moores et al., 66% in Hamed et al. and 62% in Kessinger et al. studies. This showed that the present success rate is comparable with other studies in which chemical pleurodesis is being performed by respiratory or cardiothoracic teams.

In terms of complications, the majority of the present study patients did not report any immediate issues, with only 5% of patients had a fever and 10% had pleuritic pain. This is almost similar to the Nikbakhsh study with only 4% of patients had a fever and 14% of patients had pleuritic pain. In Ong's study, 4 out of 20 patients had a fever and only 2 cases had pleuritic pain. This showed that bedside chemical pleurodesis is generally a safe procedure with minimal complications.

Malignant pleural effusion (MPE) generally is indicative of advanced disease and life expectancy is generally short with a median prognosis of 3–12 months [2]. In the present study, 55% of patients did not survive the past 6 months with all patients that failed to respond to chemical pleurodesis being in this category. In Nikbakhsh's study, 36% of patients died within the first 6 months while the median survival in Ong's study was 5 months.

Many studies have described the benefit of pleurodesis to patients suffering from malignant pleural effusion. Sivakumar et al. in their study has described that pleurodesis did improve quality of life in 4–12 weeks although insufficient long-term data is needed [8]. Basso et al. in his study also reported of improvement in the quality of life with an improvement of Karnofsky performance score from 62.1 to 71.3 and an improvement of the MRC dyspnoea score from 4.2 to 2.7 [9]. Hence, it is proved that aiming for pleurodesis patients with MPE does help to optimise and improve the quality of life which is one of the main palliative goals.

For future improvement, other alternatives and newer ways to achieve pleurodesis in managing patients with recurrent MPE may be considered. A different agent such as talc slurry may be considered. In a Cochrane meta-analysis of 1499 subjects, talc was found to be the most efficacious (RR of non-recurrence 1.34, 95% CI, 1.16–1.55) with no increased mortality post pleurodesis [10]. Talc slurry is also cheaper compared to bleomycin, thus will further reduce patients' and their family's financial burden in long run. Another strategy that needs to be considered but requires further training and

procurement of equipment is indwelling tunnelled pleural catheter (IPC) insertion. A systematic review of 19 studies with a total of 1,370 patients showed symptomatic improvement was reported in 95.6%. Spontaneous pleurodesis occurred in 45.6% [11]. Further training may be needed to equip the Palliative team to offer more services to help improve patients' quality of life.

Conclusions

Bedside chemical pleurodesis service is a relatively simple procedure that can also be safely offered by palliative care physicians as a part of holistic care in patients with recurrent malignant pleural effusion. The outcome is comparable to those being performed traditionally by respiratory, cardiothoracic or medical oncology colleagues with minimal complications. In a centre which did not offer VATS pleurodesis or IPC insertion, bedside chemical pleurodesis can be offered safely and relatively easily by palliative physicians to achieve an overall improvement in the quality of life.

Declaration of conflict of interests

The author declares that there is no conflict of interest.

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