*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*
*e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 24, Issue 4 Ser. 2 (April. 2025), PP 41-48*
*www.iosrjournals.org*

# "Assessment of the Outcome of Povidone-Iodine Versus Bleomycin Pleurodesis in the Management of Malignant Pleural Effusion"

Prof. Dr. Aslam Hossain*[1], Dr. Tania Nusrat Shanta[2],
Dr. C.M Mosabber Rahman[3], Dr. Abul Bashar Maruf[4], Dr. Md. Saiduzzaman[5],
Dr. Sumaia Binte Shawkat[6]

[1]*Professor & Chairman, Department of Cardiac Surgery, Bangladesh Medical University, Dhaka, Bangladesh*
[2]*Specialist, Department of Cardiac Surgery, United Hospital Limited, Dhaka, Bangladesh*
[3]*Junior Consultant, Department of Cardiac Surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh*
[4]*Specialist, Department of Cardiac Surgery, United Hospital Limited, Dhaka, Bangladesh*
[5]*Resident, Department of Cardiac Surgery, Bangladesh Medical University, Dhaka, Bangladesh*
[6]*Assistant Register, Department of Cardiac Surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh*

***Abstract***
***Introduction:*** *Malignant pleural effusion is one of the most frequently encountered complications of certain malignancies with a well-documented higher rate of mortality. Pleurodesis is the best palliative treatment option in most of the time. The purpose of this study was to evaluate the efficacy of povidone iodine as an agent of chemical pleurodesis in comparison to bleomycin in the management of malignant pleural effusion.*
***Methods:*** *This cross-sectional study was carried out in the Department of Thoracic Surgery, National Institute of Diseases of the Chest and Hospital, from January 2021 to December 2021. A total of 120 patients, aged between 40 and 70 years, undergoing tube thoracostomy for malignant pleural effusion, were evaluated and divided into two groups based on the agent used for pleurodesis: the povidone iodine group (group A) and the bleomycin group (group B).*
***Result:*** *The mean age in Group A is 55.0 years (±8.03), while in Group B, it is slightly higher at 59.1 years (±8.77), however, the difference is not statistically significant (P = 0.085). More than 60% of patients were diagnosed through pleural fluid cytology, while over 30% had histological evidence. Both groups showed significant improvement in dyspnea and pain post-procedure, with no statistically significant differences in symptom relief across multiple follow-ups. Group A had a shorter hospital stay (10.70 ± 2.87 vs. 12.34 ± 2.56 days, P = 0.008) and a higher proportion of patients reporting no post-procedural complications (P = 0.001). However, treatment failure was slightly more common in Group A (13.3%) compared to Group B (6.7%); nonetheless, the overall success rates were comparable (76.7% vs. 80.0%, P = 0.836). During follow-up, chest X-rays revealed recurrence of effusion in 20% of patients in Group A and 13.4% in Group B, with no significant differences in effusion recurrence, while the mortality rates were 3.3% and 6.7% in Groups A and B, respectively, due to underlying malignancies.*
***Conclusion:*** *In our study, we found that both povidone-iodine and bleomycin are effective agents for pleurodesis in MPE, with similar clinical outcomes. Povidone-iodine offers the advantage of a shorter hospital stay and fewer post-procedure complaints, while bleomycin demonstrates a slightly lower failure rate. Given its lower cost and comparable efficacy, povidone-iodine may serve as a viable alternative for pleurodesis in resource-limited settings.*

***Keywords:*** *Malignant pleural effusion, Pleurodesis, Povidone-iodine, Bleomycin, Outcome*
***Corresponding Author:*** *Dr. Aslam Hossain, Professor & Chairman, Department of Cardiac Surgery, Bangladesh Medical University, Dhaka, Bangladesh*

Date of Submission: 01-04-2025 Date of Acceptance: 11-04-2025

## I. Introduction

Malignant pleural effusion (MPE) is a common, recurrent, distressing condition that arises at the advanced stage of various malignancies and frequently heralds a poor prognosis. It occurs in about 15% of all patients with cancer, especially lung cancer [1]. As global cancer rates rise and survival improves, the incidence of malignant pleural effusion (MPE) is expected to increase. Most patients with MPE experience significant symptoms, including progressive shortness of breath, dry cough, chest pain, and reduced physical activity, all of

which severely impact their quality of life [2]. Despite advances in cancer treatment, prognosis remains poor, with a median survival of just 3 to 12 months, depending on patient and tumor-related factors [3]. Given this, the primary goal in managing MPE should be rapid and effective symptom relief with minimal discomfort, minimal disruption to daily life, and cost-effectiveness [4]. The most common approaches include frequent thoracentesis via thoracostomy tubes or pleural catheters, sometimes combined with pleurodesis, to effectively alleviate respiratory symptoms. Over the past several years, chemical pleurodesis has evolved as the most widely accepted palliative treatment for MPE. It may be the best available treatment for recurrent and troublesome pleural effusions when the underlying cause cannot be corrected. The aim of pleurodesis in patients with MPE is to prevent re-accumulation of the effusion, thereby improving symptoms, quality of life, and avoiding the need for repeated hospitalization [5]. But the main question is the choice of the sclerosing agent, which is not only determined by the efficacy of the chemical agent but also by its safety, availability, cost, ease of use, and number of administrations to achieve a complete response, since there is no consensus on the currently accessible best sclerosing agent for pleurodesis.

A wide spectrum of pleurodesis agents has been described and used for chemical pleurodesis, showing a success rate ranging from 60-94% [6], but the search for the ideal agent for pleurodesis still continues. Talc, bleomycin, and tetracycline are the frequently used pleurodesis agents in clinical practice worldwide [7]. Among them, talc is considered the most effective and commonly used sclerosant for MPEs [3]. Severe complications like ARDS have been encountered with the use of talc, and medical-grade talc is not available in many countries. Instillation of bleomycin for pleurodesis is a well-established technique and commonly used in many countries [8]. A prospective randomized trial concluded that bleomycin is as effective as talc [9]. Its side effects are not severe like those of talc, but unfortunately, it is expensive compared to other agents, thus limiting its use.

Under these circumstances, povidone iodine has drawn the attention of the researcher. Povidone-iodine (in a 10% solution), which is primarily used as a topical antiseptic agent, is cheaper and more readily available globally. It has been reported as a promising agent for pleurodesis in some series. The mechanism of action remains unclear, with multiple theories, including enhanced sclerosis related to its low pH [10]. Povidone iodine has been proven to be a safe and effective alternative sclerosing agent for pleurodesis; however, its use for MPEs management has not been as extensively studied [11]. Therefore, this study aimed to evaluate the outcome of povidone-iodine pleurodesis and to determine whether, as an alternative pleurodesis agent, povidone iodine is as effective as bleomycin in managing MPE.

## II. Methodology & Materials

This cross-sectional study was conducted in the Department of Thoracic Surgery, National Institute of Diseases of the Chest and Hospital (NIDCH), Dhaka, Bangladesh, from January 2021 to December 2021. In this study, we included 120 patients with malignant pleural effusion who underwent chemical pleurodesis in the department of thoracic surgery, NIDCH, after fulfilling the inclusion and exclusion criteria. Patients were divided into two groups with 60 patients in each group - Group A (Patients received pleurodesis with povidone iodine) and Group B (Patients with pleurodesis with bleomycin).

These are the following criteria to be eligible for enrollment as our study participants: a) Patients with recurrent malignant pleural effusion; b) Patients who underwent tube thoracostomy; c) Patients with clinical and radiological evidence of full re-expansion of lung and ensuring the criteria of pleurodesis; d) Patients who were willing to participate were included in the study **And** a) Patients with previous history of pleurodesis; b) Patients with failure re-expansion of lung after tube thoracostomy; c) Patients with known case of thyroid disorder; d) Patients with any history of chronic illness (e.g., chronic kidney disease, ischemic heart disease, asthma, COPD etc.) were excluded from our study.

**Surgery procedure:** A chest tube(32FG) was inserted under local anaesthesia through the 5th intercostal space just lateral to the anterior axillary line and connected to an underwater sealed tube drainage system. The drainage should be controlled to avoid the development of re-expansion pulmonary oedema. The patient commences chest physiotherapy with an incentive spirometer to encourage lung re-expansion. As soon as the drainage was less than 100ml/24 hours, the colour of the fluid was serous, no air leak, and the lung fully re-expanded (verified by chest X-ray), pleurodesis was performed at the patient's bedside. A mixture of 20 ml of 10% povidone iodine and 80 ml of normal saline to which 5 ml of 2% lidocaine solution was added and instilled into the pleural cavity through the chest tube in group A patients. While Group B patients received bleomycin 1U/kg of body weight (but not more than 60 units) dissolved in 50ml of normal saline to which 5ml of 2% lidocaine was added and was instilled through the chest tube into the pleural cavity.

The chest tube was clamped for 4 hours and connected to a water seal bag. Negative pressure was not applied to any of the patients. All patients were admitted to the general ward in the hospital and underwent the same post-pleurodesis physiotherapy and pain control protocols. An intravenous analgesic was administered if

needed. If the post-procedure drainage Wa≤100min 24 hours, the tube was removed. Chest X-ray was done and if satisfactory, patients were discharged with advice for oncological consultation.

**Postoperative evaluation and follow-up:** Any complications related to the procedure, such as fever, allergic reaction, are recorded and managed. Follow-up was done at the 2nd week, 6th week, and 12th week after the procedure. During follow-up, the response to the procedure, treatment failure, and the complaints of the patients, like pain and dyspnea, were evaluated. Pain was evaluated by the numeric rating scale (NSR) of pain, and dyspnea was scored according to the Medical Research Council (MRC) dyspnea scale. The efficacy of pleurodesis was defined in three levels of response: complete, partial, and failed. A chest X-ray was done to detect recurrence of effusion. A normal chest radiograph or radiological re-accumulation of pleural fluid without recurrence of dyspnea or the need for drainage (both complete and partial response) was considered a success.

**Data Collection Procedure**: Informed written consent was taken from the patients. Then, data were collected by face-to-face interviews, history sheets, and related investigation reports. Data was checked immediately after completing the interview and review of the necessary investigation reports. Before data processing, collected information was re-checked for completeness and internal consistency, considering the norms of missing data.

**Statistical Analysis:** All data were recorded systematically in a preformed data collection form. Quantitative data were expressed as mean and standard deviation; qualitative data were expressed as frequency distribution and percentage. The qualitative data were analyzed using the chi-square ($X^2$) test, Fisher's exact test, and quantitative data were analyzed using paired or unpaired t-test. A p-value <0.05 was considered significant. Statistical analysis was performed by using SPSS 26 (Statistical Package for Social Sciences) for Windows version 10. This study was ethically approved by the institutional ethical review board of the National Institute of Diseases of the Chest and Hospital, Dhaka, Bangladesh.

## III. Results

**Table 1: Distribution of study patients by age, weight, and gender**

| Characteristics | Group A ($N = 60$) | Group B ($N = 60$) | P value |
|---|---|---|---|
| Mean age(years) | 55.0±8.03 | 59.1± 8.77 | 0.085 |
| 40-49 | 8(13.4) | 6(10.0) | |
| 50-59 | 28(45.4) | 14(24.7) | |
| 60-69 | 16(27.4) | 26(42.5) | |
| 70-80 | 8(13.5) | 14(13.6) | |
| Weight(kg) | 53.26±9.14 | 50.03± 4.34 | 0.074 |
| Gender | | | |
| Male | 32(53.3) | 40(66.7) | |
| Female | 28(46.7) | 20(33.3) | |
| Total | 60(100.0) | 60(100.0) | |

Table 1 shows that the mean age in Group A is 55.0 years (±8.03), whereas in Group B, it is slightly higher at 59.1 years (±8.77); however, the difference is not statistically significant (P = 0.085). In terms of age groups, a larger proportion of individuals in Group B are aged 60-69 (42.5%) compared to Group A (27.4%). In contrast, Group A has a higher proportion of individuals in the 50-59 age range (45.4% vs. 24.7% in Group B). The mean weight in Group A is 53.26 kg (±9.14), whereas in Group B, it is slightly lower at 50.03 kg (±4.34). Group A consists of 53.3% males and 46.7% females, while Group B has a higher percentage of males (66.7%) and fewer females (33.3%).

**Table 2: Distribution of study patients by co-morbidities between two groups**

| Co-morbidities | Group A ($N = 60$) | Group B ($N = 60$) | P value |
|---|---|---|---|
| Diabetes mellitus | 6(10.0) | 10(16.9) | 0.448 |
| Hypertension | 14(23.3) | 24(40.0) | 0.165 |
| Smoking | 26(43.4) | 36(58.0) | 0.196 |
| COPD | 0(0.0) | 4(6.4) | 0.150 |
| No co-morbidity | 10(33.3) | 10(6.2) | 0.136 |

Table 2 shows that a higher proportion of individuals in Group B (40.0%) have hypertension compared to Group A (23.3%), followed by a slightly higher percentage of individuals in Group B (16.9%) having diabetes compared to Group A (10.0%). Smoking is more common in Group B (58.0%) than in Group A (43.4%). No individuals in Group A have COPD, whereas 6.4% of individuals in Group B are affected. The proportion of individuals without any co-morbidities appears higher in Group A (33.3%) compared to Group B (6.2%). None of the differences between the two groups is statistically significant.

**Table 3: Distribution of study patients by diagnostic findings between groups**

| Diagnosis of MPE | Group A ($N = 60$) | Group B ($N = 60$) | P value |
|---|---|---|---|
| Pleural fluid cytology | 40(66.7) | 38(63.3) | 0.787 |
| Pleura1 biopsy | 20(33.3) | 22(36.7) | |
| Total | 60(100.0) | 60(100.0) | |

Table 3 shows that pleural fluid cytology was the most common diagnostic method in both groups, with 66.7% of cases in Group A and 63.3% in Group B diagnosed this way. The difference is not statistically significant (P = 0.787). A smaller proportion of cases were diagnosed using pleural biopsy, with 33.3% in Group A and 36.7% in Group B, showing no significant difference between groups.

**Table 4: Comparison of pre-procedure complaints between two groups**

| Complaints | | Group A ($N = 60$) | Group B ($N = 60$) | P value |
|---|---|---|---|---|
| Chest pain | Mild | 6(10.0) | 8(13.3) | 0.021 |
| | Moderate | 36(60.0) | 50(83.3) | |
| | Severe | 18(30.0) | 2(3.3) | |
| Dyspnea | Moderate | 6(10.0) | 10(16.7) | 0.448 |
| | Severe | 54(90.0) | 50(83.3) | |
| Cough | | 24(40.0) | 24(40.0) | 1.000 |

Table 4 shows that there is a significant difference in the severity of chest pain between the two groups (P = 0.021). In Group A, 60% of individuals reported moderate pain, while 30% experienced severe pain. In contrast, Group B had a higher proportion of moderate chest pain cases (83.3%), but only 3.3% reported severe pain. Mild chest pain was reported by a small percentage in both groups (10.0% in Group A and 13.3% in Group B). The majority of participants in both groups experienced severe dyspnea, with 90.0% in Group A and 83.3% in Group B. Moderate dyspnea was reported by 10.0% of individuals in Group A and 16.7% in Group B. This difference was not statistically significant (P = 0.448). Cough was reported by 40.0% of participants in both groups, with no difference between them (P = 1.000).

**Table 5: Distribution of study patients by post-operative complications and Post-pleurodesis variables between two groups**

| Complications | Group A ($N = 60$) | Group B ($N = 60$) | P value |
|---|---|---|---|
| Fever | 12(20.0) | 24(40.0) | 0.092 |
| Pain | 14(23.3) | 28(46.7) | 0.052 |
| No complications | 34(56.7) | 8(13.3) | 0.001 |
| **Post-pleurodesis variables** | | | |
| Duration of the IT tube remained (days) | $1.83 \pm 0.53$ | $1.89 \pm 0.52$ | 0.514 |
| Total hospital stays (days) | $10.70 \pm 2.87$ | $12.34 \pm 2.56$ | 0.008 |

Table 5 presents a comparison of post-operative complications and post-pleurodesis outcomes between Group A and Group B. In terms of complications, fever and pain were more common in Group B (40.0% and 46.7%, respectively) compared to Group A (20.0% and 23.3%), though the differences were not statistically significant. Notably, a significantly higher percentage of patients in Group A (56.7%) reported no complications post-procedure compared to only 13.3% in Group B (P = 0.001). Regarding post-pleurodesis outcomes, the duration of intercostal tube (IT) placement was similar between the groups (1.83 ± 0.53 days in Group A vs. 1.89 ± 0.52 days in Group B, P = 0.514). However, total hospital stay was significantly longer in Group B (12.34 ± 2.56 days) than in Group A (10.70 ± 2.87 days, P = 0.008), indicating a potential difference in recovery time.

**Table 6: Comparison of pre and post-procedure dyspnea between groups**

| Dyspnea | | Group A ($N = 60$) | Group B ($N = 60$) | P value |
|---|---|---|---|---|
| Pre-procedure | Moderate | 6(10.0) | 10(16.7) | 0.448 |
| | Severe | 54(90.0) | 50(83.3) | |
| 1st follow-up | None | 58(96.7) | 58(96.7) | 1.00 |
| | Mild | 2(3.3) | 2(3.3) | |
| 2nd follow-up | None | 56(93.3) | 54(90.0) | 0.254 |
| | Mild | 0(0.0) | 4(6.7) | |
| | Moderate | 2(3.3) | 0(0.0) | |
| | Severe | 0(0.0) | 2(3.3) | |
| 3rd follow-up | None | 50(83.3) | 52(86.7) | 0.734 |
| | Mild | 0(0.0) | 0(0.0) | |
| | Moderate | 2(3.3) | 2(3.3) | |

| | | | | |
|---|---|---|---|---|
| | Severe | 6(10.0) | 2(3.3) | |

Table 6 compares the severity of dyspnea (shortness of breath) before and after the procedure across multiple follow-ups. Before the procedure, most patients in both groups experienced severe dyspnea (90.0% in Group A vs. 83.3% in Group B, P = 0.448). At the first follow-up, nearly all patients (96.7% in both groups) reported no dyspnea, showing a substantial improvement. By the second follow-up, a slightly higher number of patients in Group B (6.7%) experienced mild dyspnea, while two patients (3.3%) in Group A reported moderate dyspnea. At the third follow-up, most patients remained symptom-free, but a small number in both groups experienced moderate or severe dyspnea, with Group A having slightly more cases of severe symptoms (10.0% vs. 3.3%). However, the differences in dyspnea outcomes across follow-ups were not statistically significant.

**Table 7: Comparison of pre and post-procedure pain between groups**

| Pain | | Group A ($N = 60$) | Group B ($N = 60$) | P value |
|---|---|---|---|---|
| Pre-procedure | Mild | 6(10.0) | 8(13.3) | 0.021 |
| | Moderate | 36(60.0) | 50(83.3) | |
| | Severe | 18(30.0) | 2(3.3) | |
| 1st follow-up | No pain | 58(96.7) | 58(96.7) | 1.000 |
| | Mild | 2(3.3) | 2(3.3) | |
| 2nd follow-up | No pain | 58(93.3) | 54(90.0) | 0.254 |
| | Mild | 0(0.0) | 4(6.7) | |
| | Moderate | 2(3.3) | 0(0.0) | |
| | Severe | 0(0.0) | 2(3.3) | |
| 3rd follow-up | No pain | 50(83.3) | 52(86.7) | 0.735 |
| | Mild | 2(3.3) | 0(0.0) | |
| | Moderate | 4(6.7) | 2(3.3) | |
| | Severe | 2(3.3) | 2(3.3) | |

Table 7 compares pain levels before and after the procedure in both groups. Before the procedure, Group B had a higher proportion of patients with moderate pain (83.3%) compared to Group A (60.0%), while Group A had more cases of severe pain (30.0% vs. 3.3%). This difference was statistically significant (P = 0.021). After the procedure, pain levels significantly improved in both groups. By the first follow-up, 96.7% of patients in both groups reported no pain. However, at the second follow-up, a small percentage of patients in Group B experienced mild (6.7%) or severe (3.3%) pain, while Group A had two patients (3.3%) with moderate pain. By the third follow-up, most patients remained pain-free, though a few reported mild to severe pain, with no significant difference between the groups (P = 0.735).

**Table 8: Findings of chest X-ray before and after procedure in both groups**

| Chest X-ray | | Group A | Group B | P value |
|---|---|---|---|---|
| (Pleural effusion) | | (N=60) | ($N = 60$) | |
| Pre-procedure | Moderate | 4(6.7) | 6(10.0) | 0.640 |
| | Massive | 56(93.3) | 54(90.0) | |
| 1st follow-up | No effusion | 54(90.0) | 60(100.0) | 0.076 |
| | Mild | 6(10.0) | 0(0.0) | |
| 2nd follow-up | No effusion | 50(83.3) | 48(80.0) | 0.546 |
| | Mild | 6(10.0) | 10(16.7) | |
| | Moderate | 2(3.3) | 0(0.0) | |
| | Massive | 0(0.0) | 2(3.3) | |
| 3rd follow-up | No effusion | 46(76.7) | 48(80.0) | 0.388 |
| | Mild | 4(6.7) | 2(0.0) | |
| | Moderate | 2(3.3) | 4(6.7) | |
| | Massive | 6(10.0) | 2(3.3) | |

Table 8 presents chest X-ray findings before and after the procedure. Before treatment, the majority of patients in both groups had massive pleural effusion (93.3% in Group A vs. 90.0% in Group B). By the first follow-up, all patients in Group B had no effusion, while 10.0% of Group A still had mild effusion (P = 0.076). At subsequent follow-ups, mild to moderate effusion was noted in both groups, with a few cases of massive effusion reappearing by the third follow-up (10.0% in Group A vs. 3.3% in Group B). However, there was no statistically significant difference in effusion resolution between the two groups at any point.

**Table 9: Outcome after pleurodesis in both groups**

| Outcome | Group A (N=60) | Group B (N=60) | P value |
|---|---|---|---|
| Complete response | 46(76.7) | 48(80.0) | |
| Partial response | 4(6.7) | 4(6.7) | |
| Failure | 8(13.3) | 4(6.7) | 0.836 |

| | | | |
|---|---|---|---|
| Mortality | 2(3.3) | 4(6.7) | |
| Total | 60(100.0) | 60(100.0) | |

Table 9 summarizes the outcomes after pleurodesis. A complete response was achieved in most patients (76.7% in Group A and 80.0% in Group B), with a small proportion experiencing a partial response (6.7% in both groups). Treatment failure was slightly higher in Group A (13.3%) than in Group B (6.7%), and mortality rates were 3.3% and 6.7%, respectively. The differences in outcomes were not statistically significant (P = 0.836), suggesting similar overall effectiveness of pleurodesis in both groups.

**Table 10: Comparison of costs between two groups**

| Cost | Group A (N=60) | Group B (N=60) | P-value |
|---|---|---|---|
| **Amount (tk) Mean±SD** | $500 \pm 25.3$ | $4656 \pm 644.4$ | <0.001 |

Table 10 presents a comparison of the costs associated with pleurodesis between Group A (povidone-iodine) and Group B (bleomycin). The mean cost of treatment in Group A was significantly lower at 500 ± 25.3 tk, whereas in Group B, it was substantially higher at 4656 ± 644.4 tk. This difference was highly statistically significant (P < 0.001), indicating that povidone-iodine is a far more cost-effective option compared to bleomycin for pleurodesis in the management of malignant pleural effusion.

## IV. Discussion

This cross-sectional study evaluated the efficacy of povidone-iodine as a sclerosing agent for pleurodesis in malignant pleural effusion (MPE) and compared its performance with that of bleomycin. A total of 120 patients diagnosed with MPE were recruited. Patients in Group A underwent pleurodesis with povidone-iodine, while those in Group B received bleomycin.

In the present study, the mean age of patients was 55 years in Group A and 59 years in Group B, comparable to previous studies, such as Bagheri et al., who reported mean ages of 59.63 ± 7.68 years for povidone-iodine and 57.97 ± 9.27 years for bleomycin [7]. Another study found an average patient age of 57.55 ± 9.0 years [4,2]. These findings reaffirm that MPE is more prevalent in older adults. In terms of gender distribution, Group A consisted of 16 males (53.3%) and 14 females (46.7%), which is similar to the findings by Bagheri et al., who reported 61.9% males and 38.1% females [7].

All patients included in this study were diagnosed with MPE based on specific investigations such as pleural fluid cytology and histological examination of pleural tissue. More than 60% of patients in both groups had positive pleural fluid cytology, while over 30% had a histologically confirmed diagnosis. There was no statistically significant difference between the two groups (p = 0.787), consistent with previous findings, such as a study where pleural cytology was positive in 66.7% of patients and pleural biopsy was positive in 43.3% [5].

Dyspnea and chest pain were the most common presenting symptoms. Most patients experienced severe dyspnea (90% in Group A and 83.3% in Group B), while the remaining patients had moderate dyspnea. Moderate chest pain was reported in 60% of patients in the povidone-iodine group and 83.3% in the bleomycin group. Cough was observed in 40% of patients in both groups. These findings are consistent with a study by Ibrahim et al., who reported that 97.43% of patients had dyspnea, 38.46% had cough, and 48.71% had chest pain [2]. Another study on 104 patients with recurrent MPE found that all patients (100%) experienced dyspnea [4].

Post-procedure complications were primarily chest pain and fever, but there was no statistically significant difference between the two groups (p > 0.05). Chest pain was reported in 23.3% of patients in Group A and 46.7% in Group B, while fever was observed in 20% and 40%, respectively. Bagheri et al. reported chest pain and fever in only 6.7% of patients in both groups [7]. Similarly, Shouman et al. found chest pain in 13% of the iodine group versus 26% in the bleomycin group, and fever in 33% and 26%, respectively [13]. On the other hand, Bakr et al. reported much higher rates, with 50% of povidone-iodine patients experiencing chest pain and fever, compared to 60% and 30% in the bleomycin group [14].

Agarwal et al. reported that all the patients in their study experienced chest pain, fever in seven patients, and empyema in one patient [15]. Olivares Torres et al. detected serious chest pain and hypotension in three mesothelioma cases (5.8%) [16]. A study by Caglayan et al. in Turkey also found chest pain in 16.2% of cases, fever in 6.9%, and subcutaneous emphysema in 2 cases [17].

In this study, most patients experienced significant symptom improvement after pleurodesis, and all were symptom-free at discharge. At the first follow-up, 96.7% of patients in both groups were symptom-free, with only one patient in each group reporting mild dyspnea and pain. At six weeks, 93.3% of patients in the povidone-iodine group and 90% in the bleomycin group remained symptom-free. By the final follow-up at 12 weeks, the majority of patients (83.3% in Group A and 86.7% in Group B) had only four patients in each group experiencing recurrent pain and dyspnea with no significant difference between the two groups (p > 0.05).

The overall success rate of pleurodesis, including complete and partial responses, was 83.4% in the povidone-iodine group and 86.7% in the bleomycin group. This is in line with prior studies. Bagheri et al. reported a response rate of 66.7% for bleomycin and 83.3% for povidone-iodine [7]. Similarly, Fahad et al. found a 95.23%

success rate for povidone-iodine and 78.78% for bleomycin, with a recurrence rate of 4.76% in the povidone group versus 21.21% in the bleomycin group [12]. Godazandeh G et al reported that complete response was obtained in 26 patients (72.2%), 7 patients with partial response (19.4%), and the overall success rate of povidone-iodine was 91.6% [18]. Another study by Elayouty et al. reported that bleomycin was effective in 89% of cases, while povidone-iodine was effective in 88%, with failure rates of 12% and 11%, respectively [19].

A key advantage of povidone-iodine pleurodesis is its cost-effectiveness. In this study, the mean cost for povidone-iodine pleurodesis was significantly lower (500 ± 25.3 tk) compared to bleomycin (4656 ± 644.4 tk) ($p < 0.001$). Given its comparable efficacy and significantly lower cost, povidone-iodine represents a highly practical alternative to bleomycin, especially in resource-limited settings. These findings align with previous studies that highlighted the cost-effectiveness of povidone-iodine pleurodesis [7,10].

The present study found that povidone-iodine was just as effective as bleomycin in managing malignant pleural effusion. Similarly, previous studies have also demonstrated the efficacy of povidone-iodine and bleomycin in the management of malignant pleural effusion independently [20-22].

## V. Limitations Of The Study

Our study was a single-center study. We took a small sample size due to the short study period. After evaluating those patients, we did not follow up with them for the long term and did not know other possible interference that may happen in the long term with these patients.

## VI. Conclusion And Recommendations

The present study concluded that chemical pleurodesis with povidone iodine and bleomycin is equally effective in the management of MPE. Povidone-iodine offers the advantage of a shorter hospital stay and fewer post-procedure complaints, while bleomycin demonstrates a slightly lower failure rate. However, povidone iodine pleurodesis reduces cost during management of malignant pleural effusion. Immediate post-pleurodesis complications are less with povidone iodine pleurodesis. This result will encourage the use of povidone iodine as a sclerosing agent in producing pleurodesis among patients with malignant pleural effusion.

Further study with a prospective and longitudinal study design, including a larger sample size, needs to be done to validate the findings of our study.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: This study was approved by the ethical review committee*

## References

[1] Skok K, Hladnik G, Grm A, Crnjac A. Malignant Pleural Effusion And Its Current Management: A Review. Medicina. 2019;55(8):490.
[2] Ibrahim IM, Dokhan AL, El-Sessy AA, Eltaweel MF. Povidone-Iodine Pleurodesis Versus Talc Pleurodesis In Preventing Recurrence Of Malignant Pleural Effusion. J Cardiothorac Surg. 2015;10(1):1-6.
[3] Bibby AC, Dorn P, Psallidas I, Porcel JM, Janssen J, Froudarakis M, Et Al. ERS/EACTS Statement On The Management Of Malignant Pleural Effusions. Eur J Cardiothorac Surg. 2019;55(1):116-32.
[4] Saleh ME, Awad G, Sanad M. Chemical Pleurodesis For Malignant Pleural Effusion: Which Agent Is Perfect? Cardiothorac Surg. 2020;28(1):1-7.
[5] Omoregbee BI, Okugbo S. Pleurodesis With Povidone-Iodine In Patients With Malignant Pleural Effusion In A Tertiary Center In Nigeria. Pan Afr Med J. 2021;38.
[6] Yazkan R, Özpolat B, Ergene G. Iodopovidone Pleurodesis In The Treatment Of Refractory Pleural Effusions. Turk Gogus Kalp Damar Cerrahisi Dergisi. 2013;21(1):106-9.
[7] Bagheri R, Noori M, Rajayi M, Attaran D, Mohammad Hashem Asna Ashari A, Mohammadzadeh Lari S, Et Al. The Effect Of Iodopovidone Versus Bleomycin In Chemical Pleurodesis. Asian Cardiovasc Thorac Ann. 2018;26(5):382-6.
[8] Alavi AA, Eshraghi M, Rahim MB, Meysami AP, Morteza A, Hajian H. Povidone-Iodine And Bleomycin In The Management Of Malignant Pleural Effusion. Acta Med Iran. 2011;584-7.
[9] Muduly DK, Deo SVS, Subi TS, Kallianpur AA, Shukla NK. An Update In The Management Of Malignant Pleural Effusion. Indian J Palliat Care. 2011;17(2):98.
[10] Kahrom H, Aghajanzadeh M, Asgari MR, Kahrom M. Efficacy And Safety Of Povidone-Iodine Pleurodesis In Malignant Pleural Effusions. Indian J Palliat Care. 2017;23(1):53.
[11] Matus I, Ho P. Ambulatory Iodopovidone Instillation Via Indwelling Pleural Catheters For Malignant Pleural Effusions. J Bronchol Interv Pulmonol. 2019;26(4):290-2.
[12] Fahad AM, Sharba LFF, Rabeea HN, Mohammed AS, Abbood SM, Alshewered AS. Povidone-Iodine Effectiveness As Chemical Pleurodesis For Malignant Pleural Effusion In Comparison To Bleomycin. Thyroid. 2021;1(4.76):0.
[13] Shouman W, Elgazzar A, Hussien RM, Elshaaray M, Light RW. Chemical Pleurodesis For Malignant Pleural Effusion. Egypt J Chest Dis Tuberc. 2012;61(3):115-20.
[14] Bakr RM, El-Mahalawy II, Abdel-Aal GA, Mabrouk AA, Ali AA. Pleurodesis Using Different Agents In Malignant Pleural Effusion. Egypt J Chest Dis Tuberc. 2012;61(4):399-404.
[15] Agarwal R, Aggarwal AN, Gupta D, Et Al. Efficacy And Safety Of Iodopovidone In Chemical Pleurodesis: A Meta-Analysis Of Observational Studies. Respir Med. 2006;100:2043-7.

[16] Olivares-Torres CA, Laniado-Laborín R, Chávez-García C, Et Al. Iodopovidone Pleurodesis For Recurrent Pleural Effusions. Chest. 2002;122:581-3.
[17] Caglayan B, Torun E, Turan D, Fidan A, Gemici C, Sarac G, Et Al. Efficacy Of Iodopovidone Pleurodesis And Comparison Of Small-Bore Catheter Versus Large-Bore Chest Tube. Ann Surg Oncol. 2008;15:2594-9.
[18] Godazandeh G, Qasemi NH, Saghafi M, Mortazian M, Tayebi P. Pleurodesis With Povidone-Iodine, As An Effective Procedure In Management Of Patients With Malignant Pleural Effusion. J Thorac Dis. 2013;5(2):141-4.
[19] Elayouty HD, Hassan TM, Alhadad ZA. Povidone-Iodine Versus Bleomycin Pleurodesis For Malignant Effusion In Bronchogenic Cancer Guided By Thoracic Echography. J Cancer Sci Ther. 2012;4:182-4.
[20] Aelony Y. Talc Pleurodesis Vs Iodopovidone. Chest. 2003;123(4):1318-9; Author Reply 1319.
[21] Das SK, Saha SK, Das A, Halder AK, Banerjee SN, Chakraborty M. A Study Of Comparison Of Efficacy And Safety Of Talc And Povidone-Iodine For Pleurodesis Of Malignant Pleural Effusions. J Indian Med Assoc. 2008;106(9):589-90, 592.
[22] Dey A, Bhuniya S, Datta Chaudhuri A, Pandit S, Sahadutta Chowdhury M, Sengupta A, Saha I, De P. Iodopovidone Pleurodesis: Experience Of A Tertiary Hospital In Kolkata. Singapore Med J. 2010;51(2):163-5.