Experience of Iodopovidone Pleurodesis at A Tertiary Care Hospital in Peshawar

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ABSTRACT

Background: Chemical pleurodesis is used for the management of malignant /recurrent pleural effusion and pneumothorax. Malignant pleural effusion is diagnosed on histopathology or malignant cells in pleural fluid. Pneumothorax is diagnosed by chest radiograph. Pleurodesis can be performed surgically or by using medical agents. Various pleurodesis agents have been used e.g. Tetracycline, Bleomycin, Talc and Iodopovidone with different success and complications rates.

Objective: This study was conducted to know the efficacy and safety of Iodopovidone as pleurodesis agent in the management of pleural effusion (malignant/recurrent) and recurrent pneumothorax.

Material and Methods: This was a descriptive study conducted at department of Pulmonology Lady Reading Hospital Peshawar from February 2018 to May 2019.

Results: A Total of 213 patients were included in the study, among which 120 (56.3%) were males and 93 (43.6%) were females. Age range was from 20 to 83 years. One hundred and thirty eight patients (74.8%) had malignant pleural effusion and 75 (35.2%) had recurrent pneumothorax. The success rate with Iodopovidone pleurodesis was 85 % (181) as a whole with a failure rate of 13 % (28) in pleural effusion and 2 % (4) in pneumothorax. Chest pain (65.7%) was the most common side effect followed by fever (24.4%) and dyspnea (12.2%). No serious side effects were observed in this study.

Conclusion: Iodopovidone is easily available, safer, cheaper and effective agent for chemical pleurodesis in pneumothorax, malignant/recurrent pleural effusion.

Keywords: Pleurodesis, Iodopovidone, Malignant, Pleural Effusion, Pneumothorax.

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INTRODUCTION

Pleurodesis obliterates the pleural space by symphysis of the visceral and parietal pleurae either chemically or mechanically.¹ Pleurodesis is used for the management of pleural effusion (malignant/ recurrent) and pneumothorax.² Malignant pleural effusion (MPE) occurs as an exudate in the pleural cavity, accompanied by the presence of malignant cells in pleural fluid or tumour tissue by histopathology.³

MPE presents with progressive dyspnea chest pain cough cachexia and significant reduction in the quality of life.³

MPE accounts for 22% of all pleural effusions, and affects about 300 000 patients annually (UK and USA).⁴

Majority of MPE is caused by metastatic diseases comprising of breast cancer (50%) in women, and lung cancer (25%) in men while malignant pleural mesothelioma as a primary pleural tumour presents in more than 90% of the cases as MPE.^{3,4}

The treatment of cancer has progressively evolved but palliation is the best possible management of MPE when the underlying cause cannot be corrected. Median survival of patients with MPE ranging from 3 to 12 months.³

The main aim in the management of MPE is prompt relief of symptoms, minimal discomfort, negligible interference in everyday activity and cost effectiveness.

Spontaneous pneumothorax is the accumulation of air in the pleural space without any trauma. It often occurs unexpectedly. It is divided into primary and secondary pneumothorax depending on the underlying lung condition. Spontaneous pneumothorax is notorious for its recurrence. One episode of spontaneous pneumothorax bears the risk of recurrence over the years up to the rate of 20-50%.⁵

Recurrence is associated with increase in morbidity by repeated interventions (intercostal tube thoracostomy and pleurectomy) thus increasing the cost of Treatment. Pleurodesis may be considered the best treatment modality for troublesome and recurrent pleural effusion when management of underlying cause is not possible. Various pleurodesis agents have been used e.g. Tetracycline, Bleomycin, Talc and Iodopovidone with different success and complications rates.⁶

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Studies have been performed on the safety and efficacy of different pleurodesis agents but not a single agent has been found the best⁷.

An ideal pleurodesis agent should have higher success rate, easy availability, good safety profile and affordability. Talc has the highest success rate (90%) as pleurodesis agent but it has serious side effects like anaphylaxis and adult respiratory distress syndrome⁷.

Adult respiratory distress syndrome occurred in 9% of patients who received talc as pleurodesis agent.⁸ Systemic embolization were also reported with Talc pleurodesis in humans and animals studies.^{9,10}

Tetracycline as a pleurodesis agent has an average success rate of about 77 %. Excellent safety profile, reasonable efficacy, low cost and ease of administration are the advantages of tetracycline however the production of parenteral tetracycline has been discontinued.⁷

One study reported a complete response of 72.2% with Iodopovidone pleurodesis in 36 patients with malignant pleural effusion.¹¹ In another study, the success rate with Iodopovidone pleurodesis was 79% in 104 patients with malignant pleural effusion and pneumothorax.¹² Iodo-povidone is an antiseptic solution¹³ which is affordable, safe and easily available, however no study is available in Pakistan about its use as a pleurodesis agent.

This study was conducted to know the efficacy and safety of Iodopovidone pleurodesis in malignant/undiagnosed recurrent pleural effusion and pneumothorax because of its low cost and easy availability. We also want to generate local data on its safety and efficacy as a pleurodesis agent on large number of patients because in most previous studies sample sizes were small.^{9,14}

Material/Subjects/Patients and methods (to add inclusion exclusion criteria)

MATERIAL AND METHODS

This was a preliminary descriptive study of its kind conducted at the department of Pulmonology, Lady Reading hospital Peshawar from February 2018 to May 2019. During the study period, about 213 patients with malignant/undiagnosed recurrent pleural effusion and recurrent pneumothoraces were subjected to Iodopovidone pleurodesis. Informed consent was obtained from all patients included in the study.

Patients with hypersensitivity to Iodopovidone, thyroid disease(Clinically), life expectancy less than 1 month(Pleural fluid PH < 7.2), previous pleurodesis attempts with other agents and patients with pneumothorax having unsuccessful re expansion of the lung following tube thoracostomy were excluded from the study.

All patients were subjected to tube thoracostomy of 28 Fr size through the midaxillary line in the fifth intercostal space connected to water-sealed drainage system. Pleural fluid was allowed to drain slowly to avoid re expansion pulmonary edema. Re-expansion of lung was confirmed by a repeat chest radiograph. Before pleurodesis, 2 % inj. Lignocaine at a dose of 2mg/kg in a 50 ml normal saline solution was given through thoracostomy tube. After 15 minutes of premedication, 100ml solution containing 20ml Iodopovidone (10% solution) plus 80 ml normal saline was given through the chest tube and tube was clamped for one hour.⁷ One hour after the procedure, chest tube was unclamped and patients were advised to do incentive spirometry. Chest radiograph was performed daily. Chest tube was removed once lung was expanded and the fluid drain output was negligible.

Success of pleurodesis was labelled if patients had no re accumulation of pleural fluid or air at one month follow up with repeat chest x-ray.

RESULTS

A Total of 213 patients were included in the study, among which 120 (56.3%) were males and 93 (43.6%) were females. Age range was from 20 to 83 years. Out of 213 patients, 138 (74.8%) had malignant pleural effusion and 75 (35.2%) had recurrent pneumothoraces. The cause for the malignant pleural effusion was metastatic adenocarcinoma in 49(23%) patients followed by malignant pleural mesothelioma in 23(10.7%), Carcinoma breast in 21 (9.8%), bronchogenic carcinoma in 15(7%) and about 30 (14%) patients with unknown primary. After one month of follow up, there was a complete response with Iodopovidone pleurodesis in 181 patients having a success rate of 85 % (Fig1). Twenty eight patients had recurrence of pleural effusion with a failure rate of 13% and 4 patients had recurrence of pneumothorax with a failure rate of 2%. Chest pain (65.7%) was the most common side effect followed by fever (24.4%) and dyspnea (12.2%) (Figure.2). No serious side effects were observed in this study.

Table 1. Clinical Demographics of the patients (N=213)

Characteristics		No (%)
Age Range		20-83 years
Gender	Male	120(56.3)
	Female	93(43.6)
Primary malignancy	Mesothelioma	23(10.7)
	Lung	15(7.0)
	Breast	21(9.8)
	Unknown primary	30(14.0)
Metastatic Adenocarcinoma		49(23)
Pneumothoraces		75(35.2)
Post pleurodesis Adverse effects	Chest pain	65.7 %
	Fever	24.4 %
	Dyspnea	12.2 %
Site Involved	Right	87(40.8)
	Left	103(48.3)
	Bilateral	23(10.7)

■ Success ■ Failure

Figure 1. Iodo-povidone Pleurodesis Results

■ Chest pain ■ Fever ■ Dyspnea

Figure 2. Adverse effects post Pleurodesis

DISCUSSION

MPE usually recurs and is associated with troublesome symptoms like dyspnea, chest pain and cough that adversely affect the quality of life. Mesothelioma, bronchogenic carcinoma and breast cancer account for the majority of causes of MPE. These patients will require repeated thoracentesis to relieve symptoms. This is both mental and physical stress to the patient and a burden on healthcare system. These patients will require pleurodesis to prevent recurrence and improve to some extent the quality of life.^{12,15} Chemical pleurodesis is a well-established treatment modality for the management of malignant, undiagnosed recurrent pleural effusion and pneumothorax. The choice of the sclerosing agent is determined not only by efficacy but also by cost, easy availability, safety and ease of administration.

In a systemic review of 1168 patients, Talc was the most effective chemical agent for the management of malignant pleural effusion with a success rate of 93% followed by Corynebacterium Parvum (76%), Doxycycline (72%), Tetracycline (67%) and Bleomycin (54%).¹⁶ Similarly in 32 case series including 723 patients with predominantly malignant pleural effusion, talc was completely or partially effective in 91% (659) of the cases.¹⁷

However there are serious concerns regarding the safety of the Talc as pleurodesis with talc is associated with development of systemic embolization, acute respiratory distress syndrome (ARDS), acute pneumonitis, respiratory failure and mortality.^{18,19}

Iodopovidone is a topical antiseptic and has been shown to be safe and effective as a pleurodesis agent in the management of malignant, undiagnosed recurrent pleural effusion and pneumothorax.^{20,21} The precise mechanism of action Iodopovidone as a pleurodesis agent is not clear.²² Iodopovidone leads to pleural fibrosis due to low pH (pH 2.9), or the induction of increased inflammatory response with strong oxidative stress and cytotoxic properties and production of fibroblast growth factor.²³

In the present study, we evaluated a total of 213 patients for pleurodesis with Iodopovidone. Patients with recurrent/ malignant pleural effusion were 138 (74.8%) and pneumothorax was 75(35.2%). There was a complete response with

Iodopovidone pleurodesis in 181 patients having a success rate of 85% Fig1. Twenty eight patients had recurrence of pleural effusion with a failure rate of 13% and 4 patients had recurrence of pneumothorax with a failure rate of 2%. Chest pain (65.7%) was the most common side effect followed by fever (24.4%) and dyspnea (12.2%) Fig2.

Similar results were shown by previous studies conducted on the safety and efficacy of Iodopovidone pleurodesis.

A meta-analysis reviewed 13 studies including 499 patients with Iodopovidone pleurodesis. The success rates varied from 70 to 100 per cent in different studies with the pooled success rate being 88.7 %. Chest pain was the most common side effect.²

Godazandeh et al. evaluated 36 patients with malignant pleural effusion who underwent pleurodesis with Iodopovidone reported a success rate of 91.6%.¹¹

Agarwal et al. reported a complete response rate of 86.5 % in patients with pleural effusion and 92.6 % in pneumothorax with Iodopovidone pleurodesis.²⁰

Olivares-Torres et al. performed pleurodesis with Iodopovidone in 52 patients with pleural effusion and achieved a success rate of 96.1%.²¹

In a review of six studies, about 265 patients underwent chemical pleurodesis with Iodopovidone in which 157 patients had recurrent pleural effusion and 108 had pneumothorax. The success rate was 90.6% and chest pain was the most common side effect.²³

CONCLUSION

Iodopovidone is easily available, safer, cheaper and effective agent for chemical pleurodesis in pneumothorax, malignant/recurrent pleural effusion.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Umar M: Concept and design of study, Collection of data, statistical analysis
HAQ ZU, Khan I: Writing of manuscript, critical review of manuscript
Basit A, Haq AU: Analysis and interpretation of data, statistical analysis
Ziaullah: Data collection, bibliography

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.