



ROLE OF POVIDONE-IODINE AS AN EFFECTIVE AND SAFE AGENT IN CHEMICAL PLEURODESIS.

Respiratory Medicine

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ABSTRACT

Setting: Department of Respiratory Medicine, Geetanjali medical college and hospital, Udaipur

Aim: The study the efficacy and safety of povidone iodine in chemical pleurodesis

Methodology: A mixture of 20 ml of 10% povidone-iodine + 10 ml of 2% lignocaine + 70 ml of Normal saline was inserted through intercostal drainage tube.

Results: Total of 68 patients were taken into the study. Out of all, forty nine patients (72%) achieved confirmed complete response to treatment while nine patients (13.2%) achieved partial response. Failure of treatment was seen in ten (14.7%) patients. The overall success rate was 85.2%.

Conclusions: Pleurodesis with povidone iodine is a safe and effective method which can be used for chemical pleurodesis.

KEYWORDS

Chemical pleurodesis, povidone iodine, malignant pleural effusion.

Introduction

Pleurodesis is a procedure to achieve symphysis between the two layers of pleura aimed at preventing accumulation of either air or fluid in the pleural space [1]. The most common indication is malignant pleural effusion (MPE). The technique is also used for recurrent pneumothoraces and in selected patients with non-malignant pleural effusions.

Pleurodesis can be achieved by either a chemical agent or by physical abrasion of the pleural surfaces during thoracotomy or thoracoscopy. An ideal chemical agent for pleurodesis should be highly efficacious, have a high molecular weight and chemical polarity, low regional clearance, rapid systemic clearance, a steep dose-response curve, should be inexpensive and easily accessible, easy to administer, and well tolerated with minimal or no side-effects[2]. No such agent exists and the search for an ideal agent continues.

There is no global consensus on the currently available best chemical agent for pleurodesis. In a survey from five English-speaking countries (United States, United Kingdom, Canada, Australia, and New Zealand), the most commonly used agent was talc followed by tetracycline derivatives and bleomycin[3].

The availability and cost of medical grade talc remains a constraint for poor patients in developing countries. Povidone-Iodine is an inexpensive and widely available topical antiseptic [4]. It has been shown to be a safe and effective agent for chemical pleurodesis[5-8].

The present prospective study aimed to investigate the efficacy and safety of pleurodesis with povidone-iodine, as an inexpensive alternative agent for the pleurodesis. Installation of this agent is associated with high iodine intake theoretically. Hence, the authors evaluated the effect of iodine on thyroid function by measuring the thyroid function tests before and after pleurodesis with povidone-iodine.

Material & Methods

This was a prospective study conducted in Tertiary care hospital in southern part of Rajasthan. A total of 68 consecutive patients with diagnosis of either malignant pleural effusion or recurrent pneumothoraces between September 2014 upto December 2015 were enrolled for this study. All patients had documented malignant pleural effusion established by the positive result of pleural effusion cytology or pleural biopsy. Recurrent Pneumothoraces were diagnosed on the basis of chest xray and prior clinical history of ICDT insertion for pneumothorax.

Because of the possibility of systemic absorption of iodine in povidone-iodine and severity of thyroid disease, thyroid function testing was done before the procedure. Therefore, the patients with thyroid disease were excluded in the study. For the evaluation of effect

of povidone-iodine on thyroid gland, the authors measured serum levels of TSH, T3 and T4 before and after pleurodesis at 1 week.

All the patients were inserted Inter-costal drainage tube prior. Absence of broncho-pleural fistula was ensured in the cases of recurrent pneumothoraces patients before going for pleurodesis. Patients were inserted a mixture of 20 ml of 10% povidone-iodine + 10 ml of 2% lignocaine + 70 ml of Normal saline. The tube was clamped for 2 hours. The position of these patients was changed within 2 hours by the medical staff to circulate the mixture in pleura. After declamping, the thoracostomy tube was removed as soon as the drainage decreased to less than 50 ml over 24 hours with confirmation of chest radiograph. After pleurodesis, all patients were assessed via chest X-ray (CXR) after 1 week, 1 month and 3 months.

The authors defined "complete response" as symptomatic improvement of dyspnea with complete radiographic resolution of the pleural effusion and "partial response" as symptomatic improvement with recurrent pleural effusion that did not require additional thoracentesis and "treatment failure" as recurrent pleural effusion that required thoracentesis. All data were analyzed using SPSS (version 21). Chi-squares and paired-T test were used. P values <0.05 with CI=95% were considered statistically significant.

Results

Total of 68 patients were taken into the study. Sixty-one patients (89.7%) had malignant pleural effusion & seven patients (10.3%) had recurrent pneumothoraces. Forty seven (69%) patients were males & twenty one (31%) patients were females. The mean age of patients was 63.5±7.5 yrs. The involved side in forty two (62%) patients was right and twenty six (38%) patients had left side. Out of all, forty nine (72%) patients achieved confirmed complete response to treatment while nine patients (13.2%) achieved partial response. Failure of treatment was seen in ten (14.7%) patients. The overall success rate was 85.2%. In post procedure, the most common complaints of patients were pain (n=28, 41.7%), followed by burning (n=16, 23.52%), dyspnoea (n=12, 17.64%), & Fever (n=6, 8.82%).[Table: 1].

Table: 1 Characteristics of the study

Indication, N (%)		
Malignant Pleural effusion	61(89.7%)	
Recurrent Pneumothoraces	7(10.2%)	
Gender, N (%)		
Male	47(69%)	p=0.721
Female	21(31%)	
Response, N (%)		
Compete	49(72%)	p=0.021
Partial	9(13.2%)	
Failure	10(14.7%)	

Involved Side, N (%)		
Right	42(62%)	p=0.568
Left	26(38%)	
Post-procedure Symptoms, N (%)		
Pain	28(41.17%)	p=0.992
Burning	16(23.52%)	
Dyspnoea	12(17.64%)	
Fever	6(8.82%)	
Asymptomatic	5(7.35%)	

The mean serum level of TSH was 1.8 and 2.4 μ U/mL (P-value >0.05). Also, the average T4 was 7.2 and 7.5 μ g/mL (P-value > 0.05) and the average T3 was 1.29 and 1.34 μ g/mL (P-value 0.05) respectively before and after pleurodesis.

Statistically, there was significant relationship between indication & response to treatment with povidone Iodine (P=0.021). However, there was no significant relationship between response to treatment and some changes like the patient gender (P=0.721), age (P=0.358), and the involved side (P=0.568). The statistical relation between post-pleurodesis complaints and the rate of response to treatment in patients were not significant (P=0.992). Before and after pleurodesis with povidone-iodine, the significant relationship in the quantities of serum levels of TSH (P=0.423, CI =95%), T4 (P=0.34, CI =95%) and T3 (P=0.407, CI =95%) was not found statistically. Also, there was not any mortality or morbidity (such as visual or neurological complications) due to the use of povidone-iodine in this study.

Discussion

Malignant pleural effusion is found in malignant cells in pleural fluid or pleural tissue. MPE is a common complication of advanced-stages of malignancies (3-5, 8). The current treatment options include repeated thoracentesis or pleural catheter with or without chemical pleurodesis and pleuroscopy with pleurodesis. Chemical pleurodesis is one of the best treatment for untreatable underlying disease (9).

In most patients with MPE, palliative treatment requires pleurodesis with sclerosing agents. The most cost-effective method for controlling of MPE is drainage through thoracostomy tube and intrapleural instillation of a chemical agent including talc, tetracycline (e.g., doxycycline), bleomycin and povidone-iodine (10). Talc is not easily available and bleomycin, which more expensive with lower efficacy, is infrequently being used. Povidone-iodine is the most inexpensive among these agents. Talc, one of the most successful and widely used agents, has a success rate of >90% (11). However, its use has been associated with the following serious complications, including acute respiratory distress syndrome (ARDS), acute pneumonitis, systemic embolization and mortality (5-7,12,13).

In patients of pneumothorax, Current treatment guidelines recommend pleurodesis with sclerosing agent in difficult or recurrent spontaneous pneumothorax[12]. For the cases of recurrent pneumothoraces, VATS(Video assisted thoracoscopy surgery) or medical thoracoscopy is preferred. However if a patient is either unwilling or unable to undergo surgery, pleurodesis may be performed.

In the present study, the success rate of pleurodesis with povidone iodine was found to be 85.2%.Complete response was seen in 72% & partial response in 13.2% patients. This results are comparable with the studies done in past [14,15]. The most common complaints of patients were pain (n=28, 41.7%), followed by burning (n=16, 23.52%), Dyspnoea (n=12, 17.64%), & Fever (n=6,8.82%) similar to study done in past[11] but contradictory other study[8]. We also found no significant changes in thyroid function tests before and one week after pleurodesis with povidone-iodine similar to other studies done in past [16,17,18].

Conclusion

The outcome of this study suggest that povidone-iodine is a safe and effective agent with minor side effects for pleurodesis and treatment of both malignant pleural effusion and recurrent pneumothoraces. It is proposed that povidone-iodine is a proper, accessible, and low-cost alternative sclerosing agent.

Declaration of conflicting interests

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