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RESEARCH ARTICLE

IDOPOVIDONE PLEURODESIS: EXPERIENCE OF A TERTIARY HOSPITAL – AHMEDABAD

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ABSTRACT

Introduction: It is observed that recurrence rate after first spontaneous pneumothorax ranges between 25% and 50%. Among the wide variety of agents that are available for pleurodesis, povidone iodine is now perhaps the most useful agent as it is cheap, easily available, effective and safe. This study was conducted to establish the efficacy and safety of povidone iodine as an agent for pleurodesis in patients with recurrent pleural effusion and pneumothorax.

Methods: Total 23 patients with recurrent pleural effusion or pneumothorax received povidone iodine pleurodesis over a period of almost 2 years. Pleurodesis was done via tube thoracostomy technique

Results: Out of the 23 patients, 13 had malignant pleural effusion, 9 had recurrent pneumothorax and one had tubercular pleural effusion which was nonresponsive to antitubercular therapy. A complete response with no recurrence during follow-up was obtained in 21(91.30%) patients. All the cases of failure had malignant pleural effusion. 3 (13.04%) patients experienced intense chest pains after the installation of sclerosing agent, but they recovered with immediate symptomatic management.

Conclusion: Povidone iodine may be considered as the agent of choice to achieve pleurodesis, as it is inexpensive and easily available and effective.

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INTRODUCTION

It is observed that recurrence rate after first spontaneous pneumothorax ranges between 25% and 50%. (Seremetis, 1970; Voge, 1986 and Verschoof, 1988) Several materials have been instilled into the pleural space through the chest tubes in attempts to decrease the recurrence rates like tetracycline derivatives (doxycycline or minocycline), talc (insufflation or slurry), bleomycin, mitoxantrone, nitrogen mustard, silver nitrate, iodopovidone, dry killed *Corynebacterium parvum* and OK-432 (obtained from the Su strain of *Streptococcus pyogenes*) (Light, 2001) Like any other drug, the criteria for selection of the agent for pleurodesis include its effectiveness, affordability, availability, ease of administration and safety profile (Sahn, 2000). Iodopovidone, which is primarily used as a topical antiseptic, has gradually emerged as a very promising agent for chemical pleurodesis. This study was conducted to establish the efficacy and safety of iodopovidone as an agent for pleurodesis in patients with recurrent pleural effusion and pneumothorax.

MATERIALS AND METHODS

The study was conducted at the Department of Pulmonary Medicine, B.J. Medical College, Ahmedabad, from September 2012 to August 2014. A total of 23 patients who underwent pleurodesis with iodopovidone during this period were included in the study. All the patients had either recurrent exudative pleural effusion of any cause or recurrent pneumothorax. The patients with previous attempts at pleurodesis with other agents, those with known hypersensitivity to iodine, those in whom there was incomplete re-expansion of the lung after tube thoracostomy, those who are highly moribund with very limited life expectancy or those with known thyroid disease were excluded from the study.

In each of the patients selected for this study, an intercostal tube (Romsons, Agra, Uttar Pradesh, India) of size 28F was inserted into the fifth intercostal space along the mid axillary line using the operative tube thoracostomy technique. The fluid was allowed to drain out slowly through the water seal drainage system. After complete drainage of the pleural fluid and confirmation of expansion of the lung, both clinically and radiologically, pleurodesis was performed with iodopovidone using the method described by Olivares-Torres *et al* in their study (Olivares-Torres, 2002).

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Also, in cases of recurrent pneumothorax, pleurodesis was performed only after ensuring that there was no broncho-pleural fistula and that the lung had expanded completely.

Each patient received pre-medication in the form of 2 mg/kg Xylocaine 2% in 50 ml of normal saline solution through an intercostal chest tube. Only in some patients who were very apprehensive was 5mg of intravenous midazolam administered for sedation. The pleurodesis solution, containing a mixture of 20 ml of 10% iodopovidone and 80 ml normal saline, was then injected into the pleural cavity through the chest tube. The solution was allowed to remain in the pleural cavity for about twenty four hours by clamping the chest tube. After the clamp was removed, the residual fluid from the pleural cavity was drained out. The patient was observed until the lung had completely expanded and there was no residual pleural effusion or pneumothorax, which was confirmed by a chest radiograph. Only then was the chest tube removed. The patient was then followed up as an outpatient. During the follow-up period, the collection of fluid or air in the pleural space was considered a failure of pleurodesis.

RESULTS

A total 23 patients were included in this study, of which 17 (73.9%) were male. The mean age for the entire group was 55.95 years. 13 (56.52%) patients had malignancy, either primary or metastatic. Out of these 13 cases, 4 patients had bronchogenic carcinoma, another 6 had metastatic adenocarcinoma, 3 had malignant pleural effusion secondary to breast cancer. 9(39.13%) patients had recurrent pneumothorax. 1 (4.34%) patient was diagnosed to be a case of tubercular pleural effusion (the pleural fluid was exudate, with 96% lymphocytes and a high adenosine deaminase level, and a pleural biopsy showed granulomatous lesions), but there was repeated collection of pleural fluid in spite of adequate anti-tubercular drugs and oral corticosteroids. There was complete response with no reaccumulation of fluid or air during follow-up in 21 (91.30%) patients.

All the cases of failed pleurodesis had malignant pleural effusion. However, there were no failure cases among all the patients with recurrent pneumothorax. Only 3 (13.04%) patients developed intense pleuritic pain and systemic hypotension due to the irritating effect of the sclerosing solution on the pleural surface after it was instilled. However, the patients recovered with immediate symptomatic management (raising the foot end of the bed and intravenous fluids). The mean length of follow-up was 11.4 months. The serum iodine levels were not measured after the procedure, but none of the patients presented with signs and symptoms of hypo- or hyperthyroidism. Visual loss was not reported in any of the patients. 8 (34.78%) patients with malignant pleural effusion died during the follow-up. However, the post-procedure 30-day mortality rate was 0%.

DISCUSSION

The effectiveness of iodopovidone in pleurodesis has already been demonstrated by various studies from across the world.

The exact mechanism of pleurodesis by a sclerosing agent is not completely understood. However, it has been shown that the initial events that take place after the intrapleural administration of a sclerosing agent include the denudation of mesothelial cells and the subsequent development of an exudative pleural effusion (Kennedy, 1995; Sahn *et al.*, 1981). Thereafter, the complex sequence of events that take place include an acute inflammatory response to the local injury, followed by the regeneration of the damaged cells, and the wound strength is established by the migration of connective tissue cells, the synthesis of extracellular matrix proteins and finally, collagenisation (Kotran *et al.*, 1999). The efficacy of pleurodesis with iodopovidone without any significant adverse effects was 91.6% in a study conducted by (Morales-Gomez, 1993), 64.2% in a study conducted by (Kelly-Garcia, 1997) and 89.47% in a study conducted by Dey A *et al* (Dey, 2010). In both these series, pleurodesis was performed through tube thoracostomy.

In our study, the majority of the patients had malignant pleural effusions, and iodopovidone proved to be an extremely effective and safe agent for their pleurodesis. The efficacy of iodopovidone is at par with that of talc, but there is no fear of severe complications, such as acute respiratory distress syndrome, which occurs especially if the talc used has a smaller particle size (< 15µm) (Maskell, 2004).

Moreover, pleurodesis with iodopovidone can be performed under local anaesthesia with excellent tolerance and acceptability. Some difficulty was experienced in the form of increased resistance while injecting the total volume of fluid (50 ml lidocaine solution + 100 ml iodopovidone solution) in the patients with recurrent pneumothorax. It is possible that patients with pneumothorax require lower amounts of the sclerosing agent for pleurodesis, but further studies are required in order to establish this. From this study, it can be concluded that in resource constrained countries like India, iodopovidone may be the agent of choice for chemical pleurodesis in cases of recurrent pleural effusion and pneumothorax, as it is cheap, easily available, safe and highly effective. Cases of pneumothorax may require a lower amount of sclerosing agents for pleurodesis.

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