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ORIGINAL ARTICLE

Usefulness of pigtail catheter in pleurodesis of malignant pleural effusion

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KEYWORDS

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Abstract The management of patients with malignant pleural effusion (MPE) remains problematic. Various modalities are available in the management of MPE. However, optimal treatment is still controversial and there is no universal standard approach. Management options include observation, thoracentesis, indwelling pleural catheter (IPC) or chest tube placement and pleurodesis.

The aim of the study: To evaluate the efficacy, safety and tolerability of pigtail catheters in comparison to intercostal tubes in pleurodesis of malignant pleural effusions.

Patients and methods: This study was carried out at Chest Department, Zagazig University Hospitals during the period from January 2012 to September 2013. The study included 100 patients (39 males and 61 females with a mean age of 61.8 ± 11.3 years) with pleural effusion of malignant etiology. Patients were classified into two groups *Group I*: included 50 patients 18 males and 32 females with a mean age of 63.8 years who were subjected to pigtail catheter drainage then pleurodesis. *Group II*: included 50 patients 21 males and 29 females with a mean age of 61.8 years who were subjected to tube thoracotomy drainage then pleurodesis.

Results: As regards pleurodesis outcome, there was a high frequency of success in group I (33 patients, 66%) when compared with group II (27 patients, 54%). However, the difference is not statistically significant. As regards pleurodesis complications the higher frequency of complications

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was in group II (22 patients, 44%) when compared with group I (43 patients, 86%). These differences were statistically significant ($P < 0.05$).

Conclusion: Pigtail catheters could be considered a safe, easy, tolerable and effective alternative method in comparison to the traditional intercostal tubes in pleurodesis of malignant pleural effusions.

Introduction

When the pleural effusion has been proved to be malignant and the patient is not a surgical candidate the type of palliative therapy is considered, taking into account the patient's general condition, symptoms and expected survival [1].

The most cost-effective method of controlling a malignant pleural effusion is chest tube or catheter drainage and intrapleural instillation of a chemical agent. Many antineoplastic and non-antineoplastic chemical agents have been used for pleurodesis with variable success. Currently, the most successful and widely used agents include talc by slurry, the tetracyclines (minocyclin and doxycyclin) and bleomycin [2]. Tetracycline is a low-cost effective therapy that is easy to use and has a proven safety record. The recommended dose by Thomas [3] is one gram of tetracycline hydrochloride in 50 ml of normal saline. Reid and Rudd [4], have recommended a dose of three grams in 50 ml of normal saline.

The main side effects of tetracycline pleurodesis are fever and pain [3].

Pigtail catheter is a long, flexible tube that can be guided into the body. The design of this catheter includes small holes that allow for drainage and a coiled end that acts to hold the catheter in place. It can also be used to slow the flow of fluids injected through the catheter so that they do not burst out in a jet and cause injuries or obscure a medical imaging study [5].

The aim of the study was to evaluate the efficacy, safety and tolerability of pigtail catheters in comparison to intercostal tubes in pleurodesis of malignant pleural effusions.

Patients and methods

This study was carried out at, Chest Department, Zagazig University Hospitals during the period from January 2012 to september 2013. The study included 100 consecutive patients (39 males and 61 females with a mean age of 61.8 ± 11.3 years) who proved to have pleural effusion of malignant etiology.

**These patients were admitted, signed an informed consent, and subjected to the following*

1- Thorough medical history, stressing on smoking history and history of occupational exposure.
2- Full clinical examination both general and local (chest) examination.
3- Routine investigations (CBC, ESR, blood sugar, serum ALT, AST and creatinine) to evaluate the patient general condition.
4- Plain chest radiography, Chest computed tomography (CT). The pleural fluid was considered small, moderate, or massive according to BTS (2003) guidelines for the investigations of pleural effusion [6].
5- Pleural tapping and the aspirated fluid was sent for chemical, bacteriological and cytological examinations.
6- Abram pleural biopsy if pleural fluid investigations were not diagnostic.
7- Thorascopy if Abram pleural biopsy and pleural fluid investigations were not diagnostic.
8- Fiberoptic bronchoscopy was done in selected cases.

Exclusion criteria

- Atelectasis due to endobronchial obstruction.
- Empyema (pH < 7.2).
- Prior intrapleural therapy.
- Significant irradiation to the affected hemithorax.

Patients were classified into two groups

- **Group I (GI)**: included 50 patients; 18 males and 32 females with a mean age of 63.8 years, subjected to pigtail catheter drainage then pleurodesis.

Pigtail catheter insertion

Pigtail catheters were inserted percutaneously using the Seldinger technique. The pleura was initially punctured with a hollow needle trocar attached to a syringe; fluid was aspirated to confirm placement. The syringe was removed and a guidewire was advanced through the needle lumen. The guidewire stayed in place while the needle was removed and a dilator was passed over the guidewire to enlarge the opening through which the catheter would be placed. Next, the dilator was removed, the pigtail was uncoiled, and the catheter was threaded over the guidewire and into the pleural space. Finally, the guidewire was removed as the distal end of the catheter curling inside the chest. The catheter was then connected to a drainage device [7].

- **Group (GII):** included 50 patients; 21 males and 29 females with a mean age of 61.8 years, subjected to tube thoracotomy drainage then pleurodesis.

Tube thoracotomy

1- An incision about 2 cm was done in the fifth or sixth intercostal space in the midaxillary line. The incision was made at the upper border of the rib below, and parallel to the rib.
2- A tube and trocar (a sharp-tipped metal rod which extended through the distal end of the plastic tube) were inserted into the incision site and forced into the pleural space under direct pressure and a twisting motion. The