



The Egyptian Society of Chest Diseases and Tuberculosis
Egyptian Journal of Chest Diseases and Tuberculosis

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ORIGINAL ARTICLE

Using streptokinase for pleural adhesiolysis in sonographically septated pleural effusion



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Received 4 April 2015; accepted 22 June 2015

Available online 8 August 2015

KEYWORDS

Septated effusion;
Streptokinase;
Pleural adhesiolysis

Abstract *Background:* In dealing with septated pleural effusion, intrapleural fibrinolytics may be a useful alternative for others such as use of video assisted thoracic surgery or the conventional thoracotomy. The use of intrapleural fibrinolytics may be a safer, easier and cost effective management option that can promote pleural fluid drainage.

Objective: To evaluate the role of intrapleural streptokinase as a fibrinolytic agent in the management of pleural effusion with adhesions.

Patients and methods: This study was designed as a case series study in a prospective manner. Twenty-five patients were included in the study. All were admitted at Chest Department, Assiut University Hospital. The study was conducted during the period between September 2013 and September 2014. All patients had septated pleural effusion; candidate for drainage with failure of satisfactory pleural fluid drainage 24 h following intercostal tube (ICT) placement provided that the tube was properly positioned and not obstructed. Streptokinase was given daily at a dose of 250,000 IU dissolved in 40 ml of normal saline instilled in the pleural cavity through the chest tube. Instillation was repeated as long as no serious complication occurred and the drained fluid volume was > 100 cc with a maximum of 14 doses. Patients were assessed by the amount of drainage through intercostal drain, chest X-ray and chest ultrasound. Also patients were assessed carefully for evidence of complications.

Results: The study revealed increased drainage of pleural fluid through intercostal tube after streptokinase instillation. The observation difference in fluid volume before and after streptokinase instillation is found to be highly significant statistically ($p < 0.001$). Outcome was defined according to scoring of changes in X-ray and ultrasound with success rate of 60%. Chance of success increases when the adhesions are fine based on the sonographic features. No major adverse effects were noted.

Conclusion: We conclude that intrapleural streptokinase therapy may be considered in septated pleural effusion as a safe and effective treatment; it may obviate the need for surgery.

Also, the ultrasound echo features of adhesions could be considered as a predictor for the response.

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Peer review under responsibility of The Egyptian Society of Chest Diseases and Tuberculosis.

<http://dx.doi.org/10.1016/j.ejcdt.2015.06.009>

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Introduction

Septated pleural effusions are those with ultrasound evidence of fibrin strands or septa floating inside the pleural space [1]. Intrapleural adhesions and septated effusions remain a common and burdensome clinical entity. The presence of adhesions carries a poor prognostic factor in patients with exudative pleural effusions and may render the pleural fluid drainage difficult [2]. In dealing with this problem, intrapleural fibrinolytics may be a safe, easy, cost effective management option. Also, it may be a useful alternative for others such as use of video assisted thoracic surgery or the conventional thoracotomy [3]. The purpose of our study was to assess the safety and efficacy of streptokinase (SK) for intrapleural fibrinolysis in patients with septated pleural effusion.

Patients and methods

This study was designed as a case series study in a prospective manner. Twenty-five patients having septated pleural effusion were included in the study. All were admitted at Chest Department, Assiut University Hospital. The study was conducted during the period between September 2013 and September 2014.

Inclusion criteria

Patients who fulfilled all of the following criteria were included:

- 1 – Patient had pleural effusion with known underlying etiology.
- 2 – Presence of intrapleural adhesions as documented sonographically.
- 3 – Pleural fluid drainage was indicated.
- 4 – Difficult thoracentesis.
- 5 – Failure of satisfactory pleural fluid drainage 24 h following intercostal tube (ICT) placement provided that the tube was properly positioned and not obstructed.
- 6 – Patient agreed to contribute in this study.

Exclusion criteria

Patient was excluded from this study if one of the following was met:

- 1 – Recent severe trauma, hemorrhage, or stroke.
- 2 – Patient had bleeding disorder.
- 3 – Patient maintained on anticoagulant therapy.
- 4 – Patient had history of streptokinase (SK) administration in the previous 2 years.

The following were done before starting the treatment protocol

- 1 – A full history was taken and clinical examination was performed.
- 2 – Coagulation profile.
- 3 – X-ray and ultrasound evaluation of the chest.

Treatment protocol

All patients initially had a closed I.C.T drainage with a size 24–32 Fr. The chest tube is placed under the water seal system. The first dose of fibrinolytic therapy started 24 h after ICT placement. For intrapleural fibrinolysis, no premedications or analgesics were administered systemically or intrapleurally. Streptokinase was used at a dose of 250,000 IU dissolved in 40 ml of normal saline instilled in the pleural cavity through the chest tube. Patient was placed in the lateral decubitus position with the unaffected lung dependent during agent instillation, to be sure that all of this agent drained from the chest catheter into the treated pleural cavity. The tube is then clamped for 2–4 h and patient asked to repeatedly change position so that streptokinase could thoroughly spread in pleural cavity. Patient remained in bed until the tube was unclamped, to minimize the amount of agent that might leak out around the tube thereby decreasing its effective dwell time in the pleural cavity. Our plan during protocol application was to stop further instillation if severe complication occurred and if drained fluid through the tube was < 100 cc in 24 h provided that tube is patent and properly positioned. Also, we planned to continue the daily instillation as long as the drained fluid volume is > 100 cc with a maximum of 14 doses according to Maskell et al. [4]. Data about Volume of pleural fluid drained from the chest tube before and after streptokinase instillation were collected daily. Chest X-ray and chest ultrasound were performed daily till discharging day. Total dose of SK and number of instillations during the course of therapy were recorded.

The effectiveness of the protocol was assessed by

- 1 – Monitoring the volume of fluid drained from the chest tube daily.
- 2 – Chest ultrasound to check dissolution of adhesions.
- 3 – Chest radiography to see radiological clearance.

Evaluation of pleural effusion on discharging day by chest X-ray was described as

- 0 – No change.
- 1 – Less than 1/3 improvement.
- 2 – Improvement between 1/3 and 2/3.
- 3 – More than 2/3 improvement without complete clearance.
- 4 – Complete radiological clearance.

Regarding the evaluation by chest US, four results were recorded on discharge

- 0 – No change.
- 1 – Dissolution of adhesions in some regions.
- 2 – Dissolution of adhesions in all regions with residual pleural lesion.
- 3 – Total adhesion dissolution without residual pleural lesion.

Residual pleural lesion means pleural fibrosis, nodules or masses.

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