

Original Research Article

Role of medical thoracoscopy in the management of parapneumonic effusion and empyema thoracic

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ABSTRACT

Background: The treatment modality use in early pleural empyema mainly depends on the antimicrobial therapy along with thoracocentesis. In case of complicated empyema this modality does not work and lung not fully expand, until removal of adhesions. The main purpose of the current study is to analyze the experience of management of complicated parapneumonic effusion and empyema thoracic through rigid medical thoracoscopy under local anaesthesia. Aim and objective is to study the role of medical thoracoscopy in the management of empyema thoracic and parapneumonic effusion at tertiary health centre.

Methods: This is a descriptive case series study in which 49 patients were recruited, who have clinically and radiologically show empyema thoracic, from department of Respiratory medicine, GMC, Kota, Rajasthan. All patients underwent medical thoracoscopy under local anesthesia. Written Informed consent was taken from the study participants. Ethical approval was obtained from Ethical Review Committee of the hospital. Patients who have HIV and Hbsag positive, those with multiple organ failure and bleeding disorders were excluded.

Results: Total 49 patients, out of them 41(84%) were male and 8(16%) were female with mean age 45 years (range 18 to 70 years). Final evolution through chest x-ray revealed complete resolution or successful thoracoscopy done in 37 case of fibrinopurulent (92.50%) and 5 cases of organizing empyema (55.56%). overall success rate 85.71%. Total 7 cases (3 case of fibrinopurulent and 4 cases of organizing empyema) refer to higher center for decortications.

Conclusions: Medical Thoracoscopy under local anaesthesia is a safe procedure, efficient and cost-effective intervention for early management of complicated empyema, particularly in early stage of empyema (fibrinopurulent).

Keywords: Empyema pleural, Inflammation, Tuberculosis, Thoracoscopy, Video-assisted thoracoscopic surgery

INTRODUCTION

A parapneumonic effusion refers to the collection or accumulation of exudative pleural fluid, mostly associated with ipsilateral lung infection, that pneumonia. Parapneumonic effusions are mainly associated with bacterial infections.¹

Parapneumonic pleural effusions are classified into

Uncomplicated parapneumonic effusions, which are exudative in nature, neutrophilic predominance effusion.

In this stage Gram stain and culture are negative, glucose level greater than 60 mg/dl, pH above 7.20.^{2,3}

Complicated parapneumonic effusions, due to bacterial infection into the pleura. In this condition of parapneumonic effusion, there is a low glucose level, pH below 7.20. Cultures of pleural fluid from this stage are negative due to rapid bacterial clearance from the pleural space, or low bacterial count may explain this. The fluid termed as complicated because fibrinous band or adhesion form, its breakage needed for proper drainage and full resolution.⁴

Empyema thoracic in which there is frank pus in the pleural space, or there is evidence of bacterial infection of the pleural fluid by Gram stain or a positive culture.⁵

Aim and objective is to study the role and efficacy of medical thoracoscopy in the management of empyema thoracic and parapneumonic effusion at tertiary health Centre.

METHODS

This is a prospective, nonrandomized, and interventional study conducted between July 2018 and June 2019 at our Department of Respiratory Medicine, Government Medical College, Kota, Rajasthan to establish the role of thoracoscopy in complicated parapneumonic effusion and in empyema thoracis. Total of 49 adult patients with complicated parapneumonic effusion or empyema thoracic.

Inclusion criteria

- All patients above than 18 yrs age and irrespective of their sex who presented with clinical and radiological sign and symptoms suggestive of empyema thoracic Confirmation of loculation was done either by computed transaxial tomography or by chest ultrasound. No allergies to anesthetic agents, no rapidly fatal underlying disease, and the ability to tolerate single-lung ventilation.

Exclusion criteria

- General contraindications to thoracoscopy - for example, unstable angina, left ventricular failure, uncontrolled hypertension, bleeding tendency, etc. Lack of fitness for general anesthesia for any possibility of shift from local to general anesthesia due to any cause (fitness for general anesthesia was decided by the anesthesiologist).

Medical thoracoscopy done using rigid thoracoscope under local anesthesia and conscious sedation. Patients placed on operative table in lateral decubitus position with affected side up in thoracoscopy suite. Oxygen provided via nasal prong. After aseptic skin preparation, 10 to 15 ml of 2% lidocaine was infiltrated into and around skin at entry point of trocar.

2 cm incision was given, after that trocar and cannula was introduced until resistance lost, then trocar removed, and fluid were removed by suction catheter. Then 4-mm rigid video thoracoscope (Hopkins II Karl Storz Germany, 0°, 49003 AA) with optical telescope was introduced and pleural cavity was inspected with guided suction and saline instillation.

Using thoracoscopy forceps to cut interpleural adhesions, removed it and multiple loculations made free to form a single cavity followed by removal of debris. Biopsy was

taken and finally intercostal tube (30 F) was inserted in the pleural cavity and connected to drainage bag and fixed with suture and applied sterile dressing. Biopsy specimen were sent for histopathological study by preserving in formalin solution and the specimen for CBNAAT were sent in normal saline.

Treatment success was defined as radiologic confirmation of successful pleural drainage by chest X ray and ultrasound thorax, with no need for further treatment by subsequent chest tube insertions or surgical interventions.

RESULTS

In total 49 cases majority of cases were in the age group of 40-49 years (5th decade) constituting of 12 patients and 24% of the total. This was followed by the 50-59 year group where there were 11 patients constituting 22% of the total. Put together 40-59 years age interval has 46.9% of the total patient. Out of 49 patients, 41(84%) were male and 8(16%) were female with mean age 40-59 years. commonest presentation of empyema thoracis was chest pain and fever (79.59%), followed by dyspnea (77.55%), cough (73.47%), and sputum production (18.37%). Most common microbiological organism isolated was staphylococcus in 6(12.24%) patients. This was followed by *Klebsiella Pneumoniae* in 4(8.16%), *Pseudomonas* in 2(4.08%) and *Escherichia coli* in 1 case (2.04%). In 36 cases (73.48%) no growth found.

In molecular study (CBNAAT) only in 6.12% cases Mtb detected with rif sensitive. most common thoracoscopic finding seen in parapneumonic effusion and in empyema thoracis is Multiple fibrinous band & loculation seen in 22 cases out of 49 cases (44.9%) followed by interpleural adhesion seen in 17 cases out of 49(34.7%) than inflamed pleura with fibrinous band seen in 10 cases out of 49(20.4%). Based on PH and pleural fluid LDH parapneumonic effusion differentiate in fibrinopurulent (pH >7.2, pf LDH <1000) and organize form (pH <7.2, pf LDH >1000).

In my study, successful thoracoscopy done in 37 case of fibrinopurulent (92.50%) and 5 cases of organizing empyema (55.56%). overall success rate 85.71%.

Total 7 cases (3 case of fibrinopurulent and 4 cases of organizing empyema) refer to higher center for decortications.

DISCUSSION

Most common age group presenting empyema are 41-50 year (5th decade of life) comprise 24.49% with median age is 45 year. Sex ratio in our study was 5.12:1 with a clear male preponderance (84%). This is mainly due to increased prevalence of smoking habit among men. Chest pain and fever is the most common presenting complaint among patients in our study (79.59%) followed by dyspnea (77.55%) and cough (73.47%). Most common

thoroscopic finding seen in parapneumonic effusion and in empyema thoracis is Multiple fibrinous band and loculation seen in 22 cases out of 49 cases (44.9%) followed by interpleural adhesion seen in 17 cases out of 49(34.7%) than inflamed pleura with fibrinous band seen in 10 cases out of 49(20.4%), most common complication after procedure is chest pain, seen in 13 cases out of 49(26.53%), after that subcutaneous emphysema (5 out of 49, 10.20%) and only one case of severe bleeding, manage conservatively with blood transfusion later referred to CTVS department for further management. In our study, Medical thoracoscopy was successful in 92.5% of fibrinopurulent stage and 55.56% of organising empyema with a total of 85.71% success.

Success rate of medical thoracoscopy were found comparable to other studies.⁶⁻⁹

CONCLUSION

Medical thoracoscopy is instituted in the early stage of empyema, further invasive surgical procedures can be avoided leading to better recovery. Its diagnostic and therapeutic power seems to be comparable to VATS (since the success rate by medical thoracoscopy is between 73% and 100% as reported by several studies.

We conclude that medical thoracoscopy helps in disruption of septa very efficiently, whereas only partial debridement is possible in case of organized empyema which may lead to failure. Medical thoracoscopy is safe and successful in treatment of complicated parapneumonic effusion and empyema especially in early stage. So early intervention by medical thoracoscopy during the course of disease will prevent the need for further cumbersome procedures.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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