International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 8; Issue 12 (D); December 2019; Page No.20844-20847
DOI: http://dx.doi.org/10.24327/ijcar.2019.20847.4081

Research Article

SIX WEEKS INTERCOSTAL DRAINAGE FOR RECURRENT TUBERCULOUS HYDROPNEUMOTHORAX - PORT SUDAN TEACHING HOSPITAL

Dr. Murwan Mohamed Saeed and Dr. Ahmed Mohammed Atiaallah

Associated Professor of Pulmonology Assistant Professor of Surgery - Red sea University

A R T I C L E I N F O

Article History:
Received 14th September, 2019
Received in revised form 29th October, 2019
Accepted 05th November, 2019
Published online 28th December, 2019

Key words:

Tuberculosis, Hydropneumothorax, Pyopneumothorax, Intercostal drainage, Red sea state- Sudan.

A B S T R A C T

Background: Tuberculosis is a major health problem in Sudan; the annual rate is 77/100.000, and it is the commonest endemic disease in Port Sudan. Hydropneumothorax which is a rare complication that may recurrent after first intercostal drainage which is usually not respond to intercostal drainage up to seven days after which it needs thoracic surgery intervention either video assisted thoracoscope or even open thoracic surgery and there is no facilities for both in Port Sudan - Red sea state – Sudan, so a trail of six weeks intercostal drainage and antituberculous therapy under direct observed therapy strategy (DOTS) was done in order to overcome this problem and it showed a reasonable respond with minimal complications.

Method: This is a prospective interventional hospital based study which was done in Port Sudan teaching hospital from July 2010 to June 2018.

10356 tuberculous patients were seen, (0.002%) of them developed recurrent hydropneumothorax, those were hospitalized , history was taken , physical examination and CXR were done and pleural fluid was examined for protein, cells and gene X pert. 28 F chest tube introduced and those patients were followed clinically and radiologically while they continue on antituberculous therapy

Results: From 10356 tuberculous patients 24 patients (0.002%) developed recurrent hydropneumothorax, 20 (83%) male, 4 (17%) female. Recurrence occurs between two to twelve days after first intercostal drainage. 16 patients (67%) were cases of hydropnemothorax, 4 patients pyopneumothorax and 2 patients (8.3%) were haemopneumothorax.

18 patients (75%) presented with cough, 18 patients (75%) SOB, 22 patients (91.7%) presented with chest pain and 5 patients (20.8%) presented with haemoptysis.

Pleural fluid was exudative in all patients and in all samples mycobacterium tuberculosis was not detected with gene Xpert. Radiological findings beside hydropnemothorax showed cystic changes in 16 patients (66.7%), fibrotic changes in 16 patients (66.7%), and cavity formation in 6 patients (25%).

Reexpansion occur in 22 patients (91.7%) and in 2 (8.3%) patients intercostal drainage didn't success and they died, 10 patients (41.7%) developed surgical emphysema, 4 (16.7%) patients developed bronchopleural fistula and 2 (8.3 %) patients developed empyema necessitatis.

Success rate for management of hydropneumothorax in Port Sudan teaching hospital with six weeks intercostal drainage was 91.7% with 100% success in those with hydropneumothorax and haemopneumothorax and 50% in those with pyopneumothorax.

Conclusion: Recurrent tuberculous hydropneumothorax although it is very rare, but it has serious morbidity. Risk factors for recurrent hydropneumothorax in those tuberculous patients are bronchiectasis and patients with fibrotic and / or cavitatory radiological changes.

6 weeks intercostal drainage can replace thoracic surgery in managing recurrent hydropneumothorax and it showed good outcome with minimal complications that in majority resolved during course of management and rarely need further intervention.

INTRODUCTION

Tuberculosis is an infectious, caseating granulomatous disease, that return back to 5000 B,C, but the first written description is from India around 700 B.C, It represent the commonest infectious cause of death (1) . Tuberculosis is caused by mycobacterium bacilli, mainly mycobacterium tuberculosis. It is a systemic disease that affects any part of the body, but the pulmonary disease is the commonest type of tuberculosis and all other types defined as extrapulmonary.

Corresponding author:* **Dr. Murwan Mohamed Saeed
Associated Professor of Pulmonology Assistant Professor of Surgery - Red sea University

WHO estimate that two billion people are infected with tuberculosis, from those about 10 million will develop tuberculosis disease, and 1.5 million will died (2). In Sudan the annual rate of tuberculosis reduced from119/100000 (3) to 77/100.000 and in Red sea state- Sudan the detection rate in the period of study varies from 85 % to 97 %, and in this area extrapulmonary tuberculosis increased significantly and it reach 53 % in 2018 (4). Although the Sudan national tuberculosis Control Program consider pleural involvement as the second commonest extrapulmonary tuberculosis, in Red sea state it represent the third one after abdominal tuberculosis and tuberculous lymphadenitis. Pleural tuberculosis occur 6 to 12 month after the primary lesion (5), but it may occur in primary tuberculosis. Pleural involvement commonly

presented as pleural effusion which is accumulation of fluid in the pleural space, but pneumothorax; accumulation of air in the pleural space also may complicate tuberculosis, and both air and fluid may accumulate in the pleural space in same time, which called hydropneumothorax, In which the fluid may be serous which is the commonest and it known as hydropneumothorax, pus which is known as pyopneumothorax, or blood and known as haemopneumothorax, these are relatively uncommon tuberculous complication (1), that mainly occur in male rather than female, male to female ratio is 6: 1 (6).management of tuberculous hydropneumothorax is intercostal drainage in addition to fixed dose antituberculous chemotherapy under DOTS that contain rifampicin, pyrazinamide, ethambutol and isoniazide for two months as extensive phase, followed by four months of rifampicin and isoniazide, in general if lung didn't expand after seven days of chest tube insertion or in case of recurrence of accumulation patient referred to thoracic surgery for decortication, pleurectomy or pleural abrasion through VATS or open thoracic surgery, so in areas where thoracic surgery facilities are unavailable both unresponded or recurrent hydropneumothorax became a real problem and this is the situation in Red sea state – Sudan, therefore the trial of six weeks intercostal drainagewas done in order to overcome the absence of thoracic surgery facilities, and at the same time this minimally invasive procedure prevent the patients from side effects of general anaethesia, on other hand it need longer days of hospitalization comparing to thoracic surgery beside the side effect of chest tube that may occur in both six weeks chest tube or open thoracic surgery as in the latter chest tube inserted for drainage of blood such as infection, bleeding, surgical emphysema, bronchopleural fistula Reexpansion pulmonary edema and visceral injury.

METHOD

This is a prospective interventional hospital based study was done in Port Sudan teaching hospital- Port Sudan – Sudan between July 2010 to June 2018.

10356 tuberculous patients who were diagnosed according to Sudan National Tuberculosis Control Program criteria were seen in National Tuberculosis Control Program referred clinic, in Port Sudan teaching hospital. Of those tuberculous patients 24 patients (0.002%) developed recurrent hydropneumothorax, those were hospitalized, questionnaire was designated including age, sex, occupation, symptoms, previous history of tuberculosis, and comorbidities. Physical examination was done, CXR was taken for all patients at presentation and others serial CXR for follow up, 20 ml of pleural fluid was aspirated and sent for analysis for protein, cells and gram stain, and another 10 ml of fluid sent for gene X pert for mycobacterium tuberculosis using Xpert MBT/RIF version 6.o. Then the indication and procedure of intercostal drainage was explained to the patients and under aseptic condition after infiltration with 10 ml of 2 % lidocaine, two cm horizontal incision in fifth intercostal space between anterior and midaxillary lines on the skin and subcutaneous tissue, followed by blunt dissection for muscles till reach the pleura then 28 F chest tube inserted in the pleural cavity, and connected to underwater seal container and the tube was sutured with 2 – 0 silk suture. Patients were followed clinically and radiologically while they continue on antituberculous therapy. Throughout hospital course different interventions was done as needed. Chest tube removed after Reexpansion of the lung and the incision resutured.

RESULTS

10356 tuberculous patients were seen in tuberculosis referred clinic, 24 patients (0.002%) who developed recurrent hydropneumothorax were enrolled in the study, 20 patients (83%) were male and 4 patients (17%) female, mean age 29.3 years. Recurrences occur between two to twelve days after first intercostal drainage. 16 patients (67%) were hydropnemothorax, 4 patients pyopneumothorax and 2 patients (8.3%) were haemopneumothorax.

18 patients (75%) presented with cough, in 15 (83.3 %) was dry cough, 3 (16.7 %) of them showed copious, purulent, offensive sputum, 18 patients (75%) shortness of breath, 22 patients (91.7%) presented with chest pain, this was dull and increased gradually in 16 (72.7 %) while in 6 patients (27.3 %) it was sudden severe sharp pain, just 5 patients (20.8%) presented with mild haemoptysis.

Pleural fluid analysis was exudative in all cases and pleural fluid protein was more than 35 g / l. Mycobacterium tuberculosis was not detected from any sample of pleural fluid, streptococcus was found in 2 patients (8.3%) both was in those with pyopneumothorax.

Radiological findings beside hydropnemothorax showed cystic changes in 16 patients (66.7%), fibrotic changes in 16 patients (66.7%), and cavity formation in 6 patients (25%).

Reexpansion occur in 22 patients (91.7%) after six weeks and in 2 (8.3 %) patients intercostal drainage not success and they died, 10 patients (41.7%) developed surgical emphysema which was mild in 8 patients (80 %) that represent (33.3%) of all study population and resolve during the course of management with same chest tube and didn't need further intervention, and massive in 2 patients (20 %) that represent (8.3 %) of all study sample, for those two patient bilateral subscapular fasciotomy followed by bilateral chest tube was done without response and they died, 4 (16.7 %) patients developed bronchopleural fistula, two of them (50 %) of those pyopneumothorax who also developed massive surgical emphysema and they died. 2 (8.3 %) patients developed empyema necessitatis, both also were developed surgical emphysema, at same time one of them respond to antibiotics and dressing and the other died.

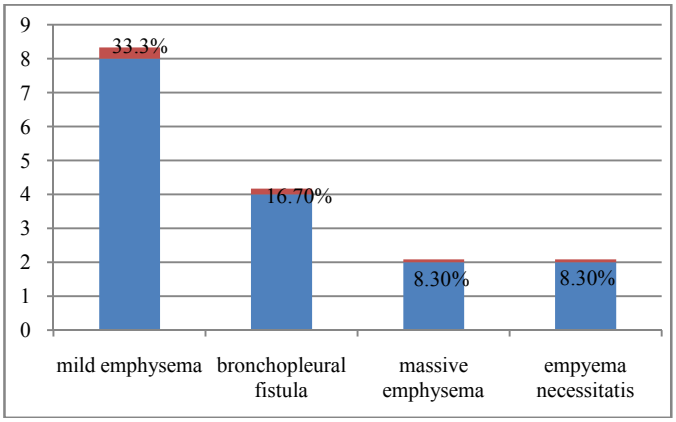

Figure 1 Showed complication of ICD

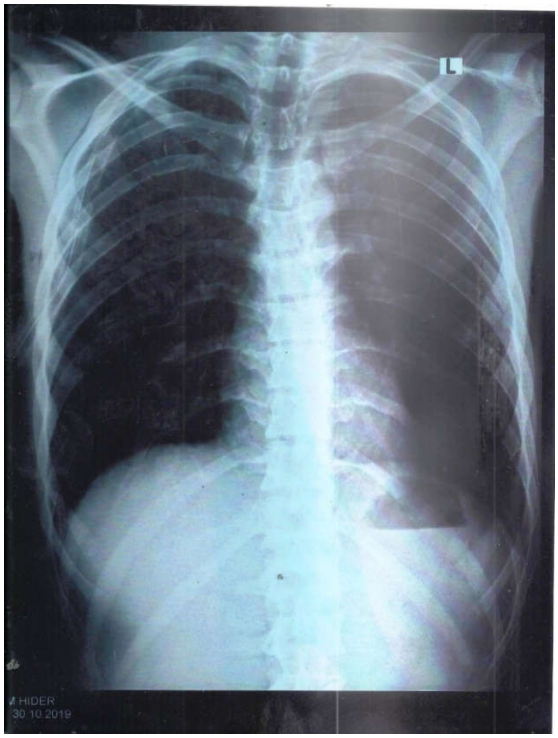

Figure 2 CXR after 5 weeks showed mild pneumothorax

DISCUSSION

Tuberculosis is an endemic disease in Port Sudan – Red sea state- Sudan and despite that extrapulmonary in this area more than pulmonary disease recurrent hydropneumothorax is very rare 0.002% that not differs with the global rate, but represent a complication of serious morbidity

From this study the patients with radiological changes of bronchiectasis, pulmonary fibrosis and cavitation was at high risk of recurrent hydropneumothorax, as bronchiectatic disorder lead to secondary bacterial infection, that induce inflammatory changes lead to further damage that including hydropneumothorax (7), fibrosis may result in traction bronchiectasis and hence hydropnemothorax and rupture of the cavity may cause hydropneumothorax.

Surgical emphysema is the commonest complication appears in this study, this is usually mild due to air leaks and resolved with same chest tube without need for further intervention, but less common large emphysema due to large air leak secondary to disruption of the bronchus occur (1) and this always accompanied with bronchopleural fistula and associated with poor outcome. Bronchopleural fistula occur in small number of patients and when comparing to those of cavitatory changes it support the hypothesis that bronchopleural fistula result from rupture of cavity that connect to tracheobronchial tree. Empyema necessitatis may occur in those of pyopneumothorax due to leakage of pus and can be prevented by securing the tube tightly and close follow up and good dressing for any leak. In comparing to thoracic surgery whatever it is decortication, pleurectomy or pleural abrasion, these complication of intercostal drainage are less than that occur in thoracic surgery as in the latter complication like atelectasis, pulmonary edema, hemorrhage, infection, air leaks, bronchopleural fistula, thromboembolism, right ventricular failure and respiratory failure mar occur(8).
Management of recurrent pleural effusion, pneumothorax or hydropneumothorax is surgery either open thoracic surgery or video assisted thoracoscope (VATS), but in our area these facilities are not available so this trial of 6 weeks intercostal drainage was applied and it showed success rate of 91.7% which is represent very good outcome.All patients with hydropneumothorax and haemopneumothorax was responded while 50% of those with pyopneumothorax respond to six week intercostal drainage the period that ensures reduction in mycobacterium load and healing of necrotizing tissue and so decrease chance of recurrence or further complication while 50% of pyopneumothorax not respond, this explained by fact that intercostal drainage is likely to be success if started early in exudative stage or early fibinopurulent stage of empyema (6) while in stage 3 usually intercostal drainage not success, so those who presented with organising phase or late fibropurulent should be treated with VATS or open thoracic surgery (9).

Two similar study about long term intercostal drainage for tuberculous pleural disease were found one of 15 days intercostal drainage after which recurrencecy occur and patient need decortication that complicated with pleural thickening and restrictive lung (10), in other study recurrence occur after one month of first intercostal drainage for two days and the patient respond to second 12 days chest tube drainage without complication (11). Comparing to those two studies our study although take more time of drainage, more days of hospitalization, but more accurate and reliable with better outcome, because of large number of patients and different presentation, as it gave overall success rate of 91.7%, with 100% success rate in both hydropneumothorax and haemopneumothorax, and 50% success rate in those with pyopneumothorax, with minimum complication.

CONCLUSION

Although pleural diseases represent 20% of extrapulmonary tuberculosis (12), hydropneumothorax remain rare complication of tuberculosis, and its recurrence is very rare in this area. Patients of bronchiectasis, pulmonary fibrosis and cavitatory lesions are at risk of recurrent hydropneumothorax and so they need close monitoring to prevent its occurrence or early detection and early intervention. Six weeks intercostal drainage despite prolonged hospitalization it has less complication comparing to open thoracic surgery, and it showed very good outcome with success rate 91.7% that reach to 100% if there is no empyema, so six weeks intercostal drainage may be the first choice in treatment of recurrent tuberculous hydropneumothorax in area of constrained facilities.

References

1. Fishman, manual of pulmonary disease and disorder, Alfered p. Fishman, Jack a. Elias, Third edition,(2002), page ( )..
2. World Health Organization report October 2019.
3. Manual of the national tuberculosis control program in Sudan, Ismail A. Elsony *Et al*, 2nd edition (2000), page (763, 787, and 581).
4. Ministry of health, Epidemiology administration, Red sea state, Sudan.
5. Crofton and Douglas Respiratory disease, Anthony Seaton, A. Gordon leitich, Fifth edition, (2002), page (483, 454).

6. Kumar & Clark clinical medicine, P. Kumar, Clark M. Forth edition, (2002), page (917).
7. Oxford hand book of respiratory medicine, C. Stephen, *Et al*, Third edition(2014), page (154, 160).
8. Oxford text book of Cardiothoracic Anaethesia, R. Peter Alston, *Et al*, First edition (2015), page (309).
9. Bailey & loves Short Practice of Surgery, S. Norman Williams, *Et al*, 26th edition, (2013), page (857).
10. JC. Borrego Galan, p. Rives Lopes, Ma. Romacha Esteras, Recurrent tuberculous pneumothorax & tuberculous empyema, an association of two rare complication, Elsevier, October (2003), Volume 39, Issue 10 page 678 - 479.
11. Nafees Ahmed Khan, Jamal Akhtar, Rakesh Bhargava, Recurrent hydropneumothorax a rare complication of military tuberculosis, North American Journal of medical science- 2011, 3 (9): 428 - 430.
12. Harrisons Pulmonary and Critical Care Medicine.L. Loscalzo, *Et al*, 17th edition (2010), page (136).

How to cite this article:

Dr. Murwan Mohamed Saeed and Dr. Ahmed Mohammed Atiaallah (2019) 'Six Weeks Intercostal Drainage for Recurrent Tuberculous Hydropneumothorax - Port Sudan Teaching Hospital', *International Journal of Current Advanced Research,* 08(12), pp. 20844-20847. DOI: http://dx.doi.org/10.24327/ijcar.2019. 20847.4081

****