CHAPTER 42

MANAGEMENT OF PLEURAL EFFUSION

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The pleura consists of two parts: parietal and visceral pleura. The parietal pleura covers the inner face of the thorax. The visceral pleura surrounds the lungs and is firmly connected with the subserous tissue and the lungs. These two pleural leaves join in the lung hiluses and ligamentum pulmonalis. Pleural membranes are embryologically composed of mesoderm layer. These membranes are composed of connective tissue cells, elastic fibers and single row endothelial cells (mesothelium) on the surface.

Serous fluid is present between the pleural leaves. This pleural fluid allows two pleural leaves to slide easily over each other. Pleural effusion is the result of disruption of the balance between the secretion and absorption of pleural fluid. Pleura has a dynamic structure. Most of the fluid in the pleural space is secreted from the capillary bed in the parietal portion. The amount of fluid consisting of parietal pleura is normally known as 0.01 ml / kg / h. Maximal drainage capacity of pleural lymphatics is at least 0.2 ml / kg / h.(1) It has been reported that in humans, pleural effusions up to 500 ml-1000 ml can be absorbed through lymphatic channels.(2.3) Basic mechanism of pleural effusion formation; pleural fluid overproduction or decreased absorption.

The composition of a normal pleural fluid is as follows;

Volume	0,1-0,2ml/kg
Cell/mm3	1.000-5.000
Mesothelial cells	%3-70
Lymphocytes	%2-30
Granulocyte	%10
Monocytes	% 30-75
Protein	1-2 gr/dl
Albumin	%50-70
Glucose	same as plasma
pH	7.5-7.6
LDH	<%50 plasma

Pleural effusions may also occur as a result of systemic diseases. Pathologies of all systems and organs may affect the pleura. Therefore, when evaluating pleural effusion, not only lung and pleural diseases, but also diaphragmatic pathologies, systemic diseases and lymphatic system diseases should be considered.

The mechanisms associated with pleural fluid collection are:

1- Hydrostatic pressure increase
2- Oncotic pressure reduction
3- Decrease in pleural pressure
4- İncreased endothelial permeability

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after draining the fluid. This process is called pleurodesis.

Today, talc, spray or liquid dissolved tetracycline derivatives (doxycycline) and bleomycin are used with different success rates Talc is the most frequently used and most successful agent. The most serious side effect is ARDS. Apart from talc powder, the success rate of Doxycycline and Bleomycin is around 70% and 60%, respectively.

Pleurodesis should be performed if the lung appears to be expansed after complete drainage of the pleural fluid by thoracentesis or tube thoracostomy.

Pleurodesis can be performed by administering sclerosing substance from the thorax tube at the bedside or using VATS in the operating room. VATS is an ideal method for both diagnosis and treatment if the patient complains of pain, is suspected of malignancy, if the fluid is loculated or the lung will not open due to diffuse pleural involvement. Recent studies report that there is no difference in the success of talc pleurodesis and talc (talc slurry) methods applied via VATS. (13.14)

If the patient has lung tissue invased with tumor and has thick visceral pleura, respiratory distress and mediastinal shift findings, permanent catheter or pleuroperitoneal shunt should be considered . In these patients, pleurodesis cannot be successful because the lung cannot be expanded. In this case, decortication can be performed in patients with long life expectancy, and in other patients permanent catheter or pleuroperitoneal shunt can be used .

If the lung cannot be fully expanded after thoracic drainage, decortication can be considered as an option according to the general condition and life expectancy of the patient. Decortication can be done by thoracotomy or VATS.

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