

**CASE REPORT**

## Acute Mediastinitis

by

TOTO ANDRIONO, IGN. SUSANTA, MAKMURI and GUNADI SANTOSA

(From the Department of Child Health, Dr. Soetomo Hospital, Surabaya)

### Abstract

*Mediastinitis is not a new disease, however, the occurrence was rare especially in children. Focal infection, which considered to be insignificant, can result in diffuse dissemination involving mediastinum leading to fatal condition.*

*This paper reported a case of mediastinitis with very critical condition. Fast and accurate diagnosis as well as adequate antibiotic treatment saved the patient without surgical intervention.*

### Introduction

Mediastinitis is a rare infection since the advent of antibiotic drugs. This infection is caused by many varieties of bacteria, both aerobic and anaerobic. Furthermore suppurative mediastinitis calls for emergency treatment. It is very progressive, and rate of progression is measured by hours rather than by days.

Infections of the mediastinum may be acute or chronic. The first sometimes progressing to abscess formation and often fulminating and lethal. This disease cha-

racteristically is of insidious onset and usually does not give rise to symptoms. The presence of mediastinal abnormality may become apparent only on a screening chest roentgenogram, although some patients seek medical aid because of the development of symptoms or signs related to obstruction or compression of one or more of the mediastinal structures.

The finding in a survivor of acute mediastinitis in detail, is the purpose of this case report.

### Case Report

HP, a ten years old Indonesian boy, previously in good health fell from a height of one meter, and a piece of stick pierced in to the right side of his chest close to his armpit. A small bleeding flowed from the wound of about 2 centimeters deep. So a minor operative procedure was performed in a small medical center. He was given antibiotics and symptomatic treatment, and observed as an outpatient.

Over the next several days because of fever, respiratory distress, a swelling over the neck and both supraclavicular region (bullneck appearance) and persistent substernal chest pain he was sent to Dr. Soetomo Hospital. Physical examination revealed an alert boy with a peculiar type of respiratory dyspnea, accompanied by grimacing and stridor inspiratory. He also had been having episodes of throwing his head backwards as if trying to catch his breath. There was a few yellowish pustules on the scar of the wounded chest. Fine and moist rales were audible on both lungs without any wheezing. There were no murmur or other abnormalities on heart sounds, as it was confirmed by the electrocardiogram. The liver and spleen were not palpable. No abnormalities were found on the liver function test, and ultrasonographic examination of the liver revealed nothing of importance.

Chest roentgenogram showed a widened mediastinum and minimal change of infiltrate on both lung. A right lateral projection roentgenogram showed a mass fulfilling the upper anterior side of the mediastinum, which represented a challenging diagnostic. Complete blood cell

count showed leukocytosis with slight elevation of the blood sedimentation rate. Tuberculin test was done and the result was negative. A puncture through the lesion of mediastinum was done, but failed to suck any liquid. Blood smear and bone marrow examination revealed nonspecific findings; there were no signs of malignancy.

The blood culture yielded *Enterobacter speciosa* which sensitive to cefotaxim and cephalaxine. So ampicilline cloxacilline combination as was previously given was discontinued. Cefotaxim was then given for three weeks, with the dosage of 50 mg/kg BW daily in two divided doses besides aminoglycoside 5 mg/kg BW. Since then the temperature had gone down slightly and the swollen neck had been slowly shrinking, but there was still enlargement of the lymphnodes over the supra clavicular region.

By the 30th day in hospital, the chest pain had resolved. A check on plain roentgenograph showed a decreased mediastinal width. Then lymphnode biopsy was done, resulting a nonspecific lymphadenitis.

For the following procedures, only antibiotics were given and the patient's condition was slowly improving. As it was confirmed by an X-ray examination, the lung field was clear and the mediastinum become normal. The patients was discharged on the 40th hospital day. On follow up three weeks later, there had been no regrowth of the mass. Laboratory examinations very unremarkable.

### Discussion

Many kinds of masses can be found in the mediastinum, because it contains a variety of important structures which may give rise to a pathologic mediastinal mass. It is also a rich and central area for lymphatic drainage, so it is frequently the site of metastatic lesion originating elsewhere. However, they are relatively rare in infants and children. More than one third (35%) of the patients with mediastinal mass have no complaint. But any mass can give a serious problem due to its pressure effect, because it contains many important structures (Busroh and Surarso, 1975; Filler et al., 1979; Fraser and Pare, 1970).

From a serial roentgenologic examination, our patient showed that the mass was diffuse, homogenous dense, located on the upper part of the mediastinum without pulsation. A cardiovascular origin may be excluded, since it reveals normal cardiovascular signs, neither pulsation on fluoroscopy nor attachment to the cardiovascular system.

Abnormality of the thymus may occur, in the forms of hyperplasia and infiltrations. These may result from a variety of causes, some based on immunological deficiency and some due to autoimmune disease. But it is generally agreed that this gland plays a vital role in early life, and would not give good response to antibiotic treatment. When simple thymic enlargement is the probable diagnosis, no treatment is indicated since spontaneous regression may be expected over some months (Feigin and Cherry, 1981; Filler et al., 1979).

Malignant tumor, either primary or metastatic, could be excluded, since malignant tumor usually reveals some signs and symptoms due to systemic effects such as anorexia, losing weight or cachexia,

weakness and fever. There is a good correlation between the presence of symptoms such as pain, dyspnea, cough and signs of malignancy. Furthermore, metastatic tumors are usually accompanied also with invasion of the bone marrow and blood, giving a leukemic picture, follicular hyperplasia of the nodes and more commonly secondary to other part of the body. Blood smear and bone marrow examination as well as supraclavicular lymphnode biopsy were done on our patient, and they showed neither specific process nor signs of malignancy.

In our patient, the diagnosis of acute mediastinitis was established after having a good result on adjuvant therapy of antibiotics. As it is obvious that the temperature was slightly down and follow up X-ray showed a fully decreased mediastinal width.

Since mediastinitis is a secondary condition, every effort should be made to determine and treat the primary cause of the mediastinal complication. Adequate drainage and prevention of continued contamination are the major considerations in management. In some patients, the control of septic or the maintenance of an adequate airway and alveolar ventilation may be of major initial consideration.

Obviously, the identification of specific microorganism with the determination of specific sensitivities is important, but initially the administration of broad spectrum antibiotics are mandatory in this patients. As the result of isolation, *Streptococcus beta-haemolyticus* is the most common isolated organism. Cases due to *Staphylococcus aureus* have been reported in infants and cases due to *Pneumococcus sp.* in adults. While cases due to *Enterobacter speciosa* are rare (Engelman et al.,

1973; Feldman and Gromisch, 1971; Payne and Larson, 1969).

Another aspects must be observed according to this diagnosis, anatomic aspects and etiologic factors.

The concept that the mediastinum is a potential extrapleural space in the thoracic cavity through which infection can spread from the neck, thoracic wall and abdomen is basic to understand, which are important for the planning of treatment. The deep cervical fascia is arranged in three layers: a superficial layer, a visceral layer and a prevertebral layer. These three layers divided the neck into three potential spaces filled with loose areolar tissue. These spaces are the pretracheal, the retrovisceral and the perivascular spaces.

At the thoracic inlet, there is a dense layer of fascia known as the suprapleural membrane or Sibson's fascia, which is attached to lower cervical spine and upper ribs. This layer continues to the fascia investing the visceral and vascular structure allows extrapleural spread of mediastinal fluid (Engelman et al., 1973; Hora, 1963; Janeka and Rankow, 1971; Moncada et al., 1978).

Acute mediastinitis is a secondary condition. Some of the primary causes of acute mediastinitis are (Fraser and Pare, 1970; Moncada et al., 1978; Spalteholz, 1966): (1) Esophageal perforation, instrumental or noninstrumental causes; (2) Infection of upper respiratory tract; (3) Infection of the lung and pleura; (4) Subphrenic infection; (5) Osteomyelitis; and (6) Hematogenous, lymphatic or metastatic abscess from re-

mote site of infection.

Most cases of acute mediastinitis are due to esophageal perforation; it is almost 90%. But we are sure that function of the esophagus was normal in our patient, since there was no dysphagia or swallowing disturbance which was characteristic of esophageal perforation. Further were, standard X-ray techniques showed no air in the cervical or mediastinal regions indicating no rupture of a hollow viscus.

Non traumatic causes of mediastinitis include infections of the upper respiratory tract, infections of the lung and pleura, subphrenic infection, vertebral and rib osteomyelitis, and metastatic. These conditions may initially present as acute mediastinitis, requiring prompt and vigorous treatment as well as searching for the underlying cause. The collecting lymphatic channels of the mediastinum are fed from the head, neck, chest wall, trachea, bronchi and intra-abdominal organs. And the fascial planes constitute natural avenue for the propagation of infection (Enquist et al., 1976, Janeka and Rankow, 1971; Moncada et al., 1978)

Our patient showed no other focal infection besides the site under influence of the wounded chest. Based on anatomic, physiologic and etiologic factors, we think that the thoracic wall extension of infection to the mediastinum was by the lymphatics or by extension through the fascial planes. Such infection was also favoured by the fluctuating negative intrathoracic pressure that tended to draw the contents of the fascial spaces into the mediastinum.

### Summary

A case of acute mediastinitis has been reported, and some aspects considering this diagnosis has been discussed.

### REFERENCES

1. BUSROH, I.; SURARSO: Tumor mediastinum, kumpulan naskah ilmiah kongres V IKABI, Jakarta, 1975.
2. CAFFEY, J.: Pediatric X Ray Diagnosis; 7<sup>th</sup> ed., pp. 490-527 (Year Book Medical Publ., Chicago, London 1978).
3. CROFTON, J.; DOUGLAS, A.: Respiratory Diseases; 3<sup>rd</sup> ed., pp. 721-739 (Blackwell Scient. Publ. Oxford, London 1981).
4. ENGELMAN, R.M.; WILLIAMS, C.D.; GOUGE, T.H.; CHASE, R.M.; FALK, E.A.; BOYD, A.D.; REED, G.E.: Mediastinitis following open-heart surgery. Arch. Surg. 107 : 772-778 (1973).
5. ENQUIST, R.W.; BLANCK, R.R.; BUTLER, R.H.: Nontraumatic mediastinitis. J. Am. med. Ass. 236 : 1048-1049 (1976).
6. FEIGIN, R.H.; CHERRY, J.D.: Textbook of pediatric infection diseases; pp. 287-291 (Saunders, Philadelphia, 1981).
7. FELDMAN, R.; GROMISCH, D.S.: Acute suppurative mediastinitis. Am. J. Dis. Child. 121 : 79-81 (1971).
8. FILLER, R.M.; SIMPSON, J.S.; EIN, S.H.: Mediastinal masses in infants and children. Ped. Clins N. Am. 26 : 677-690 (1979).
9. FRASER, R.G.; PARE, P.J.A.: Diagnosis of diseases of the chest; edition., pp. 1976-1810 (Saunders, Philadelphia 1970).
10. HORA, J.F.: Deep neck infections. Arch. Otolar. 77 : 25-32 (1963).
11. JANECKA, I.P.; RANKOW, R.M.: Fatal mediastinitis following retropharyngeal abscess. Arch. Otolar. 93 : 630-633 (1971).
12. KEMPE, C.H.; SILVER, H.K.; O'BRIEN, D.: Current pediatric diagnosis and treatment; 6<sup>th</sup> Ed. pp. 309. (Lange, Elus Altos, California 1980).
13. MONCADA, B.; WARPEHA, R.; PICKLEMAN, J.; SPAK, M.; CARDOSO, M.; BERKOW, A.; WHITE, H.: Mediastinitis from odontogenic and deep cervical infection. Chest, 73 : 497-500 (1978).
14. PAYNE, W.S.; LARSON, R.H.: Acute mediastinitis. Surg. Clins N. Am. 49 : 999-1009 (1969).
15. PETTY, T.L.: Pulmonary diagnostic techniques; pp. 243-247 (Lea & Febriger, Philadelphia 1975).
16. SABISTON, D.C.: Harrison's principles of Internal Medicine 8<sup>th</sup> ed., pp. 1396-1399 (Mc Graw Hill, New York 1977).
17. SPALTEHOLZ, W.: Hand atlas of human anatomy; 7<sup>th</sup> ed., pp. 591 (Lippcott, Philadelphia, London 1966).