A Huge Anterior Mediastinal Abscess In A 5-year-old Male: A Case Report

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Background --- Mediastinal abscess formation is a very rare entity, especially since the advent of widespread antibiotic treatment. Non-traumatic mediastinal abscess on the other hand, is extremely rare in children.

Case --- We report a case of a 5 year-old previously healthy boy who developed Staphylococcal Pericarditis, which presented as persistent fever and findings of massive pericardial effusion on 2D-echocardiography. Antibiotic treatment and tube pericardiostomy was done, however, the patient remained febrile with progressive dyspnea. A chest CT scan revealed an abscess formation in the superior-anterior mediastinal area measuring 7 x 10 x 3.2 cm with displacement of the great vessels and heart posteriorly. The abscess was surgically drained by subxiphoid approach with insertion of catheter drainage and subsequent treatment with antibiotics was done. Patient fully recovered and was discharged improved

Conclusion --- Early diagnosis and aggressive treatment of mediastinal infections is of utmost importance to reduce mortality and morbidity. *Phil Heart Center J 2008; 14(1):76-79*

Key Words: Mediastinal abscess ■ staphylococcal pericarditis

Mediastinal abscess formation is a very rare entity, especially since the advent of wide spread antibiotic treatment. Non-traumatic mediastinal abscess on the other hand, is extremely rare in children. We present a case of mediastinal abscess, which initially started as pericardial effusion in the pediatric age group. We describe the diagnostic and therapeutic approaches in the management of this case.

Case

We presented a case of a 5-year-old Filipino, previously well child, who was referred for further evaluation at the Philippine Heart Center due to persistent fever. Forty days prior to admission, the patient started to have high grade fever accompanied by chills and vague epigastric pain. No other accompanying signs and symptoms noted such as cough and colds, vomiting and diarrhea. He was brought to a district hospital where he was given Paracetamol and an unrecalled antacid. No laboratory examinations were requested. The impression that was given then was that of a Systemic Viral Illness. The patient was discharged with an antipyretic.

Six days after, there was recurrence of febrile episodes and epigastric pain. This time, there was a note of easy fatigability on moderate physical exertion and loss of appetite. The patient was again brought to the same district hospital where he was admitted for three days. Chest x-ray was done, however, results were unknown to the parents. He received IV Choramphenicol, oral Metronidazole, Ranitidine & Paracetamol. Lysis of fever was noted on the second hospital day, hence, he was discharges on the third hospital day. Chloramphenicol and Metronidazole were completed for ten days at home. He was managed as a case of Enteric Fever. Twenty-seven days prior to admission, a repeat chest x-ray done on follow-up showed cardiomegaly. Abdominal ultrasound revealed hepatomegaly. A referral was made to a nearby provincial hospital for further work-up and evaluation.

A week after, there was recurrence of moderate to high grade fever. This was accompanied by body weakness, loss of appetite easy fatigability and palpitations. He was admitted at the provincial hospital. Chest X-ray done showed cardiomegaly with concomitant findings of pneumonia. He was managed as a case of Pneumonia and Post-infectious Myocarditis. He was started on Penicillin, Amikacin, Metronidazole IV, Rifampicin, Lanoxin, Furosemide and Spirinolactone. Despite the above management, fever persisted accompanied by

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episodes of difficulty of breathing. A pediatric cardiologist requested for 2D-echocardiography, which showed massive pericardial effusion with flagellations. Pericardiocentesis showed a serosanguinous fluid was obtained approximately amounting to 350cc. Pericardial fluid analysis yielded heavy growth of Staphylococcus aureus. Blood and urine cultures including AFB Smear were negative. Piperacillin-Tazobactam was started. During his hospital stay, patient still had persistent fever and episodes of difficulty of breathing, hence the patient was referred to our institution for further evaluation and work-up.

The patient came in tachypneic, tachycardic with a high grade fever (temperature of 39.8ºC). Physical examination done revealed a muffled heart sounds with shallow subcostal retraction, fine crackles on both lung fields and diminished breath sounds on the right lung. The initial chest x-ray showed cardiomegaly, pleural effusion on the right lung, hazy infiltrates on the left lower lung with a note of hazy density at the left hilar region giving us a seemingly widened mediastinum. Initial 2D-echocardiography confirmed the presence of a massive pericardial effusion with flagellations. The patient underwent close tube pericardiostomy and chest tube thoracostomy on the right lung. After the procedure, the patient remained intubated and was maintained on a low ventilatory support. A repeat chest x-ray after the procedure showed partial clearing of pleural effusion on the right. (Figure 2). Pericardial and pleural fluids were serosanguinous in character, and were consistent with exudative effusion on analysis. Fluid samples were also sent for culture and sensitivity, KOH, AFB smear and TB culture which all came back with negative results. Pleural fluid cytology and cell block was negative for malignant and neoplastic cells; there were few degenerated mesothelial cells and lymphocytes with rare neutrophils and eosinophils noted. The initial CBC, serum potassium, calcium, liver function tests, PTT and PTPA were all normal. Serum sodium as well as albumin were low, thus albumin infusion was done. Serum LDH was high (1138 U/L). Blood culture yielded no growth after seven days of incubation. PPD was negative after 72 hours. Endotracheal tube culture revealed no growth after three days of incubation. Piperacillin-Tazobactam was continued. Oxacillin, IV Metronidazole & Rifampicin were started.

On the second hospital day, the patient was already afebrile. Repeat chest x-ray was done due to the increasing drainage on the chest tube. There was clearing of pleural effusion on the right, however, there was a note of pneumothorax on the right upper lobe, but still with a note of a widened mediastinum. There was an interval appearance of atelectasis on the right lung. On subsequent chest x-rays, minimal apical pneumothorax on the right and minimal pleural effusion persisted. Ventilatory support was maintained. On the fourth hospital day, ABG showed a normal acid base with more than adequate oxygenation, thus weaning from ventilatory support was started. On the fifth hospital day, fever recurred associated with tachypnea and episodes of desaturation, with oxygen saturation as low as 80%. Repeat labs showed leukocytosis and thombocytosis, high CRP, normal serum electrolytes and low serum albumin and globulin, thus albumin infusion was given. Repeat chest x-ray still showed pneumothorax on the right upper lobe. This time the patient was referred to Infectious service. Piperacillin-Tazobactam and Oxacillin was shifted to Vancomycin while Rifampicin and Metronidazole were continued. On the fifth to the sixth hospital day, patient had persistent high grade fever thus a chest CT scan was done. (Figure 4). This revealed a rim enhancing fluid collection of mixed attenuation measuring approximately 7 cm x 10 cm x 3.2 cm noted on supero-anterior mediastinum with displacement of the great vessels and heart posteriorly. This was officially read as abscess formation in the supero-anterior mediastinum; Pneumothorax and minimal pleural effusion on the right with Pneumonic infiltrates and atelectasis at the posterior basal segment of the right upper lobe. On the seventh hospital day, the patient underwent drainage of mediastinal abscess by subxiphoid approach with placement of catheter drainage. Approximately 60cc of purulent fluid was drained. It was sent for culture however no microorganism was noted. On the ninth hospital day, condition improved and there was lysis of fever. The patient was then extubated. On subsequent hospital days, chest tube and mediastinal tube were removed. Chest x-ray done on the 15th hospital day revealed clearing of pneumothorax, pleural effusion and infiltrates on both lung fields.(Figure 3). Vancomycin was completed for 21 days while Metronidazole and Amikacin were completed for 14 days. The patient was discharged improved on the 24th hospital day.

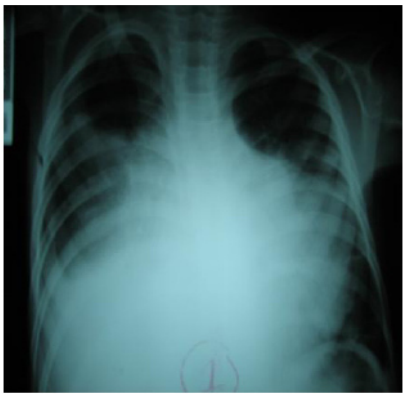


Figure 1. Chest radiograph on admission revealed cardiomegaly and pleural effusion, L

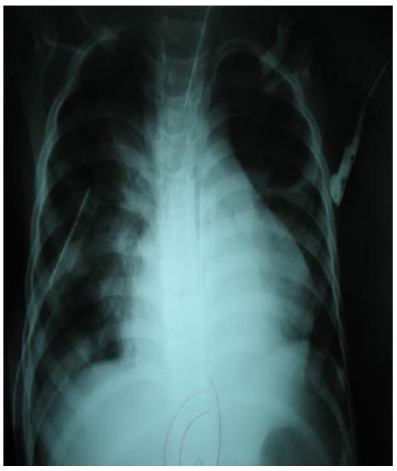


Figure 2. Chest radiograph after drainage of mediastinal

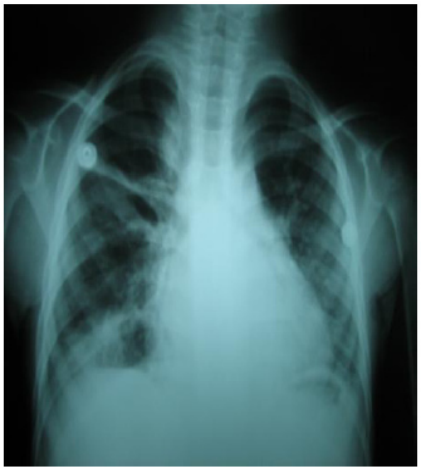
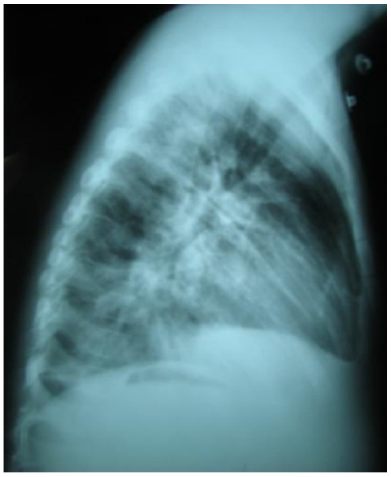


Figure 3. Chest X-ray prior to discharge



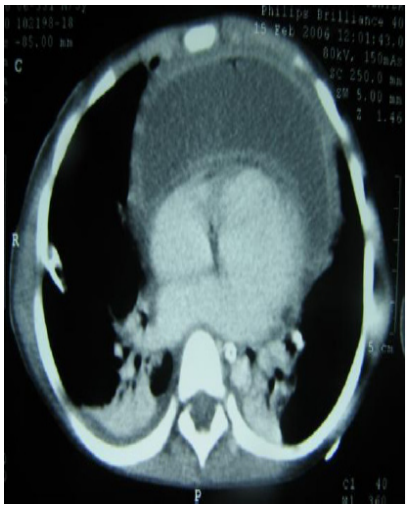


Figure 4. Chest CT Scan showing the encapsulated abscess

Discussion

Mediastinal Abscess formation is a very rare entity, especially since the advent of widespread antibiotic treatment. Non-traumatic mediastinal abscess on the other hand, is extremely rare in children. In general, this consequently occurs due to an infection in a different organ or they may be a direct extension of the buccopharyngeal or pulmonary infections by anatomic pathways.[1, 2] Some cases of hematogenous spread were reported.[3, 4] Cases of lymphatic spread were also reported since the anatomic drainage route of the internal mammary lymphatics closely communicate in the upper mediastinum. Our patient initially was diagnosed to have Bacterial Pericarditis secondary to Staphylococcus aureus as yielded by pericardial fluid culture. Bacterial pericarditis is rarely the primary site of infection. It is usually a complication of infection originating elsewhere in the body arising by contiguous spread or hematogenous dissemination. Our case describes a previously healthy child who presented with massive bacterial pericardial effusion with no localized primary focus. This could be a case of a primary bacterial pericarditis which might have caused contiguous extension of infection in the mediastinal area via direct or hematogenous route. According to reports, only eight cases of children with non-traumatic mediastinal abscess were published in the last 15 years (Table 1). Age of presentation is very variable; it may be seen in ages 15 days to 11 years. There are two patients reported with primary intrathoracic disease where Streptococcus pneumonia as the causative agent was identified. In four patients with pharyngeal or other distant site of primary infection Staphylococcus aureus was found in bacteriologic analysis. In two patients, no causative microorganism was identified. Recovery was achieved by drainage and antibiotic treatment hence bacteria as causative agent was suspected nevertheless in majority of cases. 5-10 Early diagnosis and aggressive treatment of mediastinal infections is of utmost importance to reduce mortality and morbidity.[11] In addition to the antibiotic therapy a minimal invasive percutaneous drainage is a very good option to achieved sustained healing.10 CT Scan guided drainage is a good alterative as well.[12] All but one patient from table 1 were successfully treated with antibiotic therapy and mediastinal abscess drainage. Surgical treatment consisted always of extrathoracic approach. Extensive thoracotomy has not been reported in published cases. One patient was successfully treated with medical therapy following local retropharyngeal drainage.[13] In our case, such approach was chosen to prevent possible spillage of abscess to the adjacent structures. In most adults, non-traumatic mediastinal abscesses are secondary to a descending necrotizing mediastinitis. Their common treatment consists in general of extensive thoracotomy

Table 1. Published cases of mediastinal abscess in the past 15 years

Study	Year	Gender	Age	Bacteria	Etiology	Spread	Localisation	Medical Tx	Surgical Tx	Outcome
Komatsu et al.	1989	m	24 M	Gram + Cocci	purulent tonsilitis	L	PS	Penicillin G + Oxacillin	supraclavicular drainage (10 days)	Healed
Tobias et al.	1990	f	8.5 Y	S. pneumo.	right pneumonitis	L	AS	Penicillin G (6 weeks)	right thoracocentesis	Healed
Smith et al.	1992	M	11 Y	S. aureus	septic arthritis of both knees	H	AS	Cloxacillin + Gentamyin (2 weeks)	suprasternal drainage (12 days)	Healed
Bungay et al.	1995	f	1.5 M	S. aureus	right hand abscess (cannula)	H	AS	Cloxacillin + Netilmycin (6 weeks)	drainage	Healed
Fields et al.	1997	m	22 M	S. pneumo.	focal thymic Infection	L	AS + PI	Penicillin	drainage	Healed
Sztajnbok et al.	1999	f	19 M	S. aureus	retropharyngeal abscess	L	AS	Clindamycin + Cetriaxon (2 weeks)	retropharyngeal abscess	Healed
Krebs et al.	2000	f	15 D	S. aureus	left hip arthritis	H	AS	Vancomycin (6 weeks)	drainage	Healed
Tuerlinde x et al.	2003	f	9 Y	?	retropharyngeal abscess	L	AS	Amoxicillin/Clavulanic acid (3 weeks)	parasternal drainage (6 days) (under CT)	Healed

m: male, f: female, Y: Year / M: Month / D: Day / L: Local / H: Haematogenous / AS: Antero-Superior / PI: postero-inferior / PS: postero-superior / S. pneumo.: Streptococcus pneumoniae / S. aureus: Staphylococcus aureus

or median sternotomy. In children, extensive thoracotomy usually was avoided in the published articles to prevent thoracic wall and hemithoracic spread.[2, 9]

Thoracocardiovascular surgeons should always consider that in non-traumatic mediastinal abscesses extensive thoracotomy is not necessary and may be avoided. Suprasternal cervicotomy to drain the abscess and subsequent appropriate antibiotic treatment for several weeks is, at least in the case presented above is sufficient to provide sustained recovery.

Conclusion

Increased awareness among clinicians of the typical presentation of Bacterial Pericarditis caused by Staphylococcus aureus and a high index of suspicion are required to make the correct diagnosis. A thorough history, physical examination and ancillary studies should elucidate the correct diagnosis. A remote history of Staphylococcus septicemia in a patient presenting with persistent fever with an enlarged mediastinum ad cardiac silhouette on chest radiograph should raise the suspicion of a mediastinal abscess in the differential diagnosis, which ca then be confirmed by a Chest CT Scan if still in doubt. In addition to antibiotics, treatment should include some drainage method and placement of a drainage catheter. In the current era with modern diagnostic capabilities, an early diagnosis and aggressive management will put our patient in a better prognosis and favorable outcome.

Reference

1. Chat L. Bouklata S, Chellaoui M, et. al. Non-traumatic Mediastinitis. Arch Pediatr 2002; 9: 385-387
2. Varlet F, Lavocat MP, Teyssier G, et. al. Non-traumatic Acute Suppurative Mediastiitis In a Child. Pediatrie 1992; 47: 531-534
3. Bungay HK, Shefler AG, McHugh K. CT of Staphylococcal anterior mediastinal abscess in an Infant. Pediatr Radiol 1995; 25: S205-S206
4. Krebs VL, Tenorio PB, Valente M, et. al., Computer tomography of anterior mediastinal abscess in a Neonate. Pediatr Radiol 2000; 30: 882
5. Komatsu EC, Costa F, Marchese LT, et. al. Abscess of the Mediastinum: a case report. J Pediatr Surg 1989; 24: 1125
6. Smith A, Sinzobahamvya N. Anterior Mediastinal Abscess Complicating Septic Arthritis. J Pediatr Surg 1992; 27 101-102
7. Fuji M, Murakami G, Yamagata T, et al. Topographical anatomy of the internal mammary lymphatics in the superior mediastinum and anterior mediastinum lymph nodes. Okajimas Folia Anat Jpn 1994; 71: 99-125
8. Fields JM, Schwartz DS, Gosche J, et.al., Idiopathic bilateral anterior mediastinal abscess. Pediatr Radiol 1997; 27; 596-597
9. Sztajnbok J, Grassi MS, Katayama DM, et. al. Descending suppurative mediastinitis: non-surgical approach to this unusual complication of retropharyngeal abscess in childhood. Pediatr Emerg Care 1999; 15: 341-343
10. Tobias JD, Bozeman PM, Pneumococcal Abscess pre senting as an anterior mediastinal mass in an eight-year-old child. Pediatr Infect Dis J 1990; 9: 916-918
11. Hirai S, Hamaaka Y, Mitsui , et. al. Surgical treatment of virulent descending necrotizing mediastinitis. Ann Thorac Cardiovasc Surg 2004; 10: 34-38
12. Mihos P, Potaris K, Gakidis I, et. al. Management of descending necrotizing mediastinitis. J Oral Maxillofac Surg 2004; 62: 966-972
13. Papalia E, Rena O. Oliaro A. et. al. Descending Necrotizing Mediastinitis: Surgical management. Eur J Cardiothorac Surg 2001; 20: 739-742