

**Case
Report**

Successful Management of Acute Necrotizing Mediastinitis with Trans-cervical Drainage

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Acute Necrotizing mediastinitis (ANM) is a lethal disease which without antibiotic therapy and surgical Intervention can lead to about 40% mortality. With the development of imaging technology, spiral computed tomography (CT) scanning and shortening of the time of diagnosis and surgery, the prognosis of these patients is excellently improved. This study describes the clinical presentation, management and outcome of 4 patients (mean age: 35 years) with ANM. All patients were operated on by a trans-cervical approach, and only one patient was operated on by a trans-thoracic one. After surgery, patients were transferred to the intensive care unit and underwent daily washing and debridement with antibiotic treatments. Odontogenic infection (2 cases), pharyngeal perforation and cervical esophageal perforation were the causes of the ANM. Infection of cervical space (perivisceral spaces) and superior Mediastinum were found in all patients, and Infection below the carina was found in two. All patients were discharged with a good, general condition after an average of 24 days. Early diagnosis of ANM with clinical presentation and on-time CT scanning, early drainage and careful post operation care are very important in the management of patients with ANM and can improve the outcome of trans-cervical drainage to an acceptable technique.

Keywords: acute necrotizing mediastinitis, cervical drainage, odontogenic infection

Introduction

Acute necrotizing mediastinitis (ANM) is one of the lethal diseases, which, despite routine treatments is still associated with a mortality rate of 40%. Oropharyngeal perforation, neck trauma, sinusitis and perforation of the cervical esophagus are some causes of this lethal disease.^{1,2)}

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Several treatment modalities including cervical, trans-thoracic, and recently, trans-pericardial drainage, have been introduced. In all of the patients without considering the treatment techniques, latency in diagnosis and surgical treatment is the main cause of mortality and morbidity.³⁾ Most of the previous studies have advised early clinical and imaging assessment subsequent primary drainage in order to diagnosis the probable collection in the mediastinum.³⁾ Only perfect and early stated diagnosis and selecting effective therapeutical modalities can lead to patient life salvage and survival.^{2,4)}

All of the mentioned treatment modalities are associated with prolonged hospitalization in survived cases.⁵⁾ Trans-cervical techniques, because of easy access through the neck is more favorable compared to the other techniques, but previous studies have been reported a lower success rate for this technique in comparison to the trans-thoracic one.⁵⁾ In this study, we described four cases

of ANM managed by a trans-cervical approach and with a considerable shortened hospitalization period and better survival rate compared to previous studies. This series performed in thoracic surgery ward of Imam Khomeini Hospital, Tehran, Iran, During October 2009 to March 2010.

Case 1

The patient was a 31-year-old woman who was referred with the diagnosis of tonsillar abscess after 10 days. The patient was in shock and toxic when entered to the emergency room (ER) of the Imam Khomeini Hospital, Tehran, Iran. After initial management with resuscitation and correction of water and electrolytes, cervical and thoracic spiral CT scan was performed that showed infection and air in tissues in the cervical region up to Carina (T5). Patient was transferred to the operation room (OR) and underwent cervical drainage with retrovisceral and retrothoracic exploration. Pusy discharges were extracted, extended washing was performed, and the patient was transferred to the intensive care unit (ICU). The patient underwent daily washing and cervical debridement. In the fourth day, the patient had severe respiratory distress and echocardiography was performed which showed pericardial effusion, so pericardial window was performed for the patient. After ten days, because of continuing fever repeated CT scan was performed which showed fluid concentration in the medial mediastinum. The patient was a candidate for thoracotomy. During thoracotomy, non-purified fluid was seen in the posterior mediastinum which was extracted. The patient was discharged after 31 days, and the 1- and 2-months follow-ups found no clinicopathologic problem.

Case 2

The patient was a 21-year-old man who was presented to the ER with the complaint of neck effusion and respiratory distress after swallowing a sharp object since 7 days ago. CT scan showed infection and subcutaneous air in the neck and superior mediastinum (T2 vertebra). After resuscitation patient was transferred to the OR and underwent trans-cervical drainage and superior mediastinum exploration through the neck. After extraction of pusy discharges and extended washing, the patient was transferred to the ICU and daily washing and debridement were performed on him. After 7 days, the CT scan showed no collection in the mediastinum, and the patient

was discharged after 14 days.

Case 3

The patient was a 25-year-old man who had become quadriplegic after cervical trauma and dislocation of the cervical vertebra. During the surgery for fixation of the vertebra with plaque, iatrogenic cervical esophagus injury had been happened. After 4 days, because of effusion and respiratory distress due to the compression to the respiratory tracts and involvement of superior mediastinum (T3 vertebra), he underwent trans-cervical drainage with retrovisceral exploration of the mediastinum. Discharges were extracted and simultaneous with nutritional jejunostomy and mediastinal drainage with tube, thoracostomy was performed. The patient was transferred to the ICU, and after 1 week, CT scan imaging confirmed no cervical or mediastinal collection. The patient was discharged after 27 days, and an assessment after 2 months with a CT scan showed no mediastinal collection.

Case 4

The patient was a 63-year-old diabetic man with severe odontogenic infection, extended cervical effusion, loss of consciousness and respiratory distress. These problems had started 5 days before with submandibular effusion and pain and progressive cervical effusion, worsening over time. He underwent resuscitation and cervical thoracic CT scans immediately, which showed air and fluid collections in medial and superior mediastinum up to the Carina. The patient was transferred to the OR and after the initial tracheostomy, the neck was opened with a classic incision, the superior mediastinum was explored, discharges were extracted and washed with adequate fluids. The patient was transferred to the ICU, and recurrent washing was performed for 1 week. After 4 days, a repeated CT scan showed no collection or special pathology. Finally, the patient was discharged after 24 days. The CT scan after 2 months confirmed no concentration in the mediastinum.

Discussion

Despite the usual treatment modalities, ANM is still associated with a high percentage of final mortality.¹⁾ These infections are unique among infection diseases for their versatility and potential for severe complication, early mortality and prolonged hospitalization.^{6, 7)}

Freeman RK et al. reported the average admission time for these patients about 46 ± 30 days. They found that CT scan is valuable in the assessment before and during the surgery and causes of severity of patients' conditions. In their study survival in trans-thoracic and trans-cervical approaches were 81% and 53%, respectively.⁶⁾ In our study the mean hospitalization rate was as low as 24 days compared to the prolonged admission stay in other studies.

Mihos P et al. followed 6 patients for 10.5 years including 3 patients with odontogenic infection and 3 patients with peritonsillar abscess. Finally one of their patients died because of multi-organ failure. They suggested trans-thoracic technique as standard treatment method and CT scan during the treatment period as the basis of diagnosis of the problem.⁸⁾ In the largest series with 17 cases (up to our knowledge), three patients died during the treatment. This study proposed thoracotomy only in the situation that infection is present under Carina. They related their low mortality rate to the early use of CT scan and on time thoracotomy. Because of infection in medial mediastinum and easy access through the neck, in 7 patients they used only trans-cervical approach. None of their patients required tracheostomy.⁹⁾

Latest proposed technique is using medial sternotomy and using a trans-pericardial technique with releasing Aorta and superior vena cava and debridement and washing of the medial and posterior mediastinum which needs further investigation.¹⁰⁾

Conclusion

Early diagnosis of ANM with clinical presentation and on-time CT scanning, early drainage and careful post operation care are very important in the management of

patients and can improve the outcome of trans-cervical drainage to an acceptable technique.

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References

- 1) van Natta TL, Lemettoni MD. Thoracic: Acute necrotizing mediastinitis. In: Pearson FG, Patterson, GA. Pearson's thoracic and esophageal surgery. 3rd ed. Philadelphia : Churchill Livingstone/Elsevier; 2008: 1521-28.
- 2) Klecka J, Simanek V, Vodicka J, et al. Acute mediastinitis—optimum diagnostic and therapeutic measures. *Rozhl Chir* 2009; **88**: 253-8.
- 3) Exarhos DN, Malagari K, Tsatalou EG, et al. Acute mediastinitis: spectrum of computed tomography findings. *Eur Radiol* 2005; **15**: 1569-74.
- 4) Gawrychowski J, Rokicki W, Rokicki M. Descending necrotic mediastinitis—course and methods of surgical treatment. *Pneumonol Alergol Pol* 2003; **71**: 17-23.
- 5) Cvijanovi V, Stani V, Ristanovi A, et al. Descending necrotizing mediastinitis. *Vojnosanit Pregl* 2006; **63**: 677-80.
- 6) Vieira F, Allen SM, Stocks RM, et al. Deep neck infection. *Otolaryngol Clin North Am* 2008; **41**: 459-83.
- 7) Athanassiadi KA. Infections of the mediastinum. *Thorac Surg Clin* 2009; **19**: 37-45.
- 8) Mihos P, Potaris K. Management of descending necrotizing mediastinitis. *J Oral Maxillofac Surg* 2004; **62**: 966-72.
- 9) Makieff M. Management of descending necrotizing mediastinitis. *Laryngoscope* 2005; **114**: 772-5.
- 10) Stella F, Petrella F. Transsternal transpericardial approach for acute descending necrotizing mediastinitis. *J Thorac Cardiovasc Surg* 2005; **129**: 212-4.