

# Descending Necrotizing Mediastinitis of Odontogenic Origin in a Young Male Patient: Case Report and Discussion

Sarmad Said<sup>1</sup>, Chad J. Cooper<sup>1</sup>, Mohamed Teleb<sup>1</sup>, German T. Hernandez<sup>2,\*</sup>

<sup>1</sup>Department of Internal Medicine, Paul L. Foster School of Medicine, Texas Tech University Health Sciences Center, El Paso, Texas, USA

<sup>2</sup>Department of Internal Medicine, Paul L. Foster School of Medicine, Division of Nephrology & Hypertension, Texas Tech University Health Sciences Center, El Paso, Texas, USA

\*Corresponding author: [german.hernandez@ttuhsc.edu](mailto:german.hernandez@ttuhsc.edu)

Received February 13, 2014; Revised March 13, 2014; Accepted March 14, 2014

**Abstract** *Background:* Mediastinitis is an inflammatory process that can be presented acute or chronic. Acute mediastinitis occurs secondary due to esophagus perforation or induced by infections of odontogenic or retrapharyngeal origins. The most common form is the postsurgical mediastinitis after cardiovascular interventions. Descending necrotizing mediastinitis and acute infectious mediastinitis has often a fulminate and fatal course. Chronic mediastinitis (or sclerosing fibrosing mediastinitis) appears to be associated with long standing mediastinitis, which induces collagenous and fibrous overgrowth. *Case Report:* Forty-one year-old male patient without significant past medical history presented with 2-weeks history of progressive shortness of breath, productive cough, generalized dental pain and, facial swelling. In the further workup he was found to have an acute odontogenic mediastinitis complicated by deep neck abscess after recent history of dental extraction. Hospital course included respiratory failure induced by sepsis and possible airway compression from the deep neck abscess. He was intubated, placed on mechanical ventilation, and required multiple surgical interventions including but not limited to drainage, chest tubes, and thoracentesis. Intravenous antibiotic treatment with Metronidazole and Ceftriaxone was initiated. After long-standing treatment his condition improved and was discharged home. *Conclusion:* Odontogenic mediastinitis with deep neck abscess should be considered in patients with recent tooth aches/infection or dental surgery. Early recognition, surgical, and antimicrobial treatment are implemented with good prognosis and outcome.

**Keywords:** *mediastinitis, odontogenic infection, pneumomediastinum, descending-necrotizing mediastinitis*

**Cite This Article:** Sarmad Said, Chad J. Cooper, Mohamed Teleb, and German T. Hernandez, "Descending Necrotizing Mediastinitis of Odontogenic Origin in a Young Male Patient: Case Report and Discussion." *American Journal of Medical Case Reports*, vol. 2, no. 2 (2014): 44-47. doi: 10.12691/ajmcr-2-2-5.

## 1. Introduction

The expansion of oropharyngeal infection into the mediastinum defines a rare life-threatening infection of the mediastinal tissue filling the interpleural spaces and adjacent thoracic organs known as descending necrotizing mediastinitis (DNM). Odontogenic infection originating from oral cavity, submandibular, submental, retropharyngeal, and deep cervical abscesses is the most common cause and young men are predominantly affected [1]. Significantly high mortality of descending necrotizing mediastinitis of odontogenic origin (DNMOO) was known since the 1940s and despite all diagnostic progresses we made the mortality remain high (49% versus 19.2, respectively) [2]. Typically the risk of the disease increases in the presence of other comorbidities, such as diabetes mellitus, immunosuppression, use of other drugs [3]. Estrera et al. have established criteria of the DNM, which include 1) clinically severe oropharyngeal infection, 2) radiographic features of mediastinitis, 3) surgical of

postmortem confirmation of the infection, and 4) establishment of reason-outcome between oropharyngeal infection and mediastinitis [4].

Early recognition and initiation of diagnostic modalities, especially computed tomography (CT), is crucial in the management of DNMOO. Broad-spectrum antimicrobial therapy, cervical exploration, placement of drainages, and surgical debridement are included in the management [5].

We are reporting a case of a young male who presented with progressive productive cough and shortness of breath, which turned out to be a case of "descending necrotizing mediastinitis" with favorable outcome.

## 2. Case Report

Forty-one year-old male patient without significant past medical history presented to the emergency department in El Paso with four-days history of suddenly started shortness of breath associated with productive cough, fever of 102 F measured at home, chills, and generalized weakness. The dyspnea progressed over this period

causing significant limitation of even minimal daily activity. He also complained about upper midepigastic discomfort, dysphagia and chest pain over the lower sternal level accompanied by nausea and vomiting, especially after meals. However these symptoms caused severe limitation of his oral intake. On the day prior to the presentation he went to a nearby hospital across the border in Mexico and was given a temporary treatment with ceftriaxone and paracetamol without any noted changes, therefore he decided to come back to the University Medical Center in El Paso. Further history was remarkable for generalized toothache started about 2 weeks ago causing swelling around the area of his right jaw. His social history was indicative for occasional drinking of alcohol, smoking of 10-15 cigarettes/week for the last 15 years. No history of illegal drug use.

**Table 1. initial laboratory work up upon admission**

Initial laboratory Work up	
White blood cell count	8.59 x 10 <sup>3</sup> uL
Segments	25%
Bands	20%
Metamyelocytes	5%
Lymphocytes	31%
Monocytes	16%
Hemoglobin	15.3 g/dL
Hematocrit	44.8%
Platelet count	310 x 10 <sup>3</sup> uL
Sodium	143 mmol/L
Potassium	4.3 mmol/L
Chloride	109 mmol/L
CO <sub>2</sub>	21 mmol/L
Serum glucose	125 mg/dL
BUN	69 mg/dL
Creatinine	2.58 mg/dL
Calcium	8.5 mmol/L
Albumin	3.0 g/dL
Protein	5.5 g/dL
AST	54 I.U./L
ALT	52 I.U./L
Alk. Phosphatase	117 I.U./L
Lactate	3.9mmol/L

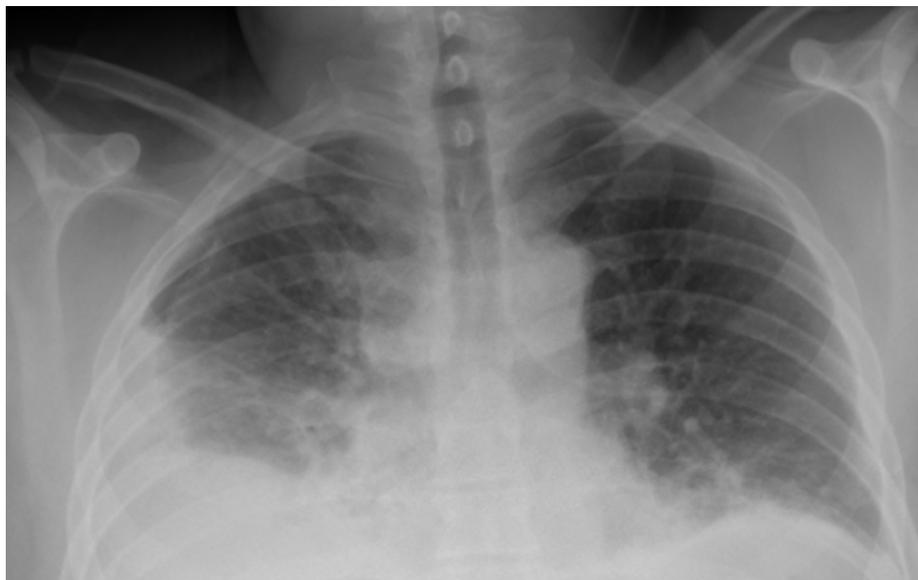
The initial evaluation showed tachycardic (heart rate 113 per minute), tachypneic (respiration rate of 28 per minute), and hypotensive patient (blood pressure 93/61

mmHg). He was noted to be in severe distress. Oral cavity examination demonstrated moist but erythematous buccal mucosa with bilateral swelling. Soft tissue swelling around the parotid glands extending to the maxillary second molar with pain upon palpation was noted. The parotid glands secreted purulent fluid into the oral cavity. The palatine tonsils were found to be enlarged and coated yellowish discharge. The gingiva appeared to be erythematous and swollen; dental plaques were noted as well. Dark discoloration was seen over all teeth diffusely. Multiple teeth cavities (on 17, 18, 31 and 32) were noted. On the rest of the physical examination bilateral cervical swelling with mildly diffuse lymphadenopathy more on the posterior cervical lymph node was observed. Chest examination revealed decreased breath sounds with bilateral scattered ronchi with decreased inspiratory effort. The rest of the physical examination was unremarkable. Laboratory workup is shown in [Table 1](#).

**Table 2. Body fluid analysis**

Body fluid analysis (pleura)	
Color	Brown
Appearance	Turbid
White blood cell count	72.810 x 10 <sup>3</sup> uL
Red blood cell count	320.000 x 10 <sup>3</sup> uL
Protein	1.1g/dL
LDH	2.490I.U./L

Initial radiographic imaging (chest x-ray) showed widening of the superior mediastinum, bilateral effusions and prominent aortic arch ([Figure 1](#)). Computed tomography (CT) of the chest revealed right-sided hydropneumothorax with adjacent crescent atelectasis, patchy bilateral airspace consolidation, fluid collections throughout the anterior and superior mediastinum and extending to the base of the neck, and extensive Pneumomediastinum involving the anterior retrosternal space ([Figure 2](#)). Clinical and radiological findings were suggestive for an acute mediastinitis. To further determine the origin of the infection cervical CT was performed and showed odontogenic infection with trans-compartmental dissecting abscess involving the supra and infrahyoid neck and extending to the superior mediastinum ([Figure 3](#)).



**Figure 1.** chest x-raydemonstrating widening of the superior mediastinum, right-sided pleural effusion and prominent aortic arch



**Figure 2.** Chest-Computertomography showing right-sided hydropneumothorax, bilateral airspace consolidation, fluid collections throughout the anterior and superior mediastinum and extending to the base of the neck, and Pneumomediastinum



**Figure 3.** cervical-CT showing odontogenic infection with trans-compartmental dissecting abscess involving the supra and infrahyoid neck and extending to the superior mediastinum

The patient was admitted in the medical intensive care unit, developed respiratory failure, was intubated and placed on mechanical ventilation. Antimicrobial treatment with daily intravenous ceftriaxone 2gm and metronidazole 500 mg every 8 hours was initiated. Oral Maxillofacial surgery service was consulted. Subsequently the teeth 17,18, 31, and 32 were extracted; an incision and drainage of pharyngeal, submandibular, buccal, submental, and deep neck abscess was performed. The postoperative neck-CT revealed and interval decrease in the abscess size ranged 30-50 %. Thoracocentesis, right thoracotomy with decortication and drainage of the mediastinal abscess were achieved and chest tubes were placed. Pleural fluid anaerobic culture showed heavy growth of *B-hemolytic streptococcus* group F, anaerobic gram-negative rods *Prevotella/porphyromonas* group and *Veillonella parvula*. The antibiotic regiment was switched to Amoxicillin/clavulanic acid 875mg twice daily for a total

duration of 2 weeks. The patient showed rapid improvement and was discharged home after a total hospitalization of almost 5 weeks. Two months after the discharge the patient was seen in the outpatient clinic and his symptoms were resolved completely.

### 3. Discussion

Descending necrotizing mediastinitis was first described by Pearse, and resembles that the source of infection is from the head and neck, most commonly an oropharyngeal or odontogenic origin [6]. The annual incidence of DNM is 5.1 cases/ million with a very high mortality [1].

Patients with comorbidities, such as malnutrition, diabetes mellitus, and alcoholism are a higher risk for the development of DNMO. The mortality risk is

exponentially increased in patients older than 70 years [7]. Descending infections from odontogenic origin may cause serious life-threatening problems, such as Ludwig angina or DNM. The pathogenic cause is mainly a mixture of aerobic and anaerobic bacteria of the oral flora [8].

The most important key to the diagnosis is the awareness about the disease and systematic physical examination. Contrast-enhanced cervicothoracic CT scan is the modality of choice for an early detection and is also helpful in the postoperative assessment [9].

The management of DNMOO includes additionally to rapid initiation of broad-spectrum antibiotic treatment, early surgical drainage of mediastinum and pleural cavity, and airway protection [10]. The surgical decision depends on the abscess location within the mediastinum [11].

#### 4. Conclusion

Descending necrotizing mediastinitis is life-threatening infection. Odontogenic origin is major cause and is associated with preexisting dental infection. The disease-related mortality is extremely high despite the medicine development available nowadays. However prompt recognition, diagnosis establishment, aggressive drainage, elimination of the cause and long-term postoperative antimicrobial treatment can save the life of a patient with this severe infection.

A multidisciplinary teamwork is an essential component for a successful treatment of this life-threatening infection.

#### References

- [1] Deu-Martín M, Saez-Barba M, Sanz IL, Peñarrocha RA, Vielva LR, Montserrat MR. Mortality risk factors in descending necrotizing mediastinitis. *Arch Bronconeumol* 2010; 46: 182-7.
- [2] Sarna T, Sengupta T, Miloro M, Kolokythas A. Cervical necrotizing fasciitis with descending mediastinitis: literature review and case report. *J Oral Maxillofac Surg.* 2012 Jun; 70(6): 1342-50.
- [3] Levitt GW. Cervical fascia and deep neck infections. *Laryngoscope* 1970; 80: 409-35.
- [4] Estrera AS, Landay MJ, Grisham JM, Sinn DP, Platt MR. Descending necrotizing mediastinitis. *Surg Gynecol Obstet* 1983; 157: 545-52.
- [5] Basoglu A, Celik B, Sengul AT, Kaya S. Descending necrotizing mediastinitis with bilateral pleural empyema. *Turk Respir J* 2004; 5: 56-8.
- [6] Pearse HE Jr. Mediastinitis following cervical suppuration. *Ann Surg* 1938; 107: 588-611.
- [7] Mathieu D, Nevriere R, Teillon C, Chagnon JL, Lebleu N, Wattel F. Cervical necrotizing fasciitis: clinical manifestations and management. *Clin Infect Dis* 1995; 21: 51-6.
- [8] Rocca F, Pecorari GC, Oliaro A, Passet E, Rossi P, Nadalin J, et al. Ten years of descending necrotizing mediastinitis: management of 23 cases. *J Oral Maxillofac Surg* 2007; 65: 1716-24.
- [9] Scaglione M, Pezzullo MG, Pinto A, Sica G, Bocchini G, Rotondo A. Usefulness of multidetector row computed tomography in the assessment of the pathways of spreading of neck infections to the mediastinum. *Semin Ultrasound CT MR* 2009; 30: 221-30.
- [10] Cirino LMI, Elias FM, Almeida JJJ. Descending mediastinitis: a review. *Sao Paulo Med J* 2006; 124: 285-90.
- [11] González-García R, Risco-Rojas R, Román-Romero L, Moreno-García C, López García C. Descending necrotizing mediastinitis following dental extraction. Radiological features and surgical treatment considerations. *J Craniomaxillofac Surg* 2011; 39: 335-9.