



**Characteristics of Patients of Descending Necrotizing Mediastinitis Thoracic, Cardiac and Vascular Surgery Subsection Thoracic in Dr. Mohammad Hoesin General Hospital From 1 November 2019 to 30 November 2020**

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**Abstract**

**Background:** Acute mediastinitis is an infection of the connective tissue of the interpleural mediastinal space. The infection may spread through the cervical spaces to the mediastinum, via negative intrathoracic pressure and gravity.<sup>1</sup> Management of DNM with minimally invasive drainage, namely video-assisted thoracic surgical drainage (VATS),<sup>6</sup> mediastinoscopy,<sup>7</sup> and percutaneous catheter drainage,<sup>8,9</sup> have been widely used. During early 1920s, data showed subsequent to broad-spectrum antibiotics, the mortality rate was about 40%.<sup>12</sup> Furthermore, without prompt diagnosis and aggressive surgery, the mortality rate can reach up to 60%.<sup>13</sup>

**Methods:** This retrospective study has a descriptive research design. The number of samples is 19 subjects.

**Results:** From January 1, 2019 to November 30, 2020 there were 19 DNM patients. In this study, most DNM patients were male, average age of 39 years, dental abscesses as the most common source of infection, neck exploration and sternotomy were the most common treatment option, most common outcome death, and the most common result of culture was *Acinetobacter baumannii*.

**Conclusion:** Good non-operative and operative management can reduce mortality rate.



**Keywords:** DNM, VATS, mediastinoscopy, neck exploration, sternotomy

## 1. Introduction

Acute mediastinitis is an infection of the connective tissue of the intrapleural mediastinal space and its surroundings from the median thorax. The infection spreads through the cervical space to the mediastinum, via negative intrathoracic pressure and gravity.<sup>1</sup> The etiology is odontogenic infection, pharyngeal soft tissue infection, sinusitis, or cervical trauma.<sup>2</sup> Acute mediastinitis is associated with high mortality rate unless it is promptly diagnosed and treated.<sup>3</sup> Old age and chronic medical conditions are important predisposing factors.<sup>2</sup>

Cervical Necrotizing Fasciitis (CNF) can spread from the oropharynx or odontology to the deep fascia of the neck. These polymicrobial infections are uncommon but progress rapidly, destructive, and often fatal. Prompt diagnosis and treatment including a patent airway, antibiotics, drainage, and pharmacological treatment intensively to improve survival. CNF with DNM was first described in 1938 by Pearse,<sup>4</sup> who reported 49% of mortality rate. Infection may spread from the neck due to negative intrathoracic pressure. Despite technological advances in diagnosis and treatment, DNM with sepsis has a high mortality.<sup>5</sup> Current management of DNM, the minimally invasive drainage methods, namely video assisted thoracic surgical drainage (VATS),<sup>6</sup> mediastinoscopy,<sup>7</sup> and percutaneous catheter drainage,<sup>8,9</sup> have been widely used. While it is certain that early source control of infection and drainage is essential for the treatment of DNM, there are no guidelines regarding drainage methods.

Several authors also point out the importance of the patient's medical history, especially a history of immunosuppressive diseases such as AIDS or diabetes as a comorbid in mediastinitis that may result in poor prognosis.<sup>10</sup> In the series published by Deu-Martín et al, with a sample size of 43 patients, evaluated the potential predictors of mortality such as diabetes mellitus and other comorbidities. The results showed that septic shock was the only independent predictor of mortality based on the multivariate analysis.<sup>11</sup>



Among the many forms of mediastinitis, DNM has been recognized as one of the most severe types. During the early 1920s, data showed that even after the use of broad-spectrum antibiotics, mortality was around 40%.<sup>12</sup> Furthermore, without prompt diagnosis and aggressive surgical management, the mortality rate can be as high as 60%.<sup>13</sup> Improper or inadequate diagnosis and drainage of the mediastinum is considered a major factor that influence mortality.<sup>14</sup>

For the reasons above, we conclude that DNM is an aggressive and deadly disease. The absence of data on DNM in South Sumatra is the basis for researchers to conduct this study.

## **2. Methods**

This study was a retrospective study with a descriptive research design. This research was conducted at the Division of Thoracic, Cardiac and Vascular Surgery, Faculty of Medicine, Universitas Sriwijaya/ Dr. Mohammad Hoesin General Hospital Palembang. The research took place from January 1, 2020 to November 30, 2020.

The sample population was South Sumatran, the accessible population were DNM patients who treated by Division of Thoracic, Cardiac and Vascular Surgery, Faculty of Medicine, Universitas Sriwijaya/ Dr. Mohammad Hoesin General Hospital Palembang who met the inclusion criteria and exclusion criteria. The inclusion criteria were patients who were treated in the surgical ward of the Dr. Mohammad Hoesin General Hospital with clinical manifestations of infection in the neck and oral cavity related to the mediastinal space. Exclusion criteria were DNM patients who died prior to further treatment and DNM patients who refused further treatment.

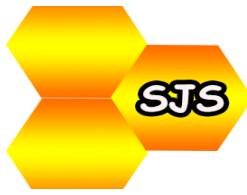
The research variables included gender, age, source of infection, treatment, mortality, and bacterial culture.

## **3. Results**

In that time period, 19 patients diagnosed as DNM were admitted to the sub-section of cardiac and vascular surgery with complete data. The results of the study based on age, sex, source of infection, treatment, mortality and bacterial culture are described in table 1.

**Table 1.** Demographic Characteristics of Research Subjects

Characteristics		N	%
Sex	Male	11	58
	Female	8	42
Age	Toddler	2	10.5
	Child	0	0
	Teenager	3	15.5
	Adult	7	37
	Elderly	7	37
Source of infection	Peritonsillar abscess	6	31.5
	Dental abscess	11	58
	Retropharyngeal abscess	2	10.5
Management of	Sternotomy	4	21
	Thoracotomy	5	26.5
	Neck exploration + debridement	3	15.5
	Neck exploration + sternotomy	7	37
Mortality	Alive	8	42
	Death	11	58
Bacterial culture	Pseudomonas aeruginosa	1	5
	Enterobacter aerogenes	1	5
	Acinetobacter baumannii	9	48
	Streptococcus sp	4	21
	Staphylococcus sp	4	21



#### 4. Discussion

The results of this study are in accordance with research by Arza Putra et al.<sup>45</sup>, Dhihintia Jiwangga<sup>46</sup>, Clara Isabel<sup>47</sup> which stated that DNM is more prevalent in men. The results of Arza Putra et al.<sup>45</sup> the average age of the patient with DNM is 37.9 years while according to Dhihintia Jiwangga<sup>46</sup> the average age of the patient is 43.73 years. The results of the present study is in accordance Dhihintia Jiwangga<sup>46</sup> which showed that the most common source of infection came from dental abscesses. This contradicts the results of the study of Clara Isabel<sup>47</sup> which stated that the most common source of infection came from the retropharynx.

The results of this study are in accordance with research by Dhihintia Jiwangga<sup>46</sup> which stated that neck exploration + sternotomy was the most common treatment for DNM patients.

The first significant study of DNM was published by Pearse<sup>4</sup> in 1938; it reported a mortality of more than 55% for patients who had been treated surgically. Estrera et al.<sup>12</sup> published the results of a 1983 study that resulted in 10 patients with a mortality of 40%; Wheatley et al.<sup>39</sup> reviewed the literature in 1990 and observed that cervical drainage was insufficient in 79% of patients; they therefore proposed the subxiphoid approach as a possible alternative to anterior mediastinal debridement.

In the 1990s, a growing number of authors recommended transthoracic drainage and thoracotomy as the ideal approach as they provide access to all parts of the mediastinum, allowing for radical surgical debridement as well as pleural or pericardial drainage and also a proper placement of chest tubes if required. Marty-Ane, Freeman and Corsten<sup>14,48,49</sup> suggest thoracotomy as the best approach, independent from the extension of mediastinitis. Corsten<sup>49</sup> also performed a meta-analysis from 36 studies with a total of 69 patients and found a statistically significant difference in the survival rate of patients treated with the transcervical approach alone (53%) compared with those treated with thoracic approach (81%). Another proposed surgical approach is video-assisted thoracoscopy (VATS), which certainly has the advantage of being minimally invasive.

The difference of this study and Arza Putra et al.<sup>45</sup>, Dhihintia Jiwangga<sup>46</sup>, Clara Isabel<sup>47</sup> are the likelihood of DNM recovery were higher and could be manage from outpatients.



Other factors that contribute to poor DNM outcomes are delayed diagnosis and inadequate initial management and drainage.<sup>4,39</sup> Cervical involvement of DNM is relatively easy to recognize from the obvious clinical features such as edema, erythema, and pain around the neck region. Along with these signs, patients often suffer from neck pain and dysphagia. In many cases, the infection cannot be detected by clinical symptoms. The result of delayed diagnosis can lead to progression of the disease and even systemic sepsis. Anatomical involvement and medical management greatly affect the prognosis of this disease.

The results of this study are not in accordance with the research of Arza Putra et al<sup>45</sup>, who found that pseudomonas aeruginosa were the most dominant etiology found in bacterial culture.

## **5. Conclusion**

Good non-operative and operative management can reduce mortality rate.

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