

ORIGINAL ARTICLE

Medicine Science 2020;9(4):917-21

Deep neck infections in geriatric patients; A clinical retrospective study

 Selcuk Kuzu,  Caglar Gunebakan

Afyonkarahisar Health Sciences University, Faculty of Medical Department of Otorhinolaryngology, Afyonkarahisar, Turkey

Received 15 June 2020; Accepted 20 July 2020

Available online 08.10.2020 with doi: 10.5455/medscience.2020.06.108

Abstract

In this study, the diagnosis and treatment results of patients over 65 years old who were followed-up with the diagnosis of deep neck infection in a tertiary hospital were evaluated retrospectively. The files of 18 patients over 65 years old who were followed-up with a diagnosis of deep neck infection in a tertiary otorhinolaryngology department between January 2012 and May 2019 were evaluated retrospectively. The most common infection was a peritonsillar abscess (50%) with 9 cases. The most common complaints at the time of admission were fever (83%) and sore throat (67%). The average onset of symptoms before admission to the hospital was 2-5 days (2-15 days). In most cases, ampicillin-sulbactam single or clindamycin or metronidazole were used. Nine patients with peritonsillar abscess were drained with local anesthesia, while four patients with parapharyngeal abscess and two patients with retropharyngeal abscess were operated with general anesthesia. Despite all the improvements in diagnosis and treatment, deep neck infections remain an important problem. The reduction of complications depends on the effective and sufficient duration of treatment in the early period. Especially in the geriatric population, comorbid diseases can accompany deep neck infections more aggressively.

Keywords: Deep neck infections, abscess, geriatric, surgery, antibiotics.

Introduction

Deep neck infection was defined by Galen in the 2nd century [1]. Deep neck infections are infections that cause abscess development in the soft tissues in the neck when they start as cellulite and are not treated. Although the frequency of seeing deep neck infections decreases after the introduction of antibiotics, there are still problems with diagnosis and treatment. When they are not recognized early or treated inadequate or improperly, they can lead to life-threatening complications because they can spread to neighboring cavities containing vital structures in the neck [2]. Infectious diseases are among the most common causes of hospitalization and deaths in the elderly, and 1/3 of the elderly deaths [3,4]. Aging mainly causes a decrease in biological capacity and many age-related changes increase the tendency to infections [5]. In this study, the diagnosis and treatment results of patients over 65 years old who were followed-up with the diagnosis of deep neck infection in a tertiary otorhinolaryngology department were evaluated retrospectively.

Material and Methods

The files of patients over 65 years old who were followed-up with a diagnosis of deep neck infection in a tertiary otorhinolaryngology department between January 2012 and May 2019 were evaluated retrospectively.

Clinical signs, physical examination findings, and computed tomography (CT) of neck findings were evaluated to diagnose deep neck infection. Patients' complaints, physical examination findings, laboratory findings (hemogram, CRP, ESH, culture results), surgical procedures, radiological findings, antibiotics and duration of use, complications, hospitalization, comorbid diseases, and relapse-recurrence were evaluated from the patient files. Symptoms included fever, neck swelling, neck pain, limited neck movements, and swallowing difficulties. The physical examination findings were mainly vital signs, signs of inflammation in the throat, tonsil displacement inferiorly and medially with a contralateral deviation of the uvula, evaluation of neck movements, swelling in the neck, torticollis, and cervical lymphadenopathy. Neck tomography was performed on all patients. All neck CT examinations were evaluated by the same radiologist for the presence and localization of the infection. In contrast-enhanced neck CT, it was evaluated as cellulitis or phlegmon that had no contrast involvement or hypodense without contrast enhancement. Hypodense area with contrast involvement

*Corresponding Author: Selcuk Kuzu, Afyon Health Sciences University, Faculty of Medical Department of Otorhinolaryngology, Afyonkarahisar, Turkey
E-mail: dr.selcukkuzu@hotmail.com

was considered as an abscess. Infection localizations were mainly peritonsillar and parapharyngeal space. Some patients were performed multiple CTs during the follow-up. Throat and blood culture of all patients, abscess culture were taken from those who applied surgical drainage, and intravenous antibiotics were initiated to all of the patients during hospitalization and the clinical view of the infectious diseases department was requested during hospitalization.

Results

A total of 18 patients with deep neck infections were included in the study. 11 were male (61%) and 7 were female (39%). The average age was 72 years. The most common infection was a peritonsillar abscess (50%) with 9 cases. The most common complaints at the time of admission were fever (83%) and sore throat (67%). The average onset of symptoms before admission to the hospital was 2-5 days (2-15 days). The main physical examination findings in hospitalization were signs of inflammation in the throat (83%), cervical lymphadenopathy (75%), swelling in the neck (42%), restriction in neck movements during the passive movement of the neck (42%), and displacement of tonsil/uvula (50%) and torticollis (25%). Leukocytosis ($> 15\,000 / \text{mm}^3$) was present in 9 patients (50%) and CRP was high in all patients. There was beta-hemolytic streptococcus growth in group A in two throat cultures and two peritonsillar abscesses. There was no reproduction in the blood culture in any patient. Eight patients had contrast neck CT, four patients had non-contrasted focal hypodensity area and phlegmon or early period abscess (patient 3, 4, 6, 12) and fourteen patients had a homogeneous hypodensity area with the contrast-enhanced environment. Intravenous antibiotics were started in all patients at admission and Infectious Diseases Clinic consultation was requested. In most cases, ampicillin-sulbactam single or clindamycin or metronidazole were used. One patient was given erythromycin treatment for penicillin allergy.

Surgical intervention was applied to all patients after hospitalization. Nine patients with peritonsillar abscess were drained with local anesthesia, while four patients with parapharyngeal abscess and two patients with retropharyngeal abscess were operated with general anesthesia. While external drainage was preferred in three of four patients with parapharyngeal abscess, external and intraoral approaches were used together in one patient. Again, eight peritonsillar abscesses and two retropharyngeal abscesses were drained with the intraoral approach. In three patients with necrotizing fasciitis, recurrent neck explorations were performed under general anesthesia and infected tissues were debrided [Figure 1]. A tracheotomy was performed in 5 patients, three necrotizing fasciitis, one parapharyngeal abscess, and one retropharyngeal abscess.

The hospitalization period of fifteen abscess patients other than necrotizing fasciitis was 6 (4-14) days on average, and all were discharged with healing except one patient (patient no: 10) who was ex on the seventh day of retropharyngeal abscess treatment. One of three patients with necrotizing fasciitis (patient no: 6) died due to mediastinitis on the second day of treatment [Figure 2, 3, 4], and one on the seventeenth day of the patient (patient no: 4). The third necrotizing fasciitis patient (patient no: 12) was discharged with healing after twenty-eight days of hospitalization. All patients discharged were sent home with oral

antibiotics and the treatment was terminated according to clinical findings and control tomography findings in some patients. The total duration of antibiotics was 17 days (12-35 days).

All patients had accompanying chronic disease. Hypertension (HT) in 10 patients, Diabetes Mellitus (DM) in 13 patients, Hyperlipidemia (HL) in 5 patients, Chemotherapy (CT) in 2 patients, Rheumatoid arthritis (RA) in 2 patients, Chronic Congestive Heart Failure (CCHF) in 1 patient, Systemic Lupus Erythematosus (SLE) in 1 patient was accompanied [Table 1].

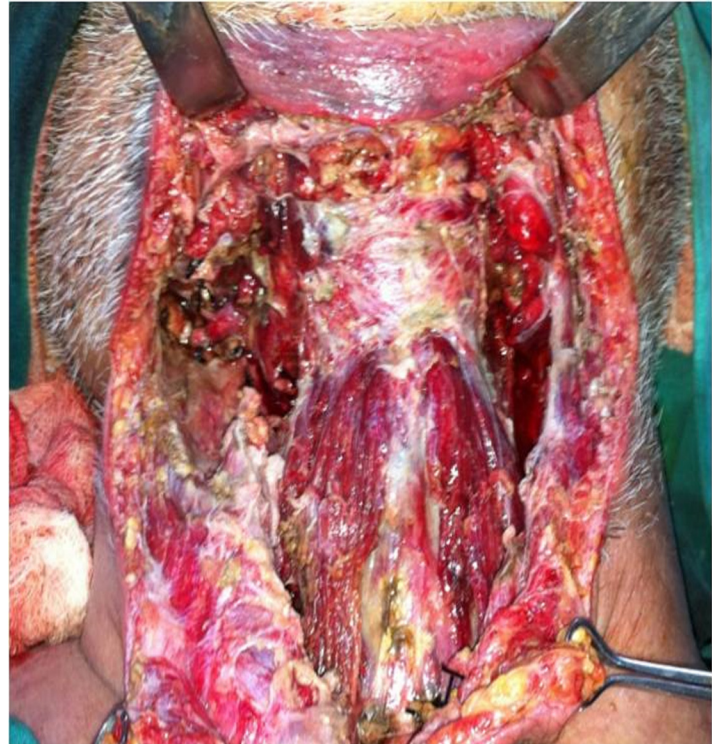


Figure 1. CT image of the case (necrotizing fasciitis)

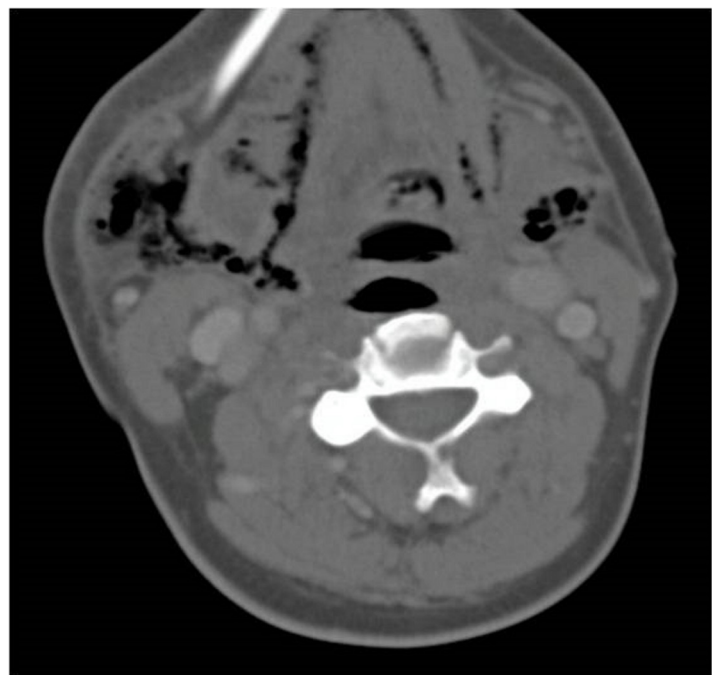


Figure 2. CT image of the case (necrotizing fasciitis)



Figure 3. CT image of the case (Air densities indicating mediastinitis)

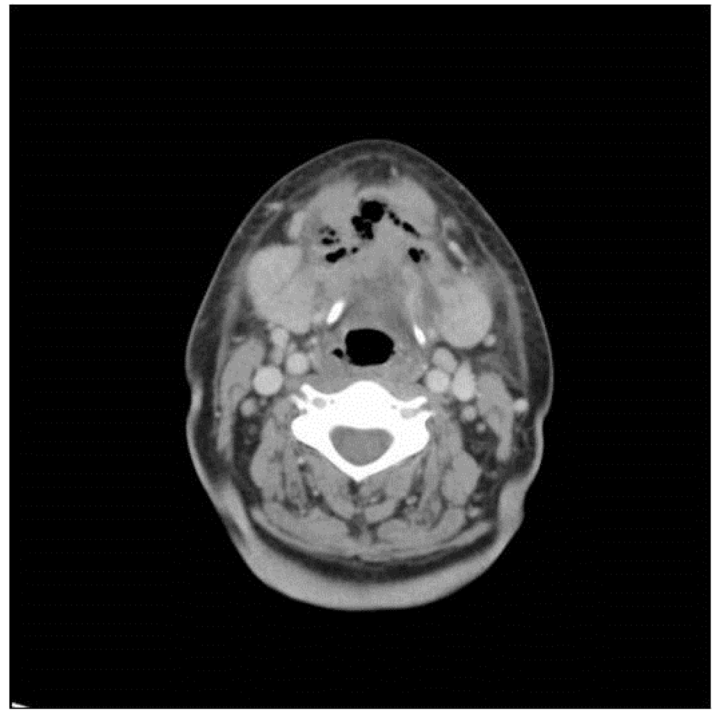


Figure 4. Perioperative image of necrotizing fasciitis case

Table 1. Comorbid diseases of patients.

No	Age/ Gender	Diagnoses	Need for Tracheostomy	Antibiotic Treatment	Hospitalization Time (day)	Co-morbidity	Anesthesia Type
1	67/M	Peritonsillar Abscess	N	Ampisilin-sulbactam	4	HT * DM * RA * HL*	Local
2	69/M	Peritonsillar Abscess	N	Ampisilin-sulbactam	5	HT DM	Local
3	77/F	Peritonsillar Abscess	N	Ampisilin-sulbactam	5	HT DM	Local
4	67/F	Necrotizing Fasciitis	Y	Penicilline Clindamycine	17-ex	HT DM CCHF	General
5	84/F	Parapharyngeal Abscess	N	Ampisilin-sulbactam Metranidazole	7	SLE	General
6	74/M	Necrotizing Fasciitis	Y	Penicilline Clindamycine	2-ex	RA DM	General
7	66/M	Peritonsillar Abscess	N	Ampisilin-sulbactam	6	DM	Local
8	73/M	Parapharyngeal Abscess	N	Ampisilin-sulbactam Metranidazole	6	HT DM	General
9	91/M	Peritonsillar Abscess	N	Ampisilin-sulbactam	7	CT	Local
10	82/F	Retropharyngeal Abscess	Y	Ampisilin-sulbactam Metranidazole	7-ex	CT HT	General
11	67/F	Retropharyngeal Abscess	N	Ampisilin-sulbactam Metranidazole	7	DM	General
12	70/M	Necrotizing Fasciitis	Y	Penicilline Clindamycine	28	DM HT CCHF	General
13	71/F	Peritonsillar Abscess	N	Ampisilin-sulbactam	7	DM	Local
14	68/M	Peritonsillar Abscess	N	Erytromycin	7	HT HL	Local
15	74/M	Parapharyngeal Abscess	N	Ampisilin-sulbactam Metranidazole	5	HT HL	General
16	73/M	Peritonsillar Abscess	N	Ampisilin-sulbactam	5	DM HL	Local
17	65/M	Parapharyngeal Abscess	Y	Ampisilin-sulbactam Metranidazole	14	DM HT	General
18	70/F	Peritonsillar Abscess	N	Ampisilin- sulbactam	5	DM HL	Local

HT: Hypertension DM: Diabetes Mellitus RA: Rheumatic Arthritis HL: Hyperlipidemia CCHF: Chronic Congestive Heart Failure SLE: Systemic Lupus Erythematosus CT: Chemotherapy

Discussion

The average life expectancy is increasing worldwide. While the proportion of people aged 65 and over, defined as old, is 1% in the 1900s in the world, it is estimated to be 20% in 2050 [5].

With aging, the immune system begins to respond more slowly and poorly to the antigens it encounters, and the body's resistance to infectious diseases decreases. Organ function disorders such as Diabetes mellitus, atherosclerosis, prostatic hypertrophy, degenerative joint diseases, dementia, chronic lung, and heart diseases that occur in older ages cause microorganisms to enter the body more easily. They can be the focus of infection in prostheses placed in areas such as heart and joints. Decreased food absorption from the intestines, stool, and urinary incontinence, pressure sores developing in bedridden patients are other factors that facilitate the development of infection in the elderly. While the susceptibility to infections increases in the elderly, the typical signs and symptoms of infectious diseases may not be seen in older ages. Fever response is poor in the elderly and may not increase even in the event of a serious infection. Complaints such as weakness, loss of appetite, confusion, incontinence, tachypnea, tachycardia, or weakness may be the only indication of an infectious disease. Typical symptoms and complaints of other health problems in the elderly can lead to confusion of infections with other diseases. Elderly people with dementia may not be able to express their complaints correctly [6-9].

Deep neck infections are infections that start in potential cavities in the neck and can quickly turn into abscess formation if left untreated. In cases where early diagnosis or insufficient treatment is applied, deep neck infections cause serious complications due to their neighborhood to vital structures [10].

Deep neck infections are infections that affect all age groups, have difficulties in diagnosis due to differences in the location, and have a high complication rate. They develop most often due to upper respiratory infections, and then odontogenic causes [11]. Congenital cyst and fistula infections, cutting, piercing foreign bodies, or iatrogenic causes such as endoscopy, dental injections may also develop as a result of intravenous injections applied to the neck region in drug addicts [12]. Although deep neck infection is seen at any age, retropharyngeal abscesses are more common in pediatric age groups [13]. In our study, 2 patients over 65 years old had a retropharyngeal abscess and one patient died due to sepsis. Both patients had poor oral hygiene as well as comorbid diseases.

In physical examination, especially the oropharynx and teeth are important for the detection of etiology, and the larynx examination is important for the follow-up of complications. In patients with deep neck infections, symptoms such as sore throat, neck swelling, difficulty swallowing, restricted neck movements, and trismus are common in addition to general signs of infection such as weakness, anorexia, and fever [14].

Contrasted CT is the most preferred imaging method. CT is useful in distinguishing cellulite with abscess and determining surgical indications [15]. Ungkanont reported the three regions where deep neck infection was most common, as the peritonsillar, retropharyngeal, and submandibular region, respectively [16]. In

our study, the first three rows are peritonsillar, parapharyngeal, and submandibular regions (necrotizing fasciitis).

In the treatment of deep neck infection, parenteral antibiotic therapy and drainage are essential. Resistance development and anaerobic factors must be taken into consideration. Empirical treatment should be changed according to the culture when necessary. Parenteral antibiotic treatment was started empirically for all our patients. As an empirical treatment, ampicillin-sulbactam group antibiotics are mostly our first choice. Nevertheless, we requested a consultation for the treatment regimen from the clinic of infectious diseases for all patients.

Surgical incision and drainage are made according to the location of the abscess. If the abscess is certainly detected, the treatment is drainage firstly. Some authors advocate the benefit of needle aspiration and antibiotic therapy [11]. In this study, 9 patients underwent open surgery under general anesthesia, and 9 patients, especially peritonsillar abscesses, underwent incisional drainage and/or needle aspiration with local anesthesia.

The main complications are sepsis and respiratory obstruction [17]. During treatment, five patients developed respiratory distress and five patients underwent a tracheotomy. Three of the patients died due to sepsis. Full recovery was observed in the follow-up of other patients.

As a result, deep neck infections most commonly arise from a nearby infectious focus. Clinicians should be aware of these infections and not underestimate their potential to cause life-threatening complications. Knowledge of the anatomical compartments and spaces of the neck is essential for understanding the pathogenesis, clinical manifestations, and potential routes of spread of infections. Deep neck space infections are typically polymicrobial in origin. The most common organisms isolated from deep neck space infections are *S. viridans*. Computed tomography is the imaging modality of choice for the diagnosis of deep neck space infections. MRI might be an alternative for the diagnosis of deep neck infection, but this imaging is more time consuming and not readily available everywhere. The treatment of deep neck infections includes appropriate antibiotics based upon the likely microbiology of the infection along with drainage of the collection, if present, via either aspiration or surgical drainage [18].

The diagnosis and management of deep neck infections are done with an interprofessional team that includes an anesthesiologist, infectious disease consultant, head-neck surgeon, radiologist, if necessary thoracic surgeon, and an intensivist. Deep neck infections have the potential to cause many complications that can be life-threatening, hence prompt treatment is necessary. The prognosis depends on the age of the patient, the severity of the infection, immune status, response to antibiotics, and other comorbidities [19].

Conclusion

Despite all the improvements in diagnosis and treatment, deep neck infections remain an important problem. The reduction of complications depends on the effective and sufficient duration of

treatment in the early period. Especially in the geriatric population, comorbid diseases can accompany deep neck infections more aggressively.

As a result, the increase in the elderly population will cause some new problems in terms of infectious diseases and increase the existing problems. We concluded that our study as presenting diagnosis of deep neck infection, underlying diseases, and treatment planning in geriatric patients, will be useful for presenting data to literature.

Conflict of interests

The authors declare that they have no competing interests.

Financial Disclosure

The financial support no have.

Ethical approval

This retrospective study was approved ethically appropriate by Afyonkarahisar Health Sciences University Ethics Committee. No: 2017-KAEK-1.

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