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Original Research Article

Current scenario of suppurative head and neck infections in patients of tertiary care centre in COVID era

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ABSTRACT

Background: In the COVID era, when self treatment and social media treatment gained popularity, diagnosis of suppurative infections was delayed and rampant misuse of antibiotics significantly increased. Hence this study is necessary to enlighten the current trend of organisms causing suppurative head and neck infections and their presentation.
Methods: Prospective observational study in 110 patients with suppurative head and neck infections who came to Department of Otorhinolaryngology and Head And Neck Surgery of NSCB Medical College, Jabalpur within a period of 18 months ie from March 2020 to August 2021.After detailed clinical examination, under strict aseptic precautions, sample was collected and sent for investigations.
Results: Of 110 patients, 75 were male and 35 were female, maximum in their fourth to fifth decade of life. Diabetes the most common risk factor. The commonest symptom of presentation was swelling, being maximum in submandibular area. Odontogenic the most common etiology. Submental and submandibular space infections presenting as Ludwig's Angina is the commonest space infection. Prior antibiotic history before visit to our hospital seen in 61.8%, still only 22.8% were sterile.61.8% showed bacterial growth,10.9% fungal and 4.5% tubercular. Psuedomonas aeruginosa was most commonly isolated with site predilection to oral cavity followed by E. coli.
Conclusions: Public education about head and neck infections, oral hygiene, non-communicable diseases should be implemented as step of primordial prevention. Culture specific antibiotic therapy for the correct amount of time should be mainstay of treatment. Prescription by a registered medical practitioner must be made mandatory for providing antibiotics to any layman to reduce the rampant overuse and misuse of antibiotics

Keywords: Suppurative, Infections, COVID, Odontogenic, Pseudomonas, Antibiotics

INTRODUCTION

Our human body is a habitat that supports microorganisms that by far exceed the number of its own cells. These bacteria can also be necessary for the survival of the host body, although if given the opportunity to leave their ecological niche, their presence may result in disease. Some of these may be beneficial, or harmless, or some can cause opportunistic infections in host organisms that are particularly susceptible, due to overall poor health, extremes of age, or constitutional or iatrogenic immunosuppression.[1]

Infections of the head and neck carry a significant risk of morbidity and mortality due to its potential for involvement of major neurovascular structures, spread to the central nervous system or compromise of the upper airway. Infections originating in deeper structures can be severe, rapidly progressive and may cause prolonged morbidity as well as potentially endanger life. They

present with a wide variety of symptomatology ranging from vague throat pain to severe respiratory compromise and dysphagia1. Hence the treating surgeon should have a high index of suspicion in making the diagnosis of deep neck space infections. Early identification of these infections and treatment is important as progression to complications or death can be rapid.[2]

The etiology of deep neck infections varies depending on the space involved. In the pre-antibiotic era, 70% of deep neck space infections were caused by pharyngotonsillitis and 20% by odontogenic infection. Recent published data demonstrate that odontogenic infection is now the most common aetiological factor causing 31–49% of DNSIs. Diabetes mellitus is frequently cited as the most common associated systemic disease in many studies.[3,4] Pain is the pre-eminent symptom in most patients. Pain is usually focused at the neck space harbouring the infection, but can also be referred to the ear, cause odynophagia, trismus or torticollis. Other symptoms caused will depend on the site of infection but include dysphonia, dysphagia, sialorrhoea or cough. The most common clinical signs include swelling in the neck, pyrexia and trismus.

Every patient should be given initial empiric antibiotic therapy until culture and sensitivity results are available. The therapy should be effective against the commonly involved aerobic and anaerobic bacteria and, once the results of the culture and sensitivity tests are available the adequate antibiotic therapy can be started accordingly.

Antimicrobial resistance is an issue of growing public health concern that threatens many common infections either difficult-to-treat or completely untreatable. Infections with resistant bacteria are associated with poor clinical outcomes like increased mortality, hospital stay and healthcare costs. Emergence of antibiotic resistance is contributed by the widespread availability of all antibiotics across-the-counter and by their rampant overuse and inadequate doses.[1] The rise of resistant organisms has been recognized as a major healthcare challenge on a national and international level and the World Health.

Aims

To evaluate the presentation and bacteriology of suppurative head and neck lesions in patients of tertiary care centre in covid era.

METHODS

Study type

This is a prospective observational study.

Study place and period

The study was done in 110 patients with suppurative head and neck infections who came to the Department of Otorhinolaryngology and Head And Neck Surgery of NSCB Medical College, Jabalpur from March 2020 to August 2021.

Inclusion criteria

Patients presented with suppurative head and neck infections.

Exclusion criteria

Patients whose consent not available.

Procedure

After taking written informed consent, patients underwent a thorough history taking and comprehensive ear, nose, throat and neck examination. The affected and surrounding area was cleaned with spirit and betadine. Once dry, under strict aseptic precautions, sample was collected by using wide bore needle. If necessary incision and drainage was done and then sample sent for culture and sensitivity, AFB staining, Gram staining, CBNAAT and Mantoux test. Radiological and pathological (FNAC/HPR) investigations were done if indicated. Patients were given initial empirical therapy with piperacillin + tazobactum / ceftriaxone, ciprofloxacin and/or metronidazole/clindamycin.

Ethical approval

Institutional Ethics Committee approved.

Statistical analysis

The data of the present study was fed into the computer and after its proper validation, checked for error, coding and decoding compiled and analysed with the help of Statistical package for social sciences (SPSS) 20 software for windows.

RESULTS

In the present study of 110 patients, the youngest was 3 years old and oldest was 79 years with mean age 35.85±19.23, maximum seen in their fourth to fifth decade of life.

Prior antibiotic history before sample collection or before visit to our hospital was seen in 61.8% (68) patients of our study.[5]

The commonest symptom of presentation was swelling (62 patients), followed by ear discharge (42 patients), dental pain (40 patients), nasal obstruction (29 patients), dysphagia and fever (25), odynophagia (24 patients), sorethroat (13) and restricted mouth opening (8 patients).

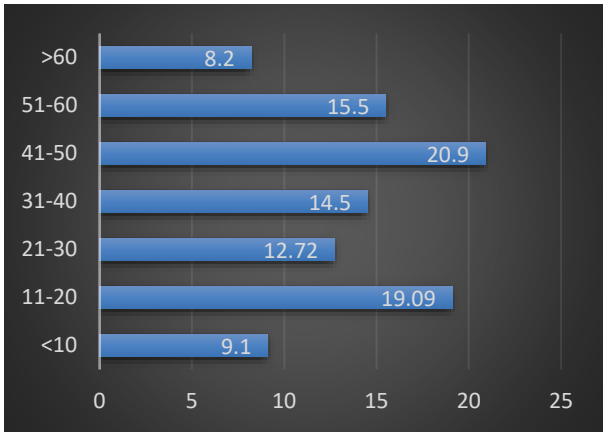

Figure 1: Age wise distribution.

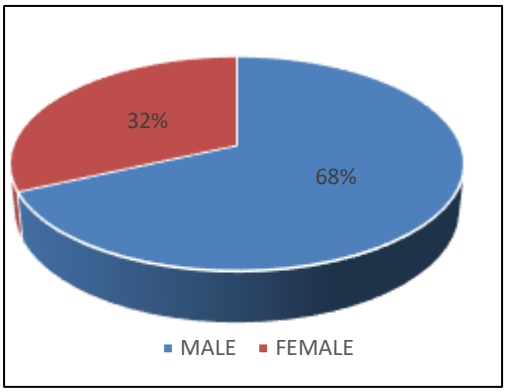

Figure 2: Sex distribution.

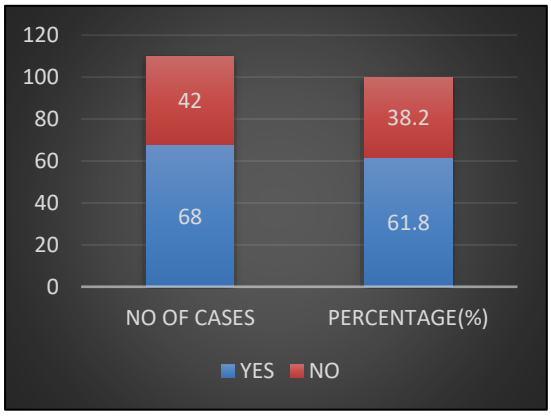

Figure 3: Prior antibiotic.

On clinical evaluation, 62% showed swelling followed by poor oral hygiene, caries tooth (39%), pus in oral cavity (37%) and halitosis (37%).

In the present study the most common organism isolated was Psuedomonas aeruginosa (21.8%), followed by E. coli (14.5). Third most common were Klebsiella and Staphylococcus aureus with 9.1% each. Others are proteus (2.7%) followed by Streptococcus anginosus and Acinetobacter 1.8% each. Least common was found to be enterococci species (0.9%). Culture was negative in 42 cases (38.2%).

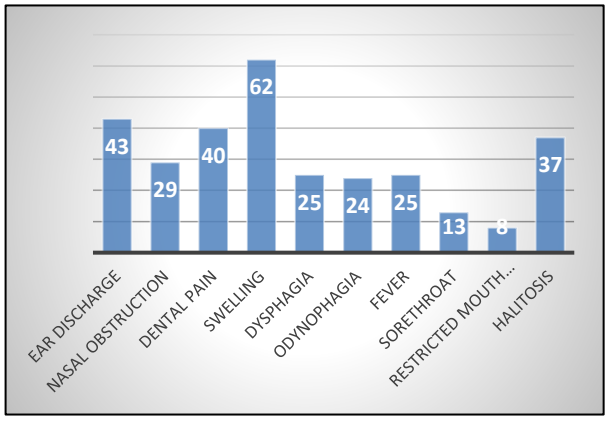

Figure 4: Presenting symptoms.

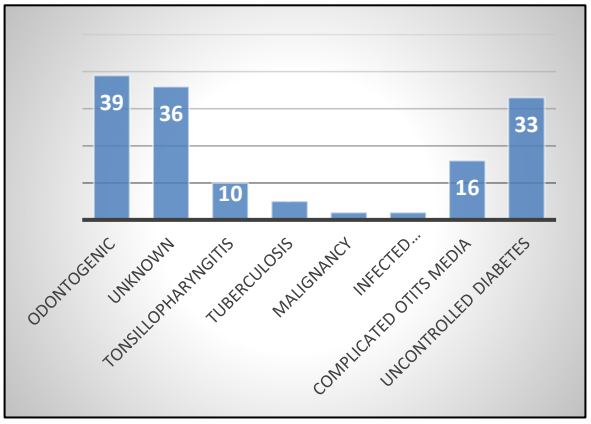

Figure 5: Aetiology and risk factors of infections.

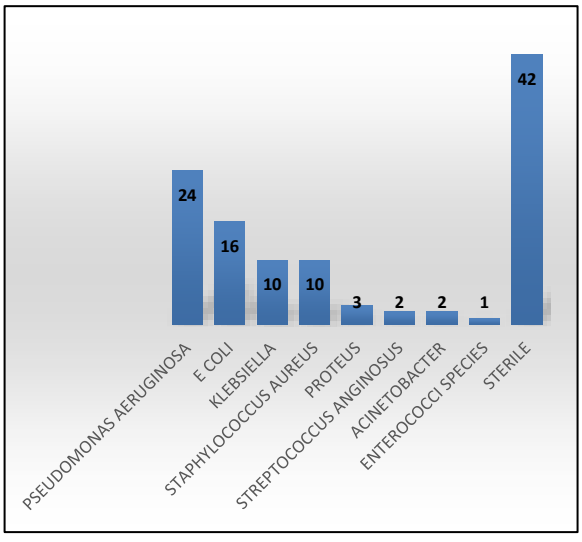

Figure 6: Organisms isolated.

The most common organism isolated in the present study Pseudomonas aeruginosa showed a site predilection to oral cavity.

Table 1: Organisms with the site of isolation.

Organisms	Ear/post auricular	Nasal cavity	Oral cavity	Neck	Face and cheek	Parotid	Submandibular
Pseudomonas aeruginosa	5	3	11	2	1	1	1
E. Coli	1	2	6	4	1	1	1
Klebsiella	2	0	4	0	1	2	1
Staphylococcus Aureus	2	0	4	2	2	0	0
Proteus	1	1	0	0	0	0	1
Streptococcus Anginosus	1	0	1	0	0	0	0
Acinetobacter	0	0	2	0	0	0	0
***Enterococci* Species**	0	0	0	1	0	0	0

Table 2: Comparison of organisms isolated in various studies with this study.

Study	Common Organisms Isolated
Lee[11]	*Klebsiella*
Agrawal et al [12]	*Staphylococcus* (37.6%), *Pseudomonas Aeruginosa* (32.8%), *Klebsiella* (4%), *Escherichia Coli* (3.2%)
Kumar[13]	*Klebsiella* (46%), *Staphylococcus* (15.3%), *Streptococcus* (15.3%), *MRSA* (7.6%), *Enterococcus* (7.6%)
Kumar[13]	*Sterile* (48%), *Streptococcus* (22%), *Staphylococcus* (17%), *Pseudomonas* (5%), *E. coli* (5%), *Klebseilla* (3%)
Present study	*Pseudomonas Aeruginosa* (21.8%), *E. coli* (14.5%), *Klesiella* (9.1%)

DISCUSSION

Age incidence

In the present study of 110 patients, the youngest was 3 years old and oldest was 79 years with mean age 35.85±19.23, maximum seen in their fourth to fifth decade of life.

Figure 7: 79 year old with necrotising fasciitis.

As per Jindal et al study, the maximum number of patients were in the age group of 40- 50 years and by Afshin Parhiscar, 50% of their patients were in their third or fourth decade of life. [5,6]

Sex distribution

In this present study there is a male preponderance i.e., 68.2% are males and 31.8% are females. Other studies consistent with this result are Dharambir et al, in which there is a male predominance and included 35 male patients (55%) and 29 female patients (45%).[7] Male patients were 63.33% and female patients were 36.66% in study by Santosh.[8] But females outnumbered males in the study conducted by Hunt which is not consitent with this study.[9]

Figure 8: Management of necrotising fasciitis done with flap reconstruction.

Clinical presentation

The commonest symptom of presentation was swelling (62 patients), followed by ear discharge (42 patients), dental pain (40 patients), nasal obstruction (29 patients), dysphagia and fever (25), odynophagia (24 patients), sorethroat (13) and restricted mouth opening (8 patients). 56 patients in the present study showed associated diseases with diabetes being the most common (34.5%). Others include hypertension, tubercular infection and malignancy.

Our study was consistent with Sethi et al studies which concluded neck pain, odynophagia and fever to be the common presenting complaints. In studies by Kamath et al neck swelling was the common finding followed by oropharyngeal abnormalities and fever.[8,10]

Clinical findings and etiology

On clinical evaluation, 62% showed swelling followed by poor oral hygiene, caries tooth (39%), pus in oral cavity (37%) and halitosis (37%). In study by Kamath et al neck swelling was the common finding followed by oropharyngeal abnormalities and fever.[10] The etiological evaluation revealed odontogenic as the most common etiology 35.4% (39). Others include idiopathic, complicated otitis media, tonsillopharyngitis, tubercular and infected lymphadenopathy. Malignacy (1.8%) and uncontrolled diabetes (30%) were found to be significant risk factors. But in the preantibiotic era, pharayngotonsillitis was the cause in 70% of deep neck infections, where as dental infections was the cause in only 20%.

Parhiscar et al have found dental infections as the commonest etiology in their studies. Decline in the role of pharyngotonsillitis can be attributed to the widespread use of antibiotics. These results showed positive correlation with our study.[6,7,8]

Anatomical location of the infections

Submental and submandibular space infections presenting as Ludwig's Angina is the commonest space infection in our study (34.5%), followed by submandibular abscess (10%) and peritonsillar abscess (9.09%). In studies by Kamath et al parapharyngeal space was the commonest space involved, whereas in our study, it was the second least common involved (1.81%) and bezold abscess the least common in our study.[6,8.] Therefore this finding is not in accordance with the present study.

As per Jindal et al study, patients with submandibular abscess were maximum (30%) followed by buccal (25%), diffuse neck abscess (22.5%), peritonsillar abscess (7.5%), parapharyngeal abscess (5%), parotid abscess (5%), submental abscess (2.5%) and retropharyngeal abscess (2.5%).[7] In a study by Rega et al, most commom abscess is in submandibular space (30%).These results are almost similar to the present study since the second most common location after ludwigs was isolated submandibular area. In a study by Prakash et al most common neck space abscess was peritonsillar (20%), submandibular (16%), diffuse neck abscess (14%), parotid (10%), parapharyngeal (8%), retropharyngeal (4%), submental (4%). This study is found to be contrary to the present study as peritonsillar is 9.09% in our study which is only the third most common.[5]

Diagnosis and management

Detailed proper history and clinical evaluation was the mainstay of diagnosis in our study. Needle aspiration was done in all cases and incision and drainage was done if indicated. The sample was then sent for pus culture and sensitivity. Radiological investigations specially Chest X-rays, X-rays soft tissue of neck lateral view helped to show any encroachment of airway to take a prompt action for securing airway. X-ray was done in all our cases. Ultrasound is a readily available investigating tool and is used in identifying deep seated abscess, multiple neck space infections and also volume of fluid/pus collected in the space involved.

In the covid era, when people feared to report to hospital as well as due to government restrictions/lockdown, patients of suppurative infections reported late to our hospital. So extensive spread of infections was significantly reported in our study. Rampant use of antibiotics was also seen. A 79 year old patient presented with necrotising fasciitis. After proper treatment with antibiotics and daily dressing, and healthy granulation tissue appeared on wound, skin grafting was done with the help of plastic surgeon. Hence multidisciplinary team can play an important role in improving quality of patients life.

Bacteriological study

It was revealed in this study that in spite of taking antibiotics prior to the collection of sample, only 22.8% cultures were sterile. This may be due to improper or inadequate use of antibiotics. In the covid period of time, when self treatment and social media treatment gained popularity, the rampant misuse of antibiotics significantly increased. Since use of antibiotics was common among people, even resistance to the used antibiotics can be the cause. History of prior antibiotic intake was reported in 61.8% cases of our study. Hence this study helped to enlighten the current trend of organisms causing suppurative head and neck infections and their diagnosis at the earliest.

It was seen that in the last decade, there was a trend of gram positive organisms mostly isolated from cultures (Table 2). In the present study, theres a significant change in the pattern with gram negative organisms paved a new path.

In this study Psuedomonas aeruginosa was the commonest organism isolated (21.8%), followed by E. coli (14.5). Third most common were Klebsiella and Staphylococcus aureus with 9.1% each. These organisms commonly inhabits human skin, sometimes part of the gut flora. When they are given the opportunity to leave their normal ecological niche like in immune-compromised, their presence result in disease. Others are proteus (2.7%) followed by Streptococcus anginosus and Acinetobacter 1.8% each. Proteus and Acinetobacter are also part of normal human flora. Streptococcus are so contagious in nature that they can spread by droplet infection, contaminated food or even we can transfer it from surface to nose, mouth etc. Least common was found to be enterococci species (0.9%).

The most common organism isolated Pseudomonas showed a site predilection to oral cavity. Out of the total 24 positive Pseudomonas cultures, were from the oral cavity.[11] Considering site wise distribution in our study, it was seen that ear and post auricular area also showed maximum organism isolated as Pseudomonas aeroginosa. The suppurative infections of the neck isolates showed E. coli as the most common organism. The suppurative parotid space infections showed maximum growth with Klebsiella. These findings are showing a trend of increased gram negative isolates. Studies by Sethi showed isolation of gram negative organisms like Klebsiella and Pseudomonas as the most common. The present study showed almost similar results with DS Sethi's study, were gram negative organisms are predominant. In our study 48.1% of the isolates were gram negative bacilli.[6]

In our study we have used Piperacillin and Tazobactum/Ceftriaxone and Ciprofloxacin regimen as mainstay in most of cases with good results supported by culture and sensitivity reports. The regimen also included metronidazole/clindamycin for anaerobic coverage if necessary after evaluating clinically. This observation was supported by Balaji Study (2009-2010).

Few studies have isolated anaerobes in deep neck infections. In a study by Anthony et al 58 anaerobes were isolated in 35% and aerobes in 65%. The commonest anaerobe was prevotella and aerobe was streptococcus viridans.

Limitation of study

Due to unavailability of the facilities in our settings of study, anaerobic culture was not done.

CONCLUSION

Suppurative head and neck infections are encountered commonly in our clinical practice. Public education about head and neck infections, oral hygiene, non-communicable diseases should be implemented as step of primordial prevention and so early diagnosis can be made easier. Clinical evaluation and management of deep neck space infections should be done at the earliest which can thereby led to decrease in complications and hence morbidity and mortality. Culture specific antibiotic therapy for the correct amount of time should be mainstay of treatment and to prevent extensive disease/abscess formation. Multidisciplinary team can play an important role in management of extensive disease. Prescription by a registered medical practitioner must be made mandatory for providing antibiotics to any layman to reduce the rampant overuse and misuse of antibiotics.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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