A Study of Anaerobic Infections and Sensitivity Pattern in Neck Abscess at Tertiary Hospital

Prakash BG[1], Sowmya D[2], Rajendra Prasad J[3]

ABSTRACT

Inroduction: Infections caused by anaerobic bacteria are common and may be serious and life threatening, requires immediate attention and management to get best out come. Objective of the study was to demonstrate the causative micro organisms, incidence of anaerobic organisms in neck abscess in neck abscess and to study the sensitivity pattern of the isolated micro-organisms to antimicrobial agents.

Material and methods: Descriptive analysis of 50 diagnosed patients of neck infections Based on incision and drainage for superficial neck space infections, aspiration of pus from deep neck space from october 2012 to august 2014

Results: The most common neck space infections are ludwings angina followed by peritonsillar abscess, incidence of aerobic growth is 64% anerobic growth 22% and no growth 14%. Predominant aerobes are alfa hemolytic streptococcus, staph aureus and anerobes are peptostreptococcus, porphyromonas. Aerobic organism showed sensitivity to linezolid, ciprofloxicin, clindamycin and anerobic showed sensitivity mainly to metronidazole, clindamycin.

Conclusion: Bacterilogical examination and culture of neck abscess helps to identify the causative organisms in neck abscess. It helps to isolate even the rarest of the organism and by knowing their sensitivity pattern we can direct specific therapy against them. It thus helps in a more effective treatment and fast recovery of patients

Keywords: Neck abscess, Ludwings angina Alfa hemolytic streptococci, Peptostreptococcus, linezolid, clindamycin, metronidazole

INTRODUCTION

"Pus in the neck calls for the surgeon's best judgement, his best skill and often for all his courage"-Mosher. Deep neck space infections pose various challenges to the treating surgeon. These infections may rapidly spread in hours and can cause fatal respiratory obstruction. Various spaces may intercommunicate facilitating the spread of infection. The abscess lies deep in the neck and in close proximity to the neurovascular structures, mediastinum and skull base.[1]

Infections caused by anaerobic bacteria are common and may be serious and life threatening. Anaerobes predominate in the bacterial flora of normal human skin and mucous membranes, and are a common cause of bacterial infection of endogenous origin. They predominate in deep oral and neck infections and abscess. Because of their fastidious nature they are difficult to isolate and are often overlooked. In addition to their direct pathogenicity in these infections, they possess an indirect role through their ability to produce the enzyme beta-lactamase. Thus they are capable of shielding non betalactamase producing bacteria from penicillins. Failure to direct therapy against these organisms often leads to clinical failures.[2]

Their isolation requires appropriate methods of collection, transportation and cultivation of specimens. Treatment of anaerobic bacterial infection is complicated by, slow growth of these organisms which makes diagnosis in laboratory only after several days and by growing resistance of anaerobic bacteria to antimicrobial agents. They are typically polymicrobial, more than anaerobe being responsible besides aerobic bacteria.[3]

While the infection is usually localised, general dissemination may occur by bacteremia. Pus produced by anaerobes is characteristically putrid, with a pervasive, nauseating odour. Pronounced cellulitis is a common feature of anaerobic wound infections. Patients at risk of neck abscess include-immuno compromised patients, HIV, chemotherapy, diabetes, malnutrition.[3]

In the pre-antibiotic area, tonsillitis and pharyngitis accounted for 70% of cases and often affected the lateral pharyngeal space (parapharyngeal space). Odontogenic causes-this is presently the most common cause**,** Salivary gland infections**,** URTI**,** Trauma**,** foreign body**,** Instrumentation**,** spread of infection from other areas**,** Previously undiagnosed congenital deformities**,** Pott's disease**,** Retropharyngeal lymphadenitis**,** Cervical lymphadenitis**,** Peritonsillar abscess/cellulitis**,** intravenous or subcutaneous drug abuse**,** Unknown causes-20% of cases**.** Mixed flora of aerobes and anaerobes are encountered in neck abscess. Common anaerobes include *B.melaninogenicus, Peptostreptococcus, Eikenellacorrodens and Fusobacterium*.

Study was aimed with the objective to demonstrate the causative micro organisms, incidence of anaerobic organisms in neck abscess in neck abscess and to study the sensitivity pattern of the isolated micro-organisms to antimicrobial agents.

MATERIAL AND METHODS

Patients presenting with neck abscess were selected from ENT Outpatient department and admitted cases in the wards in JSS Medical College and Hospital, Mysore between 1st October 2012 and 31st August, 2014. Data was collected only from the patients who gave consent for the study. Data was collected in a pretested proforma meeting the objective of the study. 50 patients were selected from purposive sampling method. The study was a prospective cohort study. Both males and female patients presenting with neck abscess were included**:** Cases due to tubercular origin and Age group lesser than 2 years and more

[1]Professor, [2]ENT Surgeon, [3]PG Student, JSS Medical College and Hospital, Mysuru, India

Corresponding author: Dr Prakash Bg, 1042/4, Chamundimahal, Suguna Marga, Siiddarth Layout, Mysuru -11, Karnataka, India

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than 60 years are excluded

Method of collection of data (including sampling procedures):

For superficial neck space infections-incision and drainage is performed and pus is collected for culture and sensitivity in anaerobic culture test tubes (having thioglycollate medium). For deep neck space infections-using syringe pus is collected and then sent for culture and sensitivity. Culture medium for aerobic and anaerobic bacteria is Mac Conkey medium (Figure–2) and blood agar (Figure–1)

STATISTICAL ANALYSIS

Contingency co-effecient analysis, Chi square test and descriptive statistics were used to infer results using SPSS for windows (version 20).

RESULTS

The subjects comprised a total of 50 patients presenting with neck abscess who came to the ENT OPD or where admitted to the ENT ward. Out of 50 patients there were 33 males and 17 females in the age group of 2 to 60 years.

Aerobic growth was found in 32 cases, anaerobic growth in 11 cases and no growth in 7 cases.

Out of 50 subjects, 11 cases were ludwigs angina, 10 were peritonsillar abscess, 8 were submandibular abscess, 7 were diffuse neck abscess, 5 were parotid abscess, 4 were parapharyngeal abscess, 2 cases each of retropharyngeal abscess and submental abscess and 1 case of posterior triangle abscess. (Table–1)

There is a strong association between Ludwigs angina and odontogenic cause as 10 out of 11 (Graph–2) cases of Ludwigs angina are odontogenic in origin. All the cases improved after dental extraction. Diabetes mellitus is an important predisposing factors in all the cases of neck abscess.

Out of a total of 11 cases of Ludwigs angina (Graph-3), aerobes were present in 8 cases and anaerobes in 3 cases. The most common aerobic organism isolated in Ludwigs angina is Staphylococcus aureus and Coagulase negative Staphylococcus aureus accounting for 18.2% each followed by N*on Haemolytic Streptococci, Alphahaemolytic Streptococci, Escherichia coli and Enterobacter cloacae* each accounting for 9.1%. No aerobic growth was observed in 27.3% cases. The most common anaerobic organism observed *in Ludwigs angina is Peptococcus, Porphyromonas and Eubacterium* each of 9.1% and no anaerobic growth was observed in 72.7%.

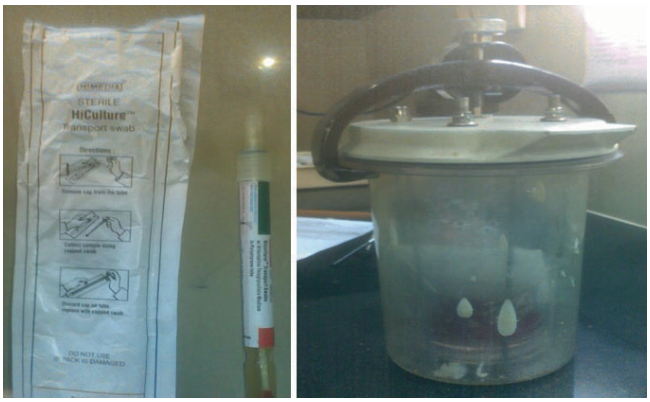
Out of 10 cases of Peritonsillar abscess, aerobic growth was observed in 6 cases, anaerobic growth was observed in 2 cases and no growth was observed in 2 cases.

The most common aerobic organism isolated in Peritonsillar

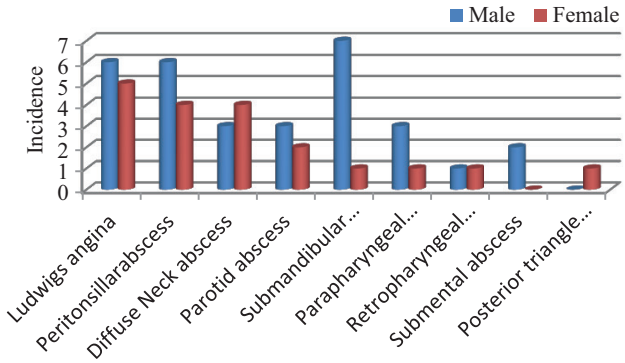
Diag	Sex		Total
	M	F	
Ludwigs angina	6	5	11
Peritonsillar abscess	6	4	10
Diffuse Neck abscess	3	4	7
Parotid abscess	3	2	5
Submandibular abscess	7	1	8
Parapharyngeal abscess	3	1	4
Retropharyngeal abscess	1	1	2
Submental abscess	2	0	2
Posterior triangle abscess	0	1	1
Total	31	19	50

Table-1: Incidence of neck abscess

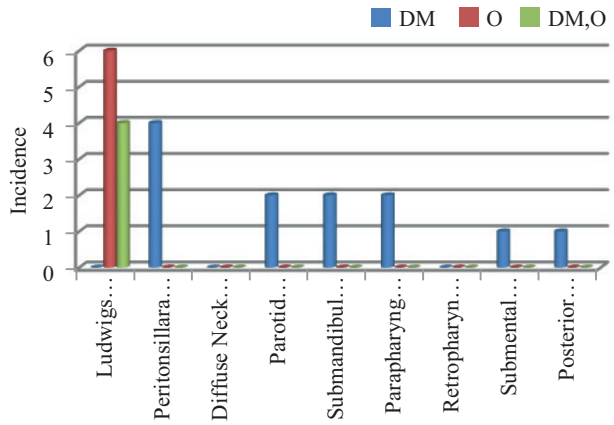
Figure–1: Blood agar *S pyogenes* showing beta hemolysis; **Figure–2:** Mac Conkey Medium



Figure–3: Sterile swab for collection; **Figure–4:** Anaerobic jar



Graph–1: incidence of neck abscess



Graph–2: incidence of neck abscess in DM and dental pathology

abscess (Graph–4) is *Alpha haemolytic Streptococci* accounting for 30% of cases, followed by *Non haemolytic Streptococci, Klebsiella and Niesseria* each accounting for 10% of cases. No aerobic growth was observed in 40% of cases.

The most common anaerobic organism isolated in peritonsillar abscess is *Peptostreptococcus* and a combination of *Peptostreptococcus* and *Bacteroides* each mounting to 10%. No anaerobic growth was observed in 80% of cases

From Diffuse neck abscess (Graph–5) only aerobes were isolated.A total of 7 aerobes were isolated. No anaerobes were present. Among the aerobes, *Staphylococcus aureus* was present in 42.9% of cases. Coagulase negative Staphylococcus aureus was responsible for 28.6% of infections. *Actinobacter boumani and Klebsiella* was isolated in 14.3% of infections.

Out of a total of 5 cases of parotid abscess (Graph–6), aerobes were isolated in 1 case and anaerobes were present in 2 cases. No growth was observed in 3 cases.

The aerobe isolated was *Alpha Haemolytic Streptococci* responsible for 20% of aerobic growth, no aerobic growth was observed in 80% of cases. Among the anaerobes, *Peptostreptococcus* was isolated in 20% of cases and *Porphyromonas* was isolated in another 20% of cases. No anaerobic growth was observed in 60% of infections.

Out of 8 cases of Submandibular abscess, 5 were aerobes and 3 were anaerobes. Out of aerobic growth, 25% were *Coagulase negative Staphylococcus aureus, Alpha haemolytic Streptococci, Staphylococcus aureus and Klebsiella* were present in 12.5% of cases each and no aerobic growth was observed in 37.5% of cases.

Out of anaerobes, *Peptostreptococcus* was present in 25% of cases, *Peptococcus* with *Proprionobacterium* was present in 12.5%, no anaerobic growth was observed in 62.5%

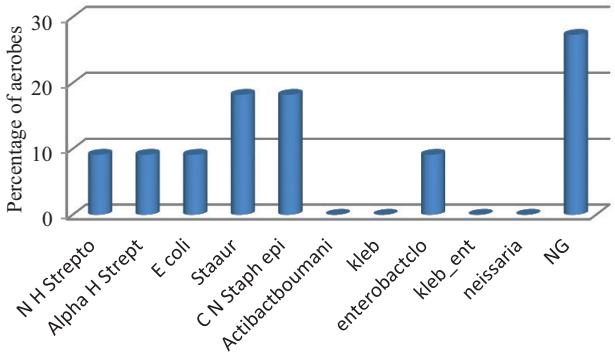
Out of 4 cases of Parapharyngeal abscess (Graph–7), 2 were aerobes, 1 was anaerobe and no growth was obtained in 1 case. Among aerobes, *Nonhaemolytic Streptococci* was isolated in 25% of cases, *Klebsiella pneumoniae* was isolated in 25% of cases, no growth was obtained in 50% cases. Among anaerobes, *Eubacterium* with *Peptostreptococcus* was present in 25% cases and no anaerobic growth was observed in 75% cases

Out of 2 cases of Retropharyngeal abscess, aerobes was present in 1 case and no growth obtained in 1 case. Among aerobes, *Klebsiella pneumoniae* was observed in 50% of cases and no aerobic growth was observed in the other 50% of cases. Anaerobes was absent in 100% of cases.

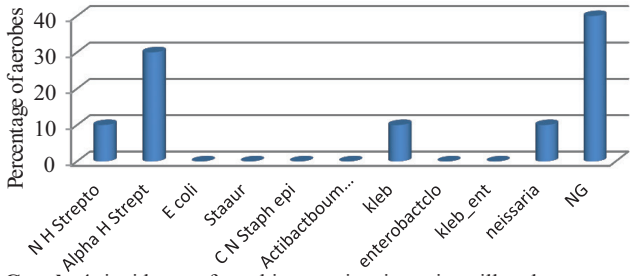
Of the 2 cases of Submental abscess, aerobes were present in 2 cases. There was no anaerobic growth. Among aerobes, *Non-haemolytic Streptococci* was present in 50% of cases and *Klesiella* with *Enterobacter* cloacae was present in another 50% of cases.

There was only 1 case of posterior triangle abscess and no growth was observed both for aerobic and anaerobic organisms Penicillin showed a sensitivity of 100% sensitivity to *Escherichia coli, Klebsiella with Enterobacter cloacae, to Neisseria* and showed resistance to all other organisms. Oxacillin showed a sensitivity of 16.7% to *Staphylococcus aureus* and a sensitivity of 33.3% to Coagulase negative *Staphylococcus aureus* and showed resistance to all other organisms. P value is 0.000, thus it was statistically significant.

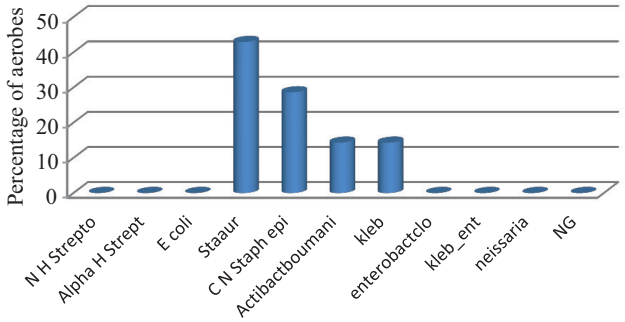
Erythromycin showed a sensitivity of 75% *to Non Haemolytic Streptococci,* 50% sensitivity to *Alpha Haemolytic Sterptococci,* 100% sensitivity to *Escherichia Coli, sensitivity of 16.7% to Staphylococcus aureus,* sensitivity of 50%to Coagulase



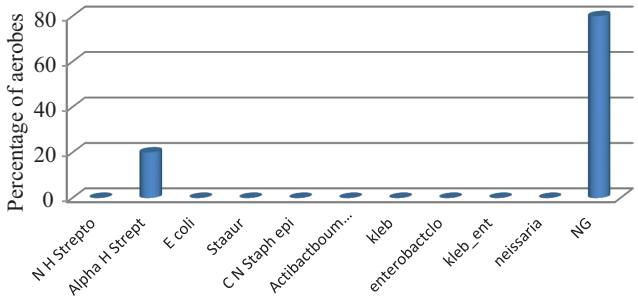
Graph–3: incidence of aerobes in ludwings angina



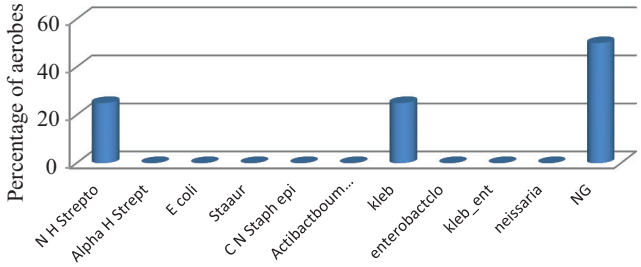
Graph–4: incidence of aerobic organism in peritonsillar abscess



Graph–5: Incidence of aerobes in diffuse neck abscess



Graph–6: Incidence of pathogen in parotid abscess



Graph–7: Incidence of aerobes in parapharyngeal abscess

negative *Staphylococcus aureus* and showed resistance to other organisms.

Linezolid showed a sensitivity of 100% *to Non Haemolytic Streptococci,* a sensitivity of 100% to *Alpha Haemolytic Streptococci,* sensitivity of 100% to *Escherichia Coli*, sensitivity of 83.3% to *Staphylococcus aureus*, a sensitivity of 100% to Coagulase negative *Staphylococcus aureus* and showed resistance to other aerobic organisms. P value is 0.000, thus it is statistically significant.

Ciprofloxacin (Graph–8) showed a sensitivity of 25% to Non *Haemolytic Streptococci,* a sensitivity of 16.7% to *Alpha Haemolytic Streptococci*, a sensitivity of 100% to *Escherichia Coli, a* sensitivity of 16.7% *to Staphylococcus aureus*, a sensitivity of 50% to Coagulase negative *Staphylococcus aureus*, a sensitivity of 80% to *Klebsiella pneumoniae* and showed resistance to other arerobic organisms.

Gentamycin showed a sensitivity of 75% to *Non haemolytic Streptococci*, a sensitivity of 66.7% to *Alpha haemolytic Streptococci*, 100% sensitivity to Escherichia coli, 50% sensitivity to *Staphylococcus aureus*, 66.7% sensitivity to Coagulase negative *Staphylococcus aureus*, 80% sensitivity to *Klebsiella pneumoniae*, 100% sensitivity to *Klebsiella* with *Enterobacter*.

It showed resistance to other aerobic organisms. P value is 0.013, thus it is statistically significant.

Cephalosporins (Graph–9) showed a sensitivity of 75% to *Non haemolytic Streptococci*, 100% sensitivity to *Escherichia coli*, a sensitivity of 16.7% to *Staphylococcus aureus*, a sensitivity of 33.3% to Coagulase negative *Staphylococcus aureus*, a sensitivity of 40% to *Klebsiella pneumoniae*, sensitivity of 100% to *Klebsiella* with *Enterobacter* cloacae.

Levofloxacin showed a sensitivity of 50% to Coagulase negative *Staphylococcus aureus* and a sensitivity of 100% to *Klebsiella* with *Enterobacter cloacae*. P value is 0.001, thus it is statistically significant

All the aerobic organisms showed zero percent sensitivity to Metronidazole and to Kanamycin. Clindamycin showed a sensitivity of 50% to *Non haemolytic Streptococci*, a sensitivity of 66.7% to *Alpha haemolytic Streptococci*, a sensitivity of 50% to *Staphylococcus aureus*, a sensitivity of 100 % to Coagulase negative *Staphylococcus aureus.*

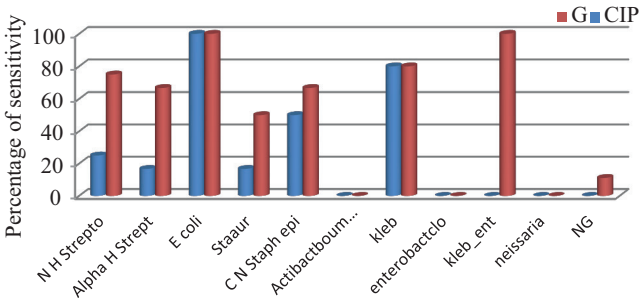
It showed resistance to other organisms. Colistin showed a sensitivity of 100% to *Escherichia coli*, a sensitivity of 100% to *Actinobacter boumani*, a sensitivity of 20% to *Klebsiella pneumoniae*, a sensitivity of 100% to *Enterobacter cloacae* and *Klebsiella pneumoniae*. It showed resistance to other organisms.

Vancomycin showed a sensitivity of 25% to *Nonhaemolytic Streptococci*, a sensitivity of 50% to *Staphylococcus aureus*, a sensitivity of 83.3% to Coagulase negative *Staphylococcus aureus*.

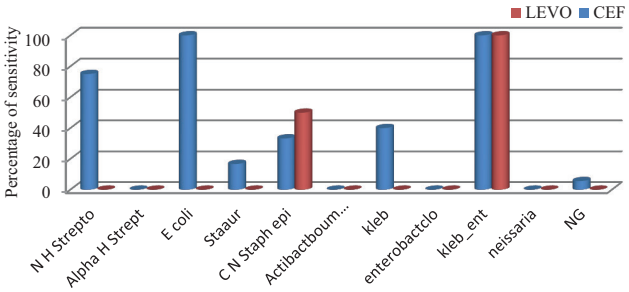
It showed resistance to other organisms. P value is 0.048, thus it is statistically significant.

Imipenam showed a sensitivity of 25% to *Nonhaemolytic Streptococci, 100% sensitivity to Escherichia coli,* 100% sensitivity to *Klebsiella pneumoniae*, 100% sensitivity to *Enterobacter cloacae* and 100 sensitivity to *Klebsiella* with *Enterobacter* cloacae. It showed resistance to other organisms.

Piperacillin showed a sensitivity of 100% to Escherichia coli and a sensitivity of 60% to *Klebsiellapneumoniae*.



Graph–8: sesnsitivity pattern of various bacteria to ciprofloxacilin and gentamycin



Graph–9: sensitivity pattern of aerobic organisms.

It showed resistance to all other organisms. P value is 0.000, thus it is statistically significant.

Clindamyc in showed a sensitivity of 100% to *Peptostreptococcus, a 100 sensitivity to Peptostreptococcus with Bacteroides*, 100% sensitivity to *Eubacterium* with *Peptostreptococcus*, 100 % sensitivity to *Peptococcus*, 100% sensitivity to *Porphyromonas*, 100% sensitivity to *Eubacterium* and 100% sensitivity to *Peptococccus* with *Propionobacterium*. Metronidazole showed a sensitivity of 100% to *Peptostreptococcus* with *Bacteroides* and a100% sensitivity to *Eubacterium*. Kanamycin also showed a sensitivity of 100% to *Peptostreptococcus* with *Bacteroides* and a 100% sensitivity to *Eubacterium*.P value is 0.000 thus it is statistically significant. Colistin showed a sensitivity of 100% to *Eubacterium* with *Peptostreptococcus* and showed a sensitivity of 100% to *Eubacterium*.

Vancomycin showed a sensitivity of 75% to *Peptostreptococcus*, a sensitivity of 100% to *Peptostreptococcus* with *Bacteroides*, a sensitivity of 100% to *Eubacterium* with *Peptostreptococcus*, a sensitivity of 100% to *Peptococcus*, a sensitivity of 100% to *Porphyromonas*, a sensitivity of 100% to *Eubacterium* and a sensitivity of 100% to *Peptococcus* with *Propionobacterium*.

DISCUSSION

The present study was conducted at JSS Medical College and Hospital, Mysore from 1st October 2012 to 31st August 2014.The aim of our study was to identify the causative micro-organisms in neck abscess, to study the incidence of anaerobic organisms in neck abscess and to study the sensitivity pattern of the isolated micro-organism to antimicrobial agents.

In our study among 50 cases, the most common neck space abscess is Ludwigs angina (22%), Peritonsillar abscess (20%), Submandibular space abscess (16%) followed by Diffuse neck abscess (14%), Parotid abscess (10%), Parapharyngeal abscess (8%), Retropharyngeal abscess (4%), Submental abscess (4%) and Posterior triangle abscess (2%).These results were similar to the study conducted by Larawin V, Najpao J, Debey SP in

which Ludwigs angina was the most common cause of neck abscess.[4]

These results are also similar to the results obtained by Beasley DJ, Amede RG in which odontogenic infections with involvement of the submandibular space are the most common source of deep neck space infections in adults, whereas in the pediatric population the most common cause is acute tonsillitis with involvement of the peritonsillar space.[5]

Of the 50cases, aerobes are isolated in 32 cases, anaerobes in 11 cases and no growth is observed in 7 cases. Thus the incidence of aerobic growth is 64%.The incidence of anaerobic growth is 22% and the incidence of no growth is 14%.These results were similar to the results obtained by Antony J Rega, Shahid R Aziz, Ziccardi VB that showed aerobes were present in 65.7% and anerobes were present in 34.3%.[6]

The predominant aerobes isolated are *Alpha haemolytic Streptococci (Viridans Streptococci) (12%), Staphylococcus aureus (12%) and Coagulase negative Staphylococcus aureus (12%)* followed by *Klebsiella pneumoniae (10%) and Non Haemolytic Streptococci (8%)*.These results were similar to the results obtained by Shih-Wei-Yang, Ming-HsunLee, Lai-Chu See et al which showed that the predominant aerobes were *Viridans streptococci*, *Klebsiellapneumoniae*, and *Staphylococcus aureus*. The predominant anaerobes included species of *Prevotella*, *Peptostreptococcus*, and *Bacteroides*.[7]

The predominant anaerobes isolated are *Peptostreptococcus (8%), Porphyromonas (4%), Peptococcus (2%), Eubacterium (2%), Peptostreptococcus with Bacteroides (2%), Eubacterium with Peptostreptococcus (2%) and Peptococcus with Propionobacterium (2%)*. These results were similar to the results obtained by Tabaqchali.S that showed that the predominant anerobic organisms obtained in head and neck infections were *Bacteroides species, Peptococcus, Peptostreptococcus, Propionobacterium species*.[8]

In Ludwigs angina the most common organism isolated is *Staphylococcus aureus* and *Coagulase negative Staphylococcus aureus* each 18.2% followed by Non haemolytic *Streptococci*, *Alpha haemolytic Streptococci, Escherichiacoli, Enterobacter* cloacae each 9.1% and the anaerobes *Peptococcus, Porphyromonas and Eubacterium* each 9.1%.Odontogenic infection is the most common predisposing factor. These results are similar to that obtained by ParhiscarA, Har-EIG in which *Streptoccus viridans, Staphylococcus epidermidis and Staphylococcus aureus* are the leading pathogens in Ludwigs angina. Dental infections are the leading etiology.[9]

In Peritonsillar abscess the most common organism isolated is *Alpha haemolytic Streptococci accounting to 30%. Non haemolytic streptococci, Klebsiella pneumoniae* and *Neisseria* were present in 10% of cases each. The anaerobes *Peptostreptococcus and Peptostreptococcus with Bacteroides* were present in 10% of cases. These results are similar to that obtained by Brook which showed Streptococci to be the most common aerobic organism and *Peptostreptococcus* to be the most common anaerobic organism isolated in Peritonsillar abscess.[10]

In Diffuse neck abscess, only aerobes are isolated the most common being *Staphylococcus aureus* responsible for 42.9% of cases followed by Coagulase negative *Staphylococcus aureus* present in 28.6% of the cases. *Actinobacterboumani* and *Klebsiella* were isolated in 14.3% of the cases. No anaerobes were isolated.In Parotid abscess, *Alpha haemolytic Streptococci* is present in 20 % of the cases. The anaerobes *Peptostreptococcus* and *Porphyromonas* are also present in 20% of the cases.Thus aerobes and anaerobes were isolated in equal number of cases.

In Submandibular abscess, the most common organism isolated is Coagulase negative *Staphylococcus aureus* present in 25% of the cases and the anaerobe *Peptostreptococcus* also present in 25% of the cases. *Alpha haemolytic Streptococci, Staphylococcusaureus*, *Klebsiella* are present in 12.5% of the cases and *Peptococcus* with Propionobacterium is present in 12.5% of the cases. Thus aerobes and anaerobes are equally represented. These results are similar to the study done by Anthony J Rega, Shahid R Aziz et al which showed *Peptostreptococcus* and Alpha haemolytic *Streptococci* were the predominant organisms in Submandibular abscess.[6]

In Parapharyngealabscess, *Non haemolytic Streptococci* and *Klebsiella pneumoniae* are isolated in 25% of cases and the *anaerobes Eubacerium* with *Peptostreptococcus* is also isolated in 25% of the cases.These results are consistent with that obtained by Lee YQ, Kanagalingam J et that showed *Klebsiella pneumoniae* to be the most common organism isolated in Parapharyngeal abscess.[11]

Retropharyngeal abscess showed only the growth of *Klebsiella pneumoniae* in 50% of the cases and no anaerobic growth. Submental abscess showed growth of *Non haemolytic Streptococci* in 50% of cases and *Klebsiella* with *Enterobacter* in another 50% of cases.There was no anaerobic growth. Posterior triangle abscess did not show any growth.

Penicillin was found to be resistant to most micro-organisms showing sensitivity only to *Escherichia coli*, to *Klebsiella with Enterobacter cloacae* and to *Neisseria*.This is due to the emergence of betalactamase producing strains which are rendering Penicillins ineffective in treatment.Oxacillin showed a sensitivity of 33.3% to *Coagulase negative Staphylococcus aureus* and a sensitivity of 16.7% to *Staphylococcus aureus*. It was resistant to all other organisms. MRSA (*Methicillin Resistant Staphylococcus Aureus*) have become common –resistant not only to penicillin but to all other beta lactam antibiotics and many other antibiotics. These results were similar to the study conducted by KuriyamaT, KarasawaT, Nakagawa et al which showed the emergence of betalacamase producing strains of penicillins especially to strains of *Bacteroides* rendering the penicillins ineffective for treatment.[12]

Our study showed Linezolid, Erythromycin, Ciprofloxacin, Gentamycin and Cephalosporins sensitive to most aerobes and Metronidazole and Clindamycin effective against anaerobes. This was similar to the study conducted by Bahl.R, Gupta M, Kanawardeep et al which showed that aerobic organisms were 60% effective to Erythromycin, 25 % to Cephalosporins, 70% to Ciprofloxacin, 15% to Gentamycin. Only 10% were sensitive to Ampicillin. Sensitivity of anaerobic strains to Metronidazole and Clindamycin was 85% each. Metronidazole has been used as an empirical antibiotic for anaerobic cover.[13]

Vancomycin showed 25% sensitivity to Non haemolytic Streptococci, 50% sensitivity to *Staphylococcus aureus*, 83.3% sensitivity to Coagulase negative *Staphylococcus aureus*. It the drug of choice for *Methicillin resistant Staphylococcus aureus* (MRSA) and can be given in all life threatening Staphylococcal

infections.[14]

Our study showed sensitivity of all anaerobes to Clindamycin and 50% sensitivity to Metronidazole similar to the study conducted by Sutter VL, Fingegold SM which proved Clindamycin and Metronidazole to be effective against all anaerobes.[15]

In our study the incidence of aerobic growth is 64%, incidence of anaerobic growth is 22% and the incidence of no growth is 14%. Ludwigs angina is the leading cause of neck abscess followed by Peritonsillar abscess and Submandibular space abscess. The most common aetiology for Ludwigs angina is odontogenic. Diabetes mellitus is an important factor associated with neck abscess. The predominant aerobes isolated in neck abscess are – *Alpha haemolytic Streptococci, Staphyloccus aureus, Coagulase negative Staphylococcus aureus, Non haemolytic Streptococci and Klebsiella pneumoniae.* The predominant anaerobes isolated in Neck abscess *are Peptostreptococcus, Porphyromonas, Eubacterium, Peptococcus, Peptostreptococcus with Bacteroides, Eubacterium with Peptostreptococcus, Peptococcus with Propionobacterium.* Most of the aerobes were found to be resistant to Penicillin due to the emergence of betalactamase producing strains. Oxacillin was found to be effective in Methicillin sensitive Staphylococcus aureus and resistant to all other organisms. Vancomycin is the drug of choice for Methicillin resistant Staphylococcus aureus and can be given in all life threatening Staphylococcal infections. Linezolid, Ciprofloxacin, Clindamycin, Erythromycin, Cephalosporins and Gentamycin were found to be effective against most aerobic organisms. But the use of Gentamycin has to be limited only in selective cases owing to its nephrotoxic and vestibulotoxic effects.

CONCLUSION

To conclude antimicrobial sensitivity for all the head and infections is a must and has to be done for all the neck abscess cases. It will help in directing a more effective treatment against the respective causative organisms and will help in achieving a faster cure rate. It will help us to detect even the rare causative organisms and by knowing their sensitivity pattern we can direct an effective treatment against them. It will also help in preventing the dreaded complications of the neck abscess by treating the infection at an earlier stage and preventing its further spread.

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