



A STUDY OF BACTERIOLOGICAL ASSOCIATION AND ANTIBIOTIC SENSITIVITY IN PATIENTS OF NECK ABSCESES.

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ABSTRACT **INTRODUCTION:** Deep neck infections which play an important role among neck abscesses have been described firstly by Galen and currently their incidence rates have ranged between 9 to 12/1,00,000. Usually the results of cultures are polymicrobial but as a whole, Streptococcus are the organisms most commonly cultured from deep neck abscesses. The incidence of deep neck infections is decreasing with the use of antibiotics. In this study we have tried to find out association of microorganisms in neck abscess patients and their antibiotic sensitivity.

AIM AND OBJECTIVE:

AIM OF THE STUDY-

1. Find out association of various microorganisms with neck abscesses
2. To determine antibiotic sensitivity of various microorganisms associated with neck abscess formation.

OBJECTIVE OF THE STUDY- To find out a proper knowledge regarding role of microorganisms in neck abscess patients so that definitive treatment lines can be established.

METHODOLOGY: A prospective study was performed in 90 cases of neck abscesses in a tertiary care hospital for a period of 1.5 years from February 2019 to July 2020 to find out association between neck abscesses with bacteriological factors and antibiotic sensitivity of the microorganisms.

RESULT: It was found that Klebsiella pneumoniae was higher proportion in associated bacteria. The antibiotic sensitivity testings revealed proper medical treatment path by directing necessary antibiotics for specific microorganisms involved in cases of neck abscess. Thus a multidisciplinary treatment approach is always advisable.

KEYWORDS : Neck abscess, microorganisms, antibiotic sensitivity.

INTRODUCTION

Deep neck infections which play an important role among neck abscesses have been described firstly by Galen and currently their incidence rates have ranged between 9 to 12/1,00,000¹. Usually the results of cultures are polymicrobial but as a whole, Streptococcus are the organisms most commonly cultured from deep neck abscesses². In an immunocompromised patient, however other uncommon organisms may be encountered³. Despite the availability of antibiotics, deep neck space infections with anaerobic germs (for example in Ludwig's angina) still carry the potential for significant morbidity and mortality with delayed treatment⁴. The microbiology of deep neck infections usually reveals mixed aerobic and anaerobic organisms, often with a predominance of oral flora. Both gram-positive and gram-negative organisms may be cultured. Group A beta-hemolytic streptococcal species (Streptococcus pyogenes), alpha-hemolytic streptococcal species (Streptococcus viridans, Streptococcus pneumoniae), Staphylococcus aureus, Fusobacterium nucleatum, Bacteroides melaninogenicus, Bacteroides oralis and Spirochaeta, Peptostreptococcus and Neisseria species often are found together in various combinations. Pseudomonas species, Escherichia coli and Haemophilus influenzae are occasionally encountered. There have been studies showing an association between the presence of biofilm and abscess development⁵. The incidence of deep neck infections is decreasing with the use of antibiotics. Antibiotic Sensitivity testing are usually performed by Kirby-Bauer's disc diffusion methods and interpretation were done following current CLSI guidelines⁶.

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MATERIALS AND METHODS

The prospective study has been conducted over a period of 1.5 years (From February 2019 to July 2020) in the Department of ENT and Head Neck surgery in a Tertiary Care Centre. Total patients studied during the period was 90.

INCLUSION CRITERIA:

Patient presenting with clinical features of neck abscess like Difficulty in Swallowing, Pain, Fever, Difficulty in Breathing, Torticollis, Trismus, Difficulty in moving neck etc.

EXCLUSION CRITERIA:

1. Age more than 70 years.
2. Children less than 5 years of age.
3. Swelling of neck other than neck abscess diagnosed by prior imaging and FNAC where feasible.

LABORATORY INVESTIGATIONS:

1. Complete blood count and serum electrolytes.
2. Aspirated pus for culture and sensitivity.
3. Pus for AFB stain and CBNAAT.
4. Blood sugar (FBS, PPBS random).
5. Lipid profile and Liver Function Tests.

6. Blood for serological studies for HIV, Hepatitis c and Hepatitis b.

RESULTS AND ANALYSIS

Table 1(Distribution of Age in Year) N=90

Age In Years	Number of Patients	Percentage
≤10	5	5.6
11-20	10	11.1
21-30	14	15.6
31-40	13	14.4
41-50	20	22.2
51-60	18	20.0
61-70	10	11.1
Total	90	100.0

In the study, 20(22.2/100) patients were 41-50 years old, 18(20.0/100) patients were 51-60 years old. 5(5.6/100) patients were ≤10 years old, 10(11.1/100) patients were 11-20 years old, 14(15.6/100) patients were 21-30 years old, 13(14.4/100) patients were 31-40 years old and 10(11.1/100) patient were 61-70 years.

Table 2(Sex Distribution) n=90

SEX	Number of Patients	Percentage
Female	26	28.9%
Male	64	71.1%
Total	90	100.0%

In the study, 64(71.1%) patient were Male and 26(28.9%) patients were Female.

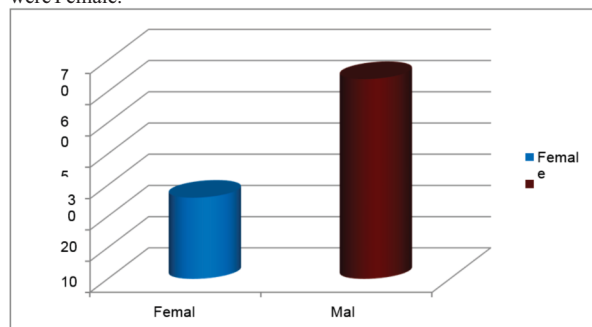


TABLE 3 (Neck space Involvements) n=90

Neck Space Involved	Present	Absent	Incidence among study population per 100
PARAPHARYNGEAL	44	46	48.9
SUBMANDIBULAR	50	40	55.6
PAROTID	9	81	10.0
RETROPHARYNGEAL	15	75	16.7
PREVERTEBRAL	3	87	3.33
PERITONSILLAR	13	77	14.44
MASTICATOR/TEMPORAL	9	81	10.0
PRETRACHEAL	7	83	7.78
BUCCAL	0	90	0.00
CAROTID	1	89	1.11
SUBMENTAL	13	77	14.44
CANINE	0	90	0.00
MULTIPLE SPACES	48	42	53.33

In the study, 50(55.6%) patients had Submandibular abscess and 44(48.9%) patients had Parapharyngeal abscess. 48(53.33%) patients had Multiple Spaces involved in abscess.

Table 4(Associated Microorganisms)

Organisms	Number of Patients	Percentage
B HEMOLYTIC STREPTOCOCCUS	13	14.44%
CANDIDA	6	6.66%
KLEBSIELLA PNEUMONIAE	51	56.67%
MRSA	3	3.3%
MYCOBACTERIUM TUBERCULOSIS	3	3.3%
NO GROWTH	7	7.8%
PSEUDOMONUS	5	5.56%

METHICILLIN SENSITIVE STAPH AUREUS	6	6.67%
STREP PNEUMONIAE	2	2.2%
Total	90	100.0%

In the study, 51(56.67%) patients had Klebsiella pneumoniae, 13(14.44%) patients had beta Hemolytic streptococcus. 6(6.66%) patients had Candida, 3(3.3%) patients had MRSA, 3(3.3%) patients had Mycobacterium Tuberculosis, 7(7.8%) patients had No Growth, 5(5.56%) patients had Pseudomonas aeruginosa, 6(6.67%) patients had Methicillin Sensitive Staphylococcus aureus and 2(2.2%) patient had Streptococcus pneumoniae. Mixed growth was found in 6 patients.

Table 5(Gram Positive Bacterias and Antimicrobials shown as Sensitive)

MI	AMP	CXM	TCC	LVX	CIP	RO	CD	COT	LZD	VAN	AZM
BS (n=13)	11	5	12	9	7	9	7	7	13	13	4
SP (n=2)	2	1	2	1	1	2	1	1	2	2	1
MSSA (n=6)	4	6	6	5	2	5	5	2	6	6	2
MRSA (n=3)	0	0	0	2	0	1	1	0	3	3	1

BS= beta Hemolytic Streptococcus, SP=Streptococcus Pneumoniae, MSSA=Methicillin Sensitive Staphylococcus Aureus, MRSA=Methicillin Resistant Staphylococcus Aureus
MI=Microbes

AMP=Ampicillin, CXM- Cefuroxime, TCC- Ticarcillin-clavulanic acid, LVX=Levofloxacin, CIP=Ciprofloxacin, CD=Clindamycin, RO-Roxithromycin, COT=Cotrimoxazole, LZD=Linezolid, VAN=Vancomycin, AZM=Azithromycin.

In this study it is seen that among gram positive bacteria, beta hemolytic streptococcus are mostly sensitive to ampicillin, ticarcillin-clavulanic acid, vancomycin and linezolid and moderately sensitive to ciprofloxacin, levofloxacin and roxithromycin. Streptococcus pneumoniae is mostly sensitive to vancomycin and linezolid. Methicillin sensitive staph aureus is mostly sensitive to most of the antibiotics excepting ciprofloxacin, cotrimoxazole and azithromycin. Methicillin resistant staph aureus are sensitive to levofloxacin, linezolid and vancomycin.

Table 6(Gram Negative Bacterias and Antimicrobials shown as Sensitive)

MI	CT R	AM C	AM K	LV X	CI P	CO T	PI T	CF Z	MR P	IP M	CH L	AZ M	PB
KP (n=51)	24	21	41	32	8	10	36	26	41	41	6	12	51
PA (n=5)	0	0	2	4	1	0	3	3	3	3	0	0	5

MI=Microbes

CTR=Ceftriaxone, AMC=Amoxycylav, AMK=Amikacin, LVX=Levofloxacin, CIP=Ciprofloxacin, COT=Cotrimoxazole, PIT=Piperacillin/Tazobactam, CFZ- Ceftazidime, MRP=Meropenem, IPM=Imepemem, AZM=Azithromycin, CHL=Chloramphenicol, PB- Polymyxin B.

KP=Klebsiella pneumoniae PA=Pseudomonas aeruginosa

In this study, it is seen that among gram negative bacteria, Klebsiella pneumoniae is mostly sensitive to piperacillin-tazobactam, imipenem, meropenem, amikacin and polymyxin B. Pseudomonas aeruginosa is mostly sensitive to ceftazidime, levofloxacin, piperacillin-tazobactam, imipenem, meropenem, amikacin and polymyxin B.

DISCUSSION

In our study we took 90 patients of neck abscesses for bacteriological and antibiotic sensitivity assessment. In the study, 64(71.1%) patient were Male and 26(28.9%) patients were Female. Males are more vulnerable to infections due to higher rate of odontogenic and upper respiratory tract infectivity and comorbidities are more commonly seen in males than females so susceptibility of neck abscess is more in males. Brito TP et al⁷ (2017) also found in his study that there was predominance in the male gender (55.5%) and young people (mean

age 28.1 years). All of the 51 patients in his study with associated disease comorbidity were adults. In our study, 20(22.2/100) patients were 41-50 years old, 18(20.0/100) patients were 51-60 years old.

In our study, 50(55.6%) patients had Submandibular abscess and 44(48.9%) patients had Parapharyngeal abscess. 48(53.33%) patients had Multiple Spaces involved in abscess. As dental infection and Upper respiratory Tract infections are in close proximity to submandibular and parapharyngeal spaces so rates of these spaces involvement in abscess formation are higher. **Bakir S et al**⁸ (2012) also found The most common involved site was the submandibular space (26.1%). In 29.5% of his cases, the infection involved more than one space.

In our study, 51(56.67%) patients had Klebsiella pneumoniae, 13(14.44%) patients had beta Hemolytic streptococcus. **Huang TT et al**⁹ (2004) in his study recorded One hundred eighty five patients; 109 (58.9%) were men, and 76 (41.1%) were women, with a mean age of 49.5 ± 20.5 years. Streptococcus viridans and Klebsiella pneumoniae were the most common organisms (33.9%, 33.9%) identified through pus cultures.

In this study it is seen that among gram positive bacteria, beta hemolytic streptococcus are mostly sensitive to ampicillin, ticarcillin-clavulanic acid, vancomycin and linezolid and moderately sensitive to ciprofloxacin, levofloxacin and roxithromycin. Streptococcus pneumoniae is mostly sensitive to vancomycin and linezolid. Methicillin sensitive staph aureus is mostly sensitive to most of the antibiotics excepting ciprofloxacin, cotrimoxazole and azithromycin. Methicillin resistant staph aureus are sensitive to levofloxacin, linezolid and vancomycin. Among gram negative bacteria, Klebsiella pneumoniae is mostly sensitive to piperacillin-tazobactam, imipenem, meropenem, amikacin and polymyxin B. **Mayor GP et al**¹⁰ (2001) In his 31 patient's prospective series on deep neck infections, managed at Hospital Ramón y Cajal in Madrid, Spain which was conducted from January 1994 to December 1997, including all parapharyngeal or retropharyngeal infections reported that Medical treatment was successful in all but 3 cases (90.32%) with no major complications.

CONCLUSION

It was found that more common age groups in neck abscess were middle aged adults. It was found that majority of the patients were male. Submandibular and Parapharyngeal abscesses were of most common occurrence. Klebsiella pneumoniae was higher proportion in associated bacteria in neck abscess cases. The antibiotic sensitivity testings revealed proper medical treatment path by directing necessary antibiotics for specific microorganisms involved in cases of neck abscess. Thus a multidisciplinary treatment approach is always advisable.

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