Spectrum of Bacteriological study of throat swabs with an indicator of Re-emergence of Diphtheria in MGM Hospital, Warangal

G V Padmaja[1], Mrudula[2], Jyothi[3]

[1]AssociateProfessor, [2]Post Graduate, [3]Assistant Professor, Department of Microbiology, Kakatiya Medical College, Warangal-Telangana state – India

Address for correspondence : Dr. G V Padmaja, Associate Professor, Department of Microbiology, Kakatiya Medical College, Warangal- Telangana State – India

Email: goteti.padmaja@ gmail.com

ABSTRACT

Introduction: Wide spectrum of bacteriological study for different types of throat infections are done routinely which are ranging from upper respiratory tract infections to dreadful diseases like Diphtheria andpertusis etc. with the advent of vaccinations schedule, vaccine preventable diseases declined remarkably and also there is continuous decline after launch of expanded program of immunization in 1977. Diphtheria surged into spotlight with a spike in 1990s. Cases strength much older than with 64-76% among those aged 15 years or older. Other bacteriological isolates are coagulase positive staphylococci, streptococcus pneumonia, klebsiella pneumonia, E. coli, proteusspecies and ESBL, MBL producing resistant strains.

Objectives : To know the routine bacteriological isolates and rare isolates like Diphtheria in cultures of throat swab, administration of booster doses and also to know the emergence of multi resistant ESBL and MBL producing gram negative bacteria

Material and Methods : 84 throat swabs received to bacteriological section in the department of Microbiology, MGM Hospital were cultured and subjected to direct smear examination, culture and sensitivity and any evidence of production ESBLs and MBLs. Throat swabs with suspected signs of diphtheria cases were also processed for Corynebacterium diphtheria and later subjected to Kirby bauer test of antibiogram

Results: After processing these 84 throat swabs non pathogenic organisms were isolated in 56 (66%) throat swabs. Routine bacteriological isolates like Klebsiella species – 6 (7.14%), coagulase positive staphylococci 6 (7.14%), Streptococcus pneumonia – 5(6%), Diphtheria -3 (3.57%), Proteus species –4 (4.7%), E. coli – 2 (2.4%) and gram negative bacilli with evidence of ESBLs – 2 (2.4%). Male preponderance is seen with 58.9%.

Conclusions : Routine bacteriological study of throat swabs should include the study of ESBLs and MBLs producing resistant strains and screening of Corynebacterium diphtheria, whenever there is supportive evidence of history and clinical features of diphtheria.

Keywords : Throat swabs, Reemergence, Diphtheria cases, ESBL and MBL strains

INTRODUCTION

Respiratory tract infections (RTI) is a term assigned not to a single disease, but to a spectrum of infections, each with a different clinical presentation, pathogenesis, epidemiology and prognosis.

The etiology, signs, symptoms of RTI vary with age, sex, season and type of population at risk. With the advent of newer drugs microbes are developing newer techniques to counteract antimicrobial agents. Hence study of this multidrug resistant strains are mandatory.

This wide spectrum of study should include from routine bacteriological study to dreadful diseases like diphtheria and pertussis.

MATERIAL AND METHODS

84 throat swabs received to bacteriological section in the department of Microbiology, MGM Hospital were cultured and subjected to direct smear examination, culture and sensitivity and any evidence of production ESBLs and MBLs.

As a preliminary step all swabs were subjected to direct smear examination and pathogenic smears were processed with routine blood agar and Mac Conkey agar and significant growth was identified with necessary bio chemical tests and antibiotic sensitivity test conducted with Kirby Bauer test. All resistant strains were subjected to Double disk synergy test (DDST) for detection of ESBLs and no MBL producing strains were detected in this study.

3 swabs out of 84 swabs proved positive for Corynebacterium diphtheria, as they were routinely screened for bacteriological study and insisted by the clinicians with the clinical features of suspected diphtheria and when patients are in toxic state.

These swabs were processed on Blood agar,Loeffler's serum slope, potassium tellurite agar shown in Figure 1 and 2 and with Hiss serum sugars. Growth on potassium tellurite agar further processed with Gram's stain,Neisser's and Albert stain are shown in figure 3, 4, & 5. 3 swabs were culture positive for Corynebacterium diphtheria.

Corynebacterium diphtheria

Figure 1. Growth on Blood Agar

Figure 2. Growth on potassium tellurite agar

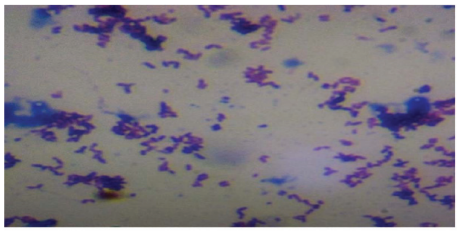

Figure 3. Gram's stain

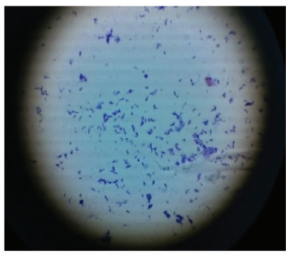

Figure 4. Neisser's strain

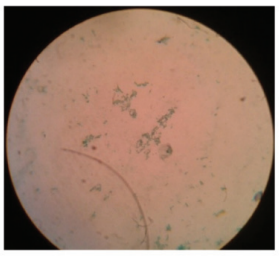

Figure 5. Albert's strain

RESULTS

TABLE 1: Showing Age wise, sex wise distribution of throat swabs

S. No.	Age	Females	Males	Culture Negative	Culture Positive
1	< 1 year	3	4	6	1
2	1 -5 years	5	7	7	5
3	6-10 years	7	10	11	6
4	11-20 years	4	5	6	3
5	21-30 years	4	8	8	4
6	31-40 years	6	7	9	4
7	41-65 years	8	6	9	5
	Total	**37**	**47**	**56**	**28**

Distribution of throat swab cultures age wise, sex wise with male preponderance of 58.9% as shown in Table 1.All 84 throat swabs were processed for culture and sensitivity, non-pathogenic organisms were isolated in 56 (66.67%) throat swabs and pathogenic organism were isolated in 28 (33.33%). Routine bacteriological isolates like Klebsiella species – 6 (7.14%), coagulase positive staphylococci 6 (7.14%), Streptococcus pneumonia – 5(6%), Diphtheria -3 (3.57%), Proteus species –4 (4.7%), E.coli – 2 (2.4%) and gram negative bacilli with evidence of ESBLs – 2 (2.4%) as shown in Table 2.

TABLE 2. Showing Isolated bacteria in positive throat culture swabs

S. No.	Name of the Bacteria	No of positive Cultures	Percentage of Positive cultures
1	Klebsiella pneumonia	6	7.14%
2	Coagulase positive Staphylococci	6	7.14%
3	Streptococci pneumoniae	5	6%
4	Proteus species	4	4.7%
5	E.coli	2	2.4%
6	Corynebacterium diphtheria	3	3.57%
7	ESBLs resistant strains	2	2.14%
	Total no of positive cultures	**28**	**33.33%**

DISCUSSION

Throat swab culture and sensitivity as a diagnostic test for an individual will have marginal utility. The utility of this investigation in giving information regarding production of ESBLs and MBLs by the microorganism and multi drug resistant strains is significant[1-4].

Pathogenic organisms were easily grown in the months of July to September as many number of epidemics and sporadic cases will occur. The area of interest in our study was three diphtheria cases and two multi drug resistance strains. The clinicians requisition form should accompany with the necessary information regarding age, sex, status of the patient, toxic status and information regarding any dreadful diseases like diphtheria and pertussis to avoid false negative reports, as one of the diphtheria case of a female child aged about ten years is on ventilator with Spo2 <60% in critical condition and expired after ten days as the first swab turned to be negative with lack of technical skill of a para medical personnel. Later on with inter departmental approach, post graduate collected the throat swab proved to be culture positive for Corynebacterium diphtheria identified with Neisser's and Albert stain with plenty of Volutingranules. Any short falls in collecting the specimens should be avoided to increase the sensitivity and specificity of the tests. [10,11,12]

Coagulase positive staphylococci, Corynebacterium diphtheria showed significant minimum inhibitory concentration (MIC) zones with vancomycin and cefaperazone with sulbactum. Streptococci pneumoniae showed sensitivity to cefotaxime and ciprofloxacin klebsiellasps, proteusspsE.coli showed sensitivity to amikacin, cefotaxime and cefaperazone. Two cultures which are resistantant to all drugs were subjected to double disk synergy test and are sensitive to cefaperazone with sulbactum[5-9.]

CONCLUSION

Indiscriminate use of antibiotics facilitate the development of resistance organisms. Periodic review of culture and sensitivity of reports are essential as it is cost effective and useful tool against expensive clinical trials. The micro-organism are also showing different patterns of sensitivity and resistance to antibiotics and expressing resistance to advanced drugs and showing susceptibility to old time tested drugs.

Routine bacteriological study of throat swabs should include the study of ESBLs and MBLs producing resistant strains and screening of Corynebacterium diphtheria, whenever there is supportive evidence of history and clinical features of diphtheria and to alert re-emergence of Dipththeria cases in adult age group and to assert administration of booster doses in school going children.

If an effective antibiotic policy formulated, unnecessary outside administration of drugs can be avoided and it will facilitate to record the different patterns of antibiotic resistance and ready availability of information in WHO NET will control the global emergency of multi drug resistance bacterial strains.

REFERENCES

1. P.T. Wakode, S.H Gaawarle, S.V. Joshi. R. Bajoriya. Throat swab culture and sensitivity culture and report – an overview, Indian Journal of Otolaryngology and head and Neck Surgery 2003;65(2): 200-10.
2. NarayanjyotiSarmah, ArunjyotiSarmah, Dipak Kumar Das, A study on the microbiological profile of respiratory tract infection (RTI) in patients attending gauhati medical college & hospital. Annals of International medical and dental research 2016; Vol 2(5): 35-37.
3. National committee for clinical laboratory standards, performance standards for antimicrobial susceptibility testing, clinical laboratory standard institute, 2014.
4. Ahmed MS, Jakribettu RP, Meletath SK, Arya R, Vpa S. Lower respiratory tract infections (LRTIS) an insight into the prevalent an antibiogram of gram negative respiratory bacterial agents, J. Clin. Diag. Res 2013;Vol.7 (2): 253-256.
5. Rajpai T, Shrivastav G, Bhatambare G.S, Deshmukh A. B, Chitnis V. Microbiological profile of lower respiratory tract inspections in neurological intensive care unit of tertiary care center from central India. J. basc. Clin. Pharm 2013;Vol 4 (3): 51-55.
6. G V Padmaja, R Kondal Rao, prevalence of extended spectrum of ß-Lactamases and Metalloß-lactamases producing bacteriologicalIsolates with correlative epidemiological study of ESBLs and MBLs in MGM hospital, International Journal of contemporary medical research 2016; Vol 3(6): 330-32.
7. Bradford PA. Extended spectrum ß-Lactamases in the 21st century, Characterization, epidemiology and detection of this important resistance threat. ClinMicrobiol Rev Vol2001; 14: 933-51.
8. Clinical laboratory standards institute, performance standards for antimicrobial susceptibility testing, sixteen international supplement, CLSI document M100-S 16, Wayne PA 2007.
9. Jarlier V, Nicolas MH, Fourneir G. Extended spectrum ß-Lactamases conferring transferrable resistance to new ß-Lactam agent in enterobacteriaceae, hospital prevalence and susceptibility patterns, Rev Infect Dis 1988; Vol 10:867-78.
10. Kriste E, Claike N, MD MSCR, FAAP, review of the epidemiology of diphtheria 2000-2016.
11. M Jhancy, A Satyavani, D Manikyamba, K TulasiDeepti, Re-emerging of diphtheria – An outbreak from east godavari, Andhra Pradesh. Pediatric infectious disease 2015; Vol 7:33-35.
12. Diphtheria – A re-emerging threat, CD alert monthly newsletter of national institute of communicable diseases, Vol 12, Directorate general of health science, govt of India, 2008; No. 1 Page 4.

How to cite this article : Padmaja G V, Mrudula, Jyothi. Spectrum of Bacteriological study of throat swabs with an indicator of Re-emergence of Diphtheria in MGM Hospital, Warangal. Perspectives in Medical Research 2019, 7(1):18-20.

Sources of Support : Nil, Conflict of interest:None declared.