Original Research Article

Spectrum of all microorganism isolated from surgical site infection and their antimicrobial susceptibility profile

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A B S T R A C T

Background: Surgical site infection are the most common nosocomial infection accounting for 14% healthcare associated infection and are estimated to double the post-operative stay and significantly increase the cost of care. Surgical site infection has been considered as the third regularly occurring infection according to national nosocomial infection surveillance system.

Aim: To determine the bacterial agents causing surgical site infection and antimicrobial susceptibility pattern of isolated microorganisms.

Objectives: Isolate and identify pathogens of surgical site infection. To determine antimicrobial resistance and sensitivity pattern of isolated wound microbes. To determine the frequency of pathogens of surgical site infection.

Materials and Methods: Samples were cultured on Blood agar and MacConkey agar then incubated at 37°C for 24 hours. Any growth for further confirmed by Gram stain and appropriate biochemical tests, and then Antibiotic sensitivity test was done.

Results: In this study 106 (61.7) were of male and 66 (38.3) were of female total 172 were examined. In our study total 172 patients included in which 142 pathogenic organism were isolated. The most common pathogenic organism found to be Staphylococcus SPP 44 isolates (30.99%) followed by E.coli 41 isolates (28.87%) Klebsiella pneumoniae 23 isolates (16.20%), Pseudomonas aeruginosa 18 isolates (12.68%), Acinetobacter baumannii 9 isolates (6.34%), Enterobacter cloacae 5 isolates (3.52%), Citrobacter koseri 1 isolate (0.70%) and Proteus Mirabilis 1 isolate (0.70%).

Conclusion: Antimicrobial resistance always pose challenges for clinician for treating wound infection the present study guide clinician about common pathogens and countered in pus sample furthermore it help the clinician to select and treat patients with proper antibiotics and decreased mortality and morbidity.

1. Introduction

Skin prevents infection in many ways because it is our essential immunity and substantially concluded the production of sweat and sebaceous secretions that provide acidic pH and protection such as fatty acids. Lysozymes has certain properties such as dissolving bacterial cell and antifungal properties.  

Nosocomial infection is the common cause of surgical site infection. Common complication of surgery occurrence rates 2 to 20%. Most of the surgical site infection are harmless including only skin or subcutaneous tissue but sometimes can proceed to harmful infection.

Patients correlated Factors such as old age, nutritive states, already existing infection or comorbidity or hospital acquired Factors such as poor surgical techniques,
Fatma et al. / Panacea Journal of Medical Sciences 2021;7(4):246–249

247

1.1. Ethics approval

Ethics approval was obtained from TMMC Moradabad institutional Ethics Committee (TMMC&RC/IEC/18-19/085)

2. Materials and Methods

2.1. Sample collection

Pus samples (Surgical Site Infection) were taken in clean and leak proof sterile container & tubes. Pus sample were processed for routine culture and for antibiotics susceptibility testing during the study Period

2.2. Processing of sample

PUS SAMPLE (Surgical site infection)

1. Pus sample were inoculated in MacConkey and blood Media.
2. All ordinary culture media were incubated at 37°C for overnight incubation in the incubator.

2.3. Inclusion criteria

1. Patients of more than 18 year of age group.
2. Sign and symptoms suggestive of post-operative wound infection like discharge of pus, pain, tenderness, fever etc.
3. Patients admitted in various surgical units. For more than 48 hrs. 

2.4. Exclusion criteria

1. Burn injuries.
2. Patients not given informed consent.

3. Procedure in which healthy skin was not incised such as opening abscess.

2.5. Antimicrobial sensitivity pattern

By using Kirby bauer disc diffusion method according with CLSI guidelines, using antibiotics, and all isolates were tested for antimicrobial sensitivity in mullen hinton agar.

3. Observation & Results

Total samples 172 were collected out of which 106(61.7%) male and 66 (38.3%) Female patients. In our study out of 172 patients included in which 142(82.55%) were pathogenic isolates, 9(12.5%) were non-pathogenic and 21(12.20%) were no growth. Isolation of pathogenic organism shows most prevalent organism Staphylococcus spp 44 (30.99%), E.coli 41(28.87%), Klebsiella pneumoniae 23(16.19%), Pseudomonas aeruginosa 18(12.68%), Acinetobacter baumannii 9(6.34%), Enterobacter cloacae 5(3.52%), Citrobacter koseri 1(0.70%), Proteus mirabilis spp 1(0.70%).

Fig. 1: Isolated organisms

4. Discussion

The present study was conducted in TMU medical college research center Moradabad, UP. Infection that occurred at the site of surgery is known as Surgical site infection. During the period from December 2018 to September 2019 out of 172 wound swab from recruited patients after informed written consent were obtained.

In this study 106 (61.7) were of male and 66 (38.3) were of female total 172 were examined. Grish S. Sharanathe, S.A. Gadgil (2020) showed in their study male patient was 686 (46%) while the females was 805 (54%). In another study Siddesh B, Sirwar, Nazneen Fatima (2018) found the rate of surgical site infection 139 males and 102 females patients.

The higher rate of infection in males than females was also observed by Leela Rani Kasukurthy, Madhumati Bathala (2020) were males (60%) 72 (40%) were females. Arundhati Jamatia, Debasish Roy et al (2017)
observed in their study that 229 were males subject 130 were females subject. C.M. Divyanshanthi et al (2014) found 156 males and 140 females in their study.

Majority of subject were found males population as compared with females population.

Study of Saranya K. Lakshmi et al (2020) the common age group of 41-61 year (42.2%).

The predominant bacteria isolate recovered in the study included Staphylococcus SPP 44 isolates (30.99%) followed by E.coli 41 isolates (28.87%) Klebsiella pneumoniae 23 isolates (16.20%), Pseudomonas aeruginosa 18 isolates (12.68%), Acinetobacter baumannii 9 isolates (6.34%), Enterobacter cloacae 5 isolates (3.52%), Citrobacter koseri 1 isolate (0.70%) and Proteus Mirabilis 1 isolate (0.70%). out of 142 total positive isolates in which gram positive isolate frequency 30.99% and gram negative isolates frequency 69.01%. Sahar Mudassar et al (2018) found in their study that Staphylococcus spp 66 isolates (36.1%) were predominant bacteria isolates followed by E.coli 44 isolates (24.0%) and then Klebsiella pneumoniae 26 isolates (14.2%).

In the present study Resistant antibiotic in gram positive bacteria are Penicillin (86.36%), followed by Ampicillin (81.81%), followed by Amoxicillin (77.27%), Norfloxacin (65.90%), Erythromycin (56.81%), linezolid (40.90%), Clindamycin (36.36%) and in gram positive bacteria sensitive antibiotics are Vancomycin (90.99%) followed by Rifampicin (79.54%) Gentamicin (68.18%), Linezolid (59.09%). Prasanta Kumar Panda, et al (2020) found in their study staphylococcus aureus was predominant isolates sensitive to vancomycin (100%).

In the present study gram negative microorganism E.Coli sensitive to Tigecycline (100%), Colistin (100%) followed by Amikacin (58.53%) Gentamicin (48.78%) and Ceftriaxome (100%), Ceftazidime (80.48%) are resistant. Rama Bastola et al (2017) found that E.coli was resistant to Ceftrixame and Ceftazidime and sensitive to Amikacin and Gentamicin.

In the present study gram negative microorganism Klebsiella pneumoniae resistant to Ampicillin (100%) followed by Amoxyccillin (100%), Cefuroxime (95.65%) and Cefuroxime (95.65%) and sensitive to Ertapenem (95.65%), Ciprofloxacin (34.44%), Amikacin (17%). Pooja Patel et al. (2019) found that Klebsiella pneumoniae sensitive to Ciprofloxacin (40.0%). Pseudomonas resistant to Ampicillin/Amoxyccillin (100%), Amoxyccillin/Clavulanic acid (100%) followed by Tigecycline (66.66%), Ertapenem (55.55%) and sensitive to Tigecycline-Clavunic Acid (100%), Piperacillin-tazobactum (100%) followed by Cefeperezzone/subactum (94.44%), Imepenam (94.44%).

Kunal Kishor et al. (2015) reveled that Pseudomonas sensitive to Penicillin, Piperacillin Tazobactum (100%) in our study is already reported.

Out of 172 multidrug resistance isolates, 26.76% were MRSA, 43.66% Were ESBL and 41.54% were MBL isolates. Higher rate of ESBL production was seen in E.coli.

Subha M. et al. related that in our study this study MRSA 100% and 25% ESBL.

5. Conclusion

The aim of this study Spectrum of all Microorganism isolated from surgical site infection was carried out on patient suffering with post-operative infection in Teerthanker Mahaveer hospital. In this study total 172 patients were included in which 82.55 were pathogenic isolates, 12.5 were non-pathogenic and in 12.20 there was no growth. We observed that higher Surgical site infection occur in the age group of 41-61 year. Most common Pathogenic organisms found to be Staphylococcus aureus.

The Staphylococcus spp 44 isolates (30.99) followed by E.coli 41 isolates (28.87) Klebsiella pneumoniae 23 isolates (16.20), Pseudomonas aeruginosa 18 isolates (12.68), Acinetobacter baumannii 9 isolates (6.34), Enterobacter cloacae 5 isolates (3.52), Citrobacter koseri 1 isolate (0.70) and Proteus Mirabilis 1 isolate (0.70). Out of 142 total positive isolates in which gram positive isolate frequency 30.99 and gram negative isolates frequency 69.01.

In this investigation the most prevalent Antibiotic Sensitivity pattern for gram positive bacteria was Vancomycin and Amikacin whereas gram negative bacteria were more Susceptible to Gentamicin and colistin.

Out of 172 multidrug resistance isolates, 26.76 were MRSA, 43.66 Were ESBL and 41.54 were MBL isolates. Higher rate of MRSA Staph.aureus production seen in Higher rate of ESBL production was seen in E.coli.

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8. Conflicts of Interest

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References


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