IOSRJournal ofDentalandMedical Sciences(IOSR-JDMS)
e-ISSN:2279-0853,p-ISSN:2279-0861.Volume20,Issue2Ser.11 (February.2021),PP33-36
www.iosrjournals.org

StudyofBacteriologicalProfileofPostOperativeWoundInfections inSurgicalWardsinaTertiary Care Hospital

DrVishalshekhar,DrChandraMohanSinha,

[1](SeniorRessident..DepttOfGeneralSurgery,J.L.N.M.C.HBhagalpur,India)[2](AssociateProf.DepttOfGeneralSurgery, J.L.N.M.C.HBhagalpur,India)

Abstract: *Introduction: Surgical site infections (SSIs) are known to be one of the most common causes ofnosocomial infections worldwide and account for nearly 20% to 25% of all nosocomial infections. Surgical siteinfection rates are reported to range from 2.5% to 41.9% globally resulting in high morbidity and mortalit.Aims: Tofindtheincidenceand risk factors, bacteriological profile, and antibiogram for SSI in General Surgerydepartmentof a tertiary care hospital in Western Rajasthan. Methods: Culture andsensitivity of wounds of all theclinically suspected cases of SSI were taken. Bacterial identificationandantimicrobialsusceptibility were performedaccording to standard CLSI guidelines. Results: Out of total 117 pus specimens received in the Microbiologylaboratory from 117 suspected SSI cases, 58(49.57%) cases were culture positive and so this cases wereconsidered as definitive cases of SSI giving a SSI rate of 2.69%. The most common organism isolated from SSIcases was Psuedomonas aeruginosa (29.31%) followed by E.coli (25.86%). Among β – lactam antibiotics, allthe gram negative bacilli showed maximum sensitivity towards Carbapenemes and Piparacillin-tazobactum.25% staphylococcus aureus isolates were identified as Methicillin Resistant Staphylococcu aureus (MRSA).*

.Conclusion:HighincidencerateofSSIinoursetupemphasizestheneedofqualitysurgicalcarewhichtakesintoconsiderationallthethreeimportantfactors,i.e.host,environmental,andmicroorganismcharacteristicsbeforedoinganysurgery.

Increasing resistance to commonlyusedantibioticswarrants the judicioususe ofantibiotics andestablishment ofantibioticpolicyinthehospital.

Keyword:*SurgicalSiteInfection,SurgicalWound.*

DateofSubmission: 13-02-2021 DateofAcceptance:27-02-2021

I. Introduction

World Health Organization (WHO) describes hospital acquired infections to be one of the majorinfectious diseases having a hugeconomic impact worldwide. These infections affect about 2 million peopleannually resulting in 5% to 15% of them requiring hospitalization. Surgical site infections (SSIs) are known asmost common causes of nosocomial infections in worldwide which are account for about 20% to 25% of allnosocomial infections. For increased postoperative morbidity worldwide Post operative wound infection is oneof the major causes However SSIs are not associated with a high case fatality rate but they cause significantmorbidity and huge economic burden for prolonged hospital stay. In a world approximately 2% to 5% of the 16million people undergoing surgical procedures each year develop surgical site infection and according to recentdata two-thirds of patients who undergo operations. In developing countries the situation is more severe whereresources are scarce and staffs are always in short supply. In nosocomial infection surgical site infections (SSI)are the third most commonly reported which approximately a quarter of all nosocomial infections. SSI stillcontinues to be a major problem in infection control and surgical practices even in hospitals with most modernfacilities. Post operative infection are usually caused by exogenous and/ or endogenous micro organisms enterthe operative wound after the surgery or during the surgery which are usually more serious, appearing withinfive to sevendays of surgery. SSIs are uncomplicated inwhich mainly involving skin and subcutaneous tissueor sometimes can progress to necrotizing infections. Surgical wound infection can be characterized by pain,tenderness,warmth,erythema,swelling and pusformation.In additionto these riskfactors there isalsoinvolvement of virulence and the invasiveness of the organism physiological state of the wound tissue and theimmunological integrity of the host are also important factors which determine whether infection can occurs ornot. Therefore in developing countries problem gets more complicated due to poor infection control practices,inappropriateuseofantimicrobialsandovercrowdedhospitals.

Hence this observational study has beenundertakento estimate the incidence of SSI, the factorsassociatedwiththeoccurrenceofSSIandtheirantibioticsensitivities ingeneralsurgeryhospitalwards.

II. Materialandmethod

The present study was conducted in the department of general surgery J.L.N.M.C.H Bhagalpur incollaboration with the department of microbiology. Patients for study were selected from among those admittedin the surgical wards and the surgical emergencies that underwent surgical procedure in this hospital. Eachpatient carefully assessed for the sign of surgical site infection till the day of discharge and followed up as anoutpatient basis once a week for 30 days. The discharges from infected wounds were inoculated into blood agarand MacConkey's plate and also into a tube of brain heart infusion broth, which were incubated at 37°Covernight. If no growth was observed on plates, then subculture were made from BHI broth on solid media andprocessed as described above. Exclusion criteria were all the wound infections other than postoperative woundswereexcludedfromthestudyResults

Based on the type of setting in which the surgeries were done, there were 700 cases in elective settingoutofwhich52gotinfectedand132casesinemergencysettingoutofwhich60gotinfected.Theoverallrateofsurgicalsiteinfection(SSI)was11.7%.

The occurrence of SSI in emergency cases (23.8%) was found to be higher compared to elective cases(7.4%). Among the organism cultured gram negative organism predominate the picture (89%) and commonestwas Escherchia coli (57.1%), followed by Klebsiella(18.9%), Pseudomonas(11.4%) and Staphylococcus aureus(8.6%). E.coli and Klebsiella from emergency cases showed resistance to ciprofloxacin (83%) and ceftraixone(83%) and elective cases showed resistance of 70 % to ciprofloxacin and 40% to ceftriaxone.Onstatisticalanalysis ofthedataitwasfoundthatoccurrenceofSSIis significantlymoreinemergencycases (pvalue
<0.000001)whichishighlysignificant.

Table1: Distributionofcases basedonthecasescenario

TypeOfClass	No.OfCases	No.OfSsi	%
Emergency	132	60	23.8
Elective	700	52	7.4
Total	832	112	11.7

Table2:SSIin differentclass ofwounds

SNo	ClassOfTheWound	NoOfCases(Emergency +Elective)	No Of Ssi	%
1.	Clean	150 (0+150)	14	5.6
2.	CleanContaminated	456(15+426)	36	7.9
3.	Contaminated	112(108+16)	26	21.3
4.	Dirty	121(116+4)	36	29.5

Out of all cases in which SSI occurred 35 were deep SSI and 21 were superficial SSI. The incidence of deep SSIwas more in contaminated dirty groups than in the clean and clean contaminated groups. (p value of < 0.000002whichishighlysignificant).TheincidenceofsuperficialSSIwasfoundnottobesignificant.

Table3: Distribution ofinfectedcasesbased ondegreeofSSI

Cases	SuperficialSSI	DeepSSI	Total
Clean	4	3	7
CleanContaminated	8	10	18
Contaminated	3	10	13
Dirty	6	12	18
Total	21	35	56

The presence of diabetes increased the occurrence of wound infections. The percentages of surgical wound indiabeticgettinginfectedwere42.3%andnondiabeticwere9.4%whichis statically highlysignificant.

TableNo4: Distribution ofSSI amongdiabeticsandnon diabetics

		Noofcases	NoofSSI	%ofinfection
Diabetic	Elective	56	5	17.8
	Emergency	16	6	75
Nondiabetic	Elective	344	21	6.5
	Emergency	236	24	20.3

The number of SSI increased as the duration of surgery also increased. The surgeries in the abdominaland perineal regions show more infections rate. Also surgeries on limbs show increased infection rate due todecreased blood supply. The cleaner and well perfuse area of head, neck and thorax show decreased infectionrate. It was observed that when procedure wise risk of SSI was analyzed, the risk was found to be

higher in thecontaminatedcasesandemergencysurgeries.

Among the organisms cultured from various swabs taken the gram negative bacteria were 86% andgrampositivewere14%.AmongthemtheindividualorganismculturedwereEscherichiaColi(57.1%),Pseudomonas (11.4%), Klebsiella (18.9%) and Staphylococcus aureus (8.6%). On Gram staning in emergencycases out of total 22 , 3 were Gram positive and 19 were Gram negative and in elective cases out of 13 cases 1was Grampositiveand12wereGramnegative.

The organism isolated from infected cases in Elective cases showing positive culture the type bacteria isolatedwere E.coli 8,Pseudomonas 2, Klebsiella 2, Staphylococcua aureus 3 and in 11 cases no growth was seen. InEmergency cases showing positive culture the type bacteria isolated were E.coli 12,Pseudomonas 2, Klebsiella5,Staphylococcuaaureus 1andin10casesnogrowthwasseen.

Table5: Distributionofbacterialisolateamongemergencyandelectivecases

S.No.	Class of wound	No. of cases(emergency)	No. of cases(elective)	No. of SSI(emergency)	No. of SSI(elective)	Organisms	No. of SSI(emergency)	No.ofSSI(elective)
1	Clean	0	250	0	14	E.coli	0	2
						Pseudomonas	0	0
						Staph.aureus	0	6
						Klebsiella	0	2
						Sterile	0	4
2	CleanContaminated	15	213	5	13	E.coli	0	4
						Pseudomonas	2	2
						Staph.aureus	2	0
						Klebsiella	2	4
						Sterile	4	16
3	Contaminated	54	8	9	4	E.coli	10	6
						Pseudomonas	0	
						Staph.aureus	0	
						Klebsiella	4	2
						Sterile	4	
4	Dirty	57	4	16	2	E.coli	14	4
						Pseudomonas	2	
						Staph.aureus		
						Klebsiella	4	
						Sterile	12	

III. Discussion

Post-operative wound infection still remains one of the most important causes of morbidity and is oneof the most common nosocomial infection[17] in surgically treated patients. In the present study, an attempt hasbeen made to know the various bacterial flora responsible for surgical site infections and their antibacterialsusceptibility pattern. The rate of SSI varies greatly worldwide and from hospital to hospital. The rate of SSIvaries from 2.5% to 41.9% as per different studies.[18-21] The incidence of SSI in the present study is 2.69% eventhoughhigh, isinagreementwiththevarious studies.

ThemostcommonorganismisolatedfromSSIcasesinthepresentstudywas*Psuedomonasaeruginosa* (29.31%) followed by E.coli (25.86%).Ramesh et al 2013[22] reported *E. coli* (20.8%) as the mostcommon organism isolated followed by *S. aureus* (16.1%) from SSI cases.Whereas some studies also revealed*Staphylococcus aureus* as the most common organism isolated from *SSI*.[19,22] The high incidence of gram-negative organisms in the post operative wound infections can be attributed to be acquired from patient's normalendogenous microflora[23]

The present study also revealed that all the gram negative bacteria(GNBs) isolated were having a veryhighpercentageofresistancetoβ-lactamantibioticsandalsowereshowingalowsusceptibilitytocephalosporins and aminoglycosides. Extensive use of inappropriate antibiotics in empirical therapy can causeemergenceofsuchresistantbacterialstrains,especiallyinhealthcarecenters..TheseGNBsshowedmaximum

sensitivity towards piperacillin-tazobactam, imepenem and polymyxin B. This finding coincides well with Pateletaletal2011.[23]

Our study also revealed that all the staphylococci showed maximum sensitivity towards Vancomycinand Linezolid which is again in accordance with Raza et al 2013.[24] In the present study we isolated 25%MRSAfrom SSI cases. Naik et al 2011[25] reported isolation of 9.6% of MRSA from SSI cases whereas Rameshetal2013[22]reportedisolationof66.37%MRSAfromSSIcases.

IV. Conclusion

A better Surveillance system for surgical site infection with feedback of appropriate data to surgeons ishighly recommended to reduce the SSI rate in tertiary healthcare centres.Thus,every hospital needs toorganize its infection control program. Failure to implement infection control policies and lack of awareness arethe factors contributing to hospital infections and disease. Guidelines and protocols for basic infection controlpractices such as hand washing, written protocols of perioperative, intraoperative and post operative infectioncontrolpracticesshouldbewidelyavailableandadheredto.

References

[1]. WHO.Surveillance,controlandpreventionofhospitalacquired(nosocomial)infections.Reportofanadvisorygroup.1981BAC/NIC/81.6.
[2]. AnushaS,VijayaLD,PallaviK,ManavalanR.AnEpidemiologicalStudyofSurgicalWoundInfectionsinasurgicalunitofTertiarycareTeaching Hospital.IndianJournalofPharmacy Practice.2010;4:8-13.
[3]. MartoneWJ,NicholasRL. Recognition,prevention, SurveillanceandManagementofSSI.ClinInfectDis.2001;33:67-8.
[4]. Leaper DJ, Vangoor H, Reilly J, Petrosillo N, Geiss HK, Torres AJ etal. Surgicalsite infectionaEuropeanperspectiveofincidence andeconomicalburden.IntWoundJ2004;1:247-73.
[5]. SampsonP.Postoperativewoundsepsisratecanbecut bysimplemeasure.JAMA.1998;239:9-10.
[6]. ClinicalandLaboratoryStandardsInstitute,Performancestandardsforantimicrobialdisksusceptibilitytests;Approvedstandard. 2013;33:M100-S23.
[7]. SuljagićV, Jevtic M,Djordjevic B,JovelicA.Surgicalsite infections in atertiary health care center:Prospectivecohortstudy.SurgToday.2010;40:763-71.
[8]. ReichmanDE,GreenbergJA.ReducingSurgicalSiteInfections:AReview.RevObstetGynecol. 2009;2:212-21.
[9]. LilaniSP,JangaleN,ChowdharyA,DaverGB.Surgicalsiteinfectionincleanandclean-contaminatedcases.IndianJMedMicrobiol.2005;23:249-52.

Dr Vishal shekhar, et. al. "Study of Bacteriological Profile of Post Operative Wound Infections inSurgical Wards in a Tertiary Care Hospital." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(02), 2021,pp.33-36.