Original Article

Common Bacterial Isolates and Antibiotic Sensitivities in Bed Sores

Frequency of Common Bacterial Isolates and Antibiotic Sensitivities in Patients with Community Acquired Bed Sores

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ABSTRACT

Objective: To determine the frequency of common bacterial isolates and antibiotic sensitivities in patients with community acquired bed sores.

Study Design: Cross-sectional study

Place and Duration of Study: Department of Medicine, DHQ Teaching Hospital, KDA Kohat from July 2018 to July 2019.

Methodology: 220 patients were enrolled from both genders. Patient's comprehensive histories and clinical review carried out and regular inquiries followed. Within 48 hours of admission / referral, bed sores were examined with a cotton swab from all patients. After the bacteria were found, susceptibility was tested to widely used antibiotics.

Results: Male to female ratio was 2.55:1. Average age was 37.15±10.91. Escherichia Coli was found in majority of cases which were 57.27%.

Conclusion: Culture and sensitivity were practiced in patients with bed sores acquired from the culture. This will not only allow patients to seek adequate care, but also deter the indiscriminate use of antibiotics and avoid further production of bacterial drug resistance.

Key words: Community acquired bed sores, Antibiotics, Common bacteria

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INTRODUCTION

Bedsores (pressure sores) have skin ulcers. They occur over osseous areas, caused by a prolonged strain on the skin, by limiting nutrients and oxygen to the tissue, the slugging of tissue cells in order to induce death, microbial invasions of weakened skin, causing infection[1]. This takes place in four stages reddening of field, redness with may be included the upper skin layers blistering or degradation Dermis and subcutaneous layers breakdown Which contains deeper tissue, including fascia muscles.[2] Pressure injury is 10% in hospitalized patients and its influence in the society is roughly 5% Boxes ordered[3]. These ulcers primarily affect Injury to the spinal cord to using a wheelchair, are lining to cannot travel, due to inadequate nutrition or hygienic conditions or Diabetics.[1,3,4]

Level pressure ulcer incidence in the United Kingdom is 2.2% to 66%, 0% to 65.6% in the United States and Canada. Those figures are determined from the environment and condition of the patient population (hospital relative to community setting, general care patients relative to those with broken femur neck).[1] Pressure ulcers occurred among the 2.5 million hospitalized Americans and the annual cost of decubitus ulcer prevention and treatment is around $10 billion.[5]

Different microorganisms which include normal microflora Gram-positive cocci, e.g. Epidermidis Staphylococcus and Gram-negative pathogen e.g. Pseudomonas aeruginosa, known to cause nosocomial infections, may infect wounds and may result in limited antibiotic treatment options and life-threatening effects.[4,6] Resident skin microflora may be considered largely commensal in nature, but it is known that nonpathogenic microbes often become opportunistically pathogenic when the skin barrier becomes impaired.

Infection by bacteria in pressure sore is a big cause that hampers pressure sore healing[1]. Pathogenic bacteria in pressure sore can help us treat the condition and yet antibiotic resistance of the organism is another common problem.[8] Antiseptics and disinfectants will reduce contamination; these include simple liquid soap, betadine, and iodine. Pseudomonas was the leading bacteria found in bed sores in a study reported by Hossain et al[8] (34.6 percent) followed by E coli (28.4%), Staphylococcus Aureus (12.34%) and Proteus (11.1%). Ceftazidime, Amikacin, Ciprofloxacin, and Gentamycin displayed a higher percentage of sensitivity (77.63%, 71.05%, 72.33%, and 56.58%, respectively).

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Organisms are largely resistant to Ampicillin (94.74%), Amoxicillin (90.78%), Co Trimoxazole (73.68%), Flucloxacillin (85.53%), and Ceftriaxone (56.58%), respectively. In another Ghaly et al[1] study, the most prevalent pathogen isolated from pressure sores is Staphylococcus Epidermidis (31.4%), followed by Proteus vulgaris (28.6%), Pseudomonas aeruginosa (22.8%), and E. Coli, K. (8.6%). A pneumoniae (5.8%). Antibiotic susceptibility check for Gram-positive and negative bacteria found that ofloxacin is the most effective antibiotic against clinical bacterial isolates (68.6%), followed by norfloxacin (62.8%), chloramphenicol and amikacin (51.4%), erythromycin (25.7%), ampicillin (20.0%), cephalexin (5.8%), and penicillin (0%).

This research aims to investigate the bacteria involved in contaminated bed sores and to assess their susceptibility to antibiotics. Such pressure ulcers affected not only the patient's family financially but also hospitals.

MATERIALS AND METHODS

This study was conducted at Department of Medicine, DHQ Teaching Hospital, KDA Kohat 1st July 2018 to 31st July 2019. A total of 220 patients were observed by using 3.7% proportion of community acquired Bed sores[3], 95% confidence level and 2.5% margin of error, using WHO software. More over all the patients with bed sores, age range 18- 60 years and both the gender were included while patients having wounds other than bed sores, Bed sores developed during hospitalization were excluded. All patients meeting the inclusion criteria i.e. all Patients with persistent bed sores were included in the OPD report and met the inclusion criteria. The purpose and the benefit of the research were clarified and written informed consent was given. The guardian / relative. Clinical history and clinical examinations were carried out of all cases and regular testing was conducted. Bed sores were obtained from all patients with cotton swab within 48 hours of receipt / reference. In order to take samples using wound swabs in strict aseptic conditions, Sore has been swept in according to Gloucestershire Protocol[8] for cultivation in hospitals for the identification of specific bacteria such as E. Coli, staphylococcus aureus, proteus, and pseudomonas. The susceptibility of commonly-used antibiotics such as ceftazidime, amikacin, gentamicin, ampicillin, ceftriaxone, amoxicillin, ciprofloxacin, co trimaxazole, cephridine and doxycycline was tested when bacteria were detected. To control confusers and prejudice in the study results, strict exclusion criteria were followed. All laboratory experiments were performed under the supervision of an experienced pathologist with at least five years ' experience. Data was analyzed in SPSS version 20. Chi Square test to see effect modification keeping P value $\leq$0.05 were significant.

RESULTS

In this study, 220 patients with community acquired bed sores were observed, in which 158(71.82%) were male and 62(28.18%) were female patients. Male to female ratio was 2.55:1 (Fig. 1). There were 61 (27.7%) patients presented having age less than or equal to 30 years while 109(49.5%) patients were in the age range of 31-45 years and 50(22.7%) were of age range of more than 45 years of age with mean age was 37.15±10.91 years (Table 1). Distribution of common bacteria shows that E Coli was found in majority of cases which were 57.27%, followed by Staphylococcus Aureus 55% and Proteus in 42.73% and klebsiella in 42.73% patients (Fig. 2).

Age wise distribution of common bacteria shows that Escherichia coli was found in majority of the patients having age less than or equal to 30 years which was 60.7% followed by 56.9% patients having age 31-45 years and more than 45 years of age with 54%, while almost all the other organisms show in majority of patients having age less than or equal to 30 years of age (Table 2). The majority of females i.e. 40(64.5%) presented with community acquired bed sores have Escherichia coli while 86(54.4%) Escherichia coli were found in male patients. Similarly 87(55.1%) Staphylococcus Aureus found in male and 34(54.8%) were found in female. There were 72(45.6%) Klebsiella have found in male and 22(35.5%) have found in female patients. There were 66(41.8%) Campylobacter Jejuni have found in male and 22(35.5%) have found in female patients. The rest of micro organisms are shown in Table 3. The antibiotic sensitivity of common bacteria shows that Amikacin was more sensitive. The rest of antibiotics sensitivity and resistant has given in Table 4.

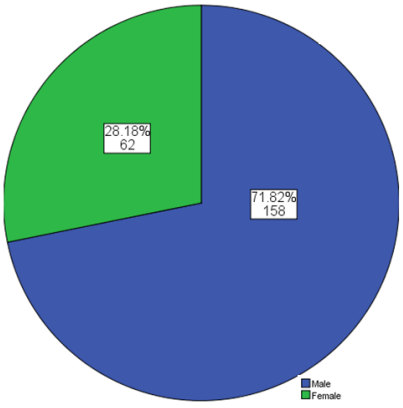

Fig. 1: Gender wise distribution of the patients

Table No.1: Age-wise distribution of the patients (n=220)

Age (years)	No.	%
≤ 30	61	27.7
31-45	109	49.5
≥46	50	22.7

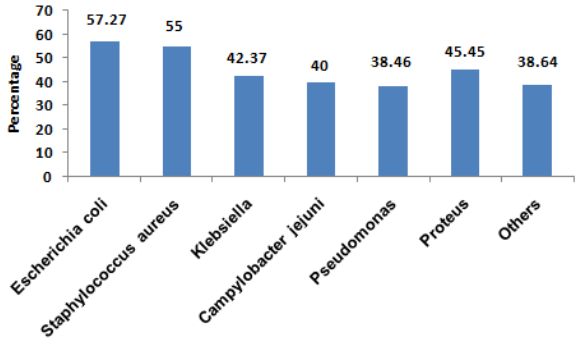

Figure No.. 2: distribution of micro-organism

Table No.2: Comparison of common bacteria according to age

Common bacteria	Age (years)			P value
	≤30	31-45	≥46	
E. coli				
Yes	37 (60.7%)	62 (56.9%)	27 (545)	0.7745
No	24 (39.3%)	47 (43.1%)	23 (46%)	
Staphylococcus aureus				
Yes	31 (50.8%)	62 (56.9%)	28 (56%)	0.7383
No	30 (49.2%)	47 (43.1%)	22 (44%)	
Klebsiella				
Yes	23 (37.7%)	48 (44%)	23 (46%)	0.7248
No	38 (62.3%)	61 (56%)	27 (54%)	
Campylobacter jejuni				
Yes	19 (31.1%)	47 (43.1$)	22 (445)	0.2507
No	42 (68.9%)	62 (56.95)	28 (565)	
Pseudomonas				
Yes	25 (41%)	40 (36.7%)	20 (40%)	0.8378
No	36 (59%)	69 (63.3%)	30 (60%)	
Proteus				
Yes	27 (44.3%)	49 (45%)	24 (48%)	0.9155
No	34 (55.7%)	60 (55%)	26 (52%)	
Others (S. epidermidis & bacteroids				
Yes	25 (41%)	40 (36.7%)	20 (40%)	0.8378
No	36 (59%)	69 (63.3%)	30 (60%)	

Table No.3: Comparison of common bacteria according to gender

Common bacteria	Gender		P value
	Male	Female	
E. coli			
Yes	86 (54.4%)	40 (94.5%)	0.2259
No	72 (45.6%)	22 (35.5%)	
Staphylococcus aureus			
Yes	87 (55.1%)	34 (54.8%)	0.5471
No	71 (44.9%)	28 (45.2%)	
Klebsiella			
Yes	72 (45.6%)	22 (35.5%)	0.2259
No	86 (64.4%)	40 (64.5%)	
Campylobacter jejuni			
Yes	66 (41.8%)	22 (35.5%)	0.4833
No	92 (58.2%)	40 (64.5%)	
Pseudomonas			
Yes	56 (35.4%)	29 (46.8%)	0.1629
No	102(84.6%)	33 (53.2%)	
Proteus			
Yes	72 (45.6%)	28 (45.2%)	0.5389
No	86 (54.4%)	34 (54.8%)	
Others (S. epidermidis & bacteroids			
Yes	56 (35.4%)	29 (46.8%)	0.1629
No	102(64.6%)	33 (53.2%)	

DISCUSSION

Treatment for home patients, 1.2 percent – 11.3 percent in stage II or higher pressure ulcers.[5]. 17% of the people admitted to nursing homes reported pressure trauma at the time of admission. 13% of citizens did not have pressures at the time of enrollment in the first year and 21% in the second year[6]. According to the analysis of Canada, the incidence of new pressure ulcers was widely differed in installations from one installation to the next and ranged from 0 to 10.9% over a 6-month period [8-10]. Patients without pressure ulcers admitted to care facilities, ranked 11.2% of patients between 70–79 years, and 34% of 190 years of age finally developed a pressure ulcer[11].

Pressure sore is the main cause of fatigue in admitted patients in hospitals. We have researched the bacteriological status of 220 patients admitted to Medical Station, Khyber Professional Hospital. The majority of patients were in the middle age group in my study. Patients' average age was 47.44±13.30. The pressure sore patients included 72% of the males and 28% of the females. Males were predominant in our sample group. The ratio of men to women was 2.57: 1. In 2009, the Wound Electronic Medical Record checked Sciffmen et al[4], 2060 patients in the wound healing hospital unit: the mean patient age was 73.1 years, and the men 45%. In comparison, in our sample group, average age is lower.

Table No.4: Antibiotic sensitivity of common bacteria

Antibiotics	E Coli	Staphylococcus aureus	Klebsiella	Campylobacter Jejuni	Pseud-omonas	Proteus	Others (S. Epidermidis & Bacteroids)
Ceftazidime							
Sensitive	44 (34.9)	44(36.4)	32(34.0)	37(42.0)	34(40.0)	35(35.0)	34(40.0)
Resistance	82 (65.1)	77(63.6)	62(66.0)	51(58.0)	51(60.0)	65(65.0)	51(60.0)
Amikacin							
Sensitive	91(72.2)	84(69.4)	62(66.0)	58(65.9)	64(75.3)	74(74.0)	64(75.3)
Resistance	35(27.8)	37(30.6)	32(34.0)	30(34.1)	21(24.7)	26(26.0)	21(24.7)
Gentamicin							
Sensitive	67(53.2)	74(61.2)	58(61.7)	53(60.2)	56(65.9)	64(64.0)	56(65.9)
Resistance	59(46.8)	47(38.8)	36(38.3)	35(39.8)	29(34.1)	36(36.0)	29(34.1)
Ampicillin							
Sensitive	84(66.7)	76(62.8)	55(58.5)	56(63.6)	65(76.5)	72(72.0)	65(76.5)
Resistance	42(33.3)	45(37.2)	39(41.5)	32(36.4)	20(23.5)	28(28.0)	20(23.5)
Ceftriaxone							
Sensitive	73(57.9)	75(62.0)	57(60.6)	72(81.8)	53(62.4)	62(62.0)	53(62.4)
Resistance	53(42.1)	46(38.0)	37(39.4)	16(18.2)	32(37.6)	38(38.0)	32(37.6)
Amoxicillin							
Sensitive	104(82.5	67(55.4)	57(60.6)	64(72.7)	46(54.1)	55(55.0)	46(54.1)
Resistance	22(17.5)	54(44.6)	37(39.4)	24(27.3)	39(45.9)	45(45.0)	39(45.9)
Ciprofloxacin							
Sensitive	100(79.4)	65(53.7)	56(59.6)	61(69.3)	46(54.1)	55(55.0)	46(54.1)
Resistance	26(20.6)	56(46.3)	38(40.4)	27(30.7)	39(45.9)	45(45.0)	39(45.9)
Cotrimaxazole							
Sensitive	95(75.4)	64(52.9)	54(57.4)	59(67.0)	42(49.4)	51(51.0)	42(49.4)
Resistance	31(24.6)	57(47.1)	40(42.6)	29(33.0)	43(50.6)	49(49.0)	43(50.6)
Cephridine							
Sensitive	100(79.4)	66(54.5)	55(58.5)	61(69.3)	45(52.9)	54(54.0)	45(52.9)
Resistance	26(20.6)	55(45.5)	39(41.5)	27(30.7)	40(47.1)	46(46.0)	40(47.1)
Others							
Sensitive	101(80.2)	66(54.5)	56(59.6)	61(69.3)	44(51.8)	53(53.0)	44(51.8)
Resistance	25(19.8)	55(45.5)	38(40.4)	27(30.7)	41(48.2)	47(47.0)	41(48.2)

In 2005, Matthias[15] investigated the management in 48. percent of Pseudomonas aeruginosis 10.8 percent Enterococcus Sp of complicated skin and soft tissue infection and Staphylococcus aureus isolated. 7,0% Entereobacter spp. 8,2% Escherichia coli Klebsiella spp. 5.8 percent. 5.1% of cases. 5.1%.

In a study of 23 patients, aerobic as well as anaerobic cultivation methods and advanced transport of specimens were tested as the bacteriological findings for clinically contaminated pressure ulcers.[12,13] An average of four isolates (3 aerobic and 1 anaerobic) were recovered. Among those patients with sepsis symptoms, bacteremia is highly prevalent (79 percent)[13]. Aerobes were more often ulcers isolated than anaerobics but twice as many blood samples obtained from 19 patients with bacteremia were recovered. Proteus mirabilis, Escherichia coli, enterococci, staphylococci, and Pseudomonas were isolates recovered from the ulcer.[15,16] Anaerobic isolates included the species of Peptostreptococcus, Bacteroides fragilis, and Clostridium perferential bacteria. B isolates were primarily B. Peptostreptococcus, fragilis and Staphylococcus aureus. P. mirabilis. Bacteremia is polymicrobial in 41 percent of cases. Mudere al.[17] stated that the second leading cause of bacteremia (the main cause is urinary tract infections) and the most likely cause of polymicrobial bakeremia was caused by bacterial pressure ulcers in a 5-year prospective study by residents of a long-term treatment facility. In order to conduct initial microbiological examination of all suspected patients with pressure ulcers, therefore, blood cultures are clearly very important.

CONCLUSION

Pressure sores are definitely a medical condition which is underestimated. The implications of their creation are medical and economical. The most complicated treatment of pressure sore is for patients. Wound debridement is a main concept along with other operations. The most frequent bacterial isolation of Pseudomonas species was followed by E.Coli. Staph was the second most common isolated bacteria. Aureus

and Proteus. Aureus and Proteus. Some sores showed candida and bacteroid anaerobic development. It indicates greater sensitivity in ceftazidim, amikacin, ciprofloxacin and gentamycin. Ampicillin, Amoxicillin, Co Trimoxazole, Ceftriaxone were mainly resistant species isolated from pressure sore.

Author's Contribution:

Concept & Design of Study:	Siraj-ud-Din
Drafting:	Arif Mumtaz, Mehreen Khan
Data Analysis:	Gul Mehnaz, Umair-ul-Islam
Revisiting Critically:	Siraj-ud-Din, Arif Mumtaz
Final Approval of version:	Siraj-ud-Din

Conflict of Interest: The study has no conflict of interest to declare by any author.

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