



COMPARISON OF CLINICAL CHARACTERISTICS OF STAPHYLOCOCCUS AUREUS INFECTION IN ELDERLY AND YOUNGER ADULT PATIENTS IN KURDISTAN REGION. IRAQ

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Article DOI: <https://doi.org/10.36713/epra19564>

DOI No: 10.36713/epra19564

ABSTRACT

The study aimed to determine the clinical characteristics and outcomes of *Staphylococcus aureus* infections are different in elderly patients as compared with younger adults, the study started from January 2021 to December 2022, the samples were collected from male and female patient of 2 hospitals in Zakho and Duhok cities, were stratified into two groups by age, those 60 years or older were considered 'elderly' and those aged 15 to 59 years were defined as a younger'. Of 481 patients with an *S. aureus* infection. 249 (51.67) were classified as younger, while incidence rates of elderly patients were 232 (48.33). Pneumonia was the most common *S. aureus* infection in the younger group and skin and soft tissue infection, bacteremia infection, Bone and joint infection, Surgical site infection and endocarditis infection was the most common in the younger group comparative with the elderly group, Old age (60 years) was confirmed to be a strong independent risk factor for death in the entire study population after adjustment for confounding variables. And the clinical Characteristics in elderly and younger patients with *Staphylococcus aureus* infection. was incidence most common in the younger group comparative with the elderly group rates.

KEYWORDS: *Staphylococcus aureus* Aged. Infection, outcomes, Clinical characteristics.

INTRODUCTION

Staphylococcus aureus is both a commensal bacterium and a human pathogen. Approximately 30% of the human population is colonized with *S. aureus* (1). Simultaneously, it is a leading cause of bacteremia and infective endocarditis (IE) as well as osteoarticular, skin and soft tissue, pleuropulmonary, and device-related infections. We do not address in any significant depth issues regarding colonization or mechanisms of drug resistance and refer readers to recent reviews (1–6).

Elderly population is increasing in the developed world, both in terms of absolute numbers and proportion of the entire population. In the UK, from 1982 to 2002, life expectancy at the age of 80 increased from 5.8 years to 7.2 years in men and from 7.5 to 8.7 years in women. Trends are similar in other countries where elderlies represent more than 10% of ICU admissions (1–3). Infection, either as a cause of admission to intensive care units (ICU) or as complication during the ICU stay, represents a major health-care issue. It is estimated that elderly adults account for 60% of all ICU days, indicating a prolonged and frequently complicated length of stay (LOS) in an environment with increased rates of nosocomial infections owing to the severity of illness, multiplicity of invasive procedures and complexity of antibiotic and non-antibiotic treatments (3–6). Large epidemiological studies on outcomes of elderly adults after ICU admission are limited. Most data derive from small reports usually from single centers, describing a particular infection or syndrome, while few studies are available on ICU acquired infections (7–14). The most frequent infections in the ICU are respiratory infections, followed by urinary tract (UTIs) and bloodstream infections (BSIs) including catheter related infections (CRIs) (15,16). The definition of elderly patient is a matter of debate. The adult of 65 years old is considered elderly due to insurance reasons. However, aging is a continuous and host-specific process, therefore the subgroups of 65–74 (young-old elderlies), 75–84 (old elderlies) and >85 (old-old or oldest old elderlies) have been used (4,17,18). Over the past three decades, the incidence of *S. aureus* infections has increased and methicillin resistance among *S. aureus* isolates has been a growing problem. (6,7) With the continuing increase in the annual incidence of *S. aureus* bacteremia across all age groups and the continuing increase in the elderly population,

staphylococcus aureus infections have become significant causes of morbidity and mortality in older patients. (19,20,21) Older persons generally have greater susceptibility to infections than younger adults (.22). Urinary tract infections, pneumonia, skin and soft tissue infections, intra-abdominal infections, infective endocarditis, bacterial meningitis, tuberculosis, and herpes zoster appear to have a special predilection for elderly individuals.(22,23) Probably because of the increased prevalence of chronic diseases in older individuals, bacteremia illnesses appear to be more frequent and more often associated with death.(23,24) Despite the clinical significance and increasing frequency of *S. aureus* bacteremia in older adults, only few studies of *S. aureus* bacteremia in older adults have been published.(25) In addition, although it is well established that many infections are both more frequent and more



often associated with mortality in older individuals, comprehensive studies focusing on elderly patients with *S. aureus* infection, not just bacteremia cases, are still limited.

Staphylococcus aureus is the second most common etiological agent of nosocomial bloodstream infections after coagulase-negative *Staphylococcus*. *S. aureus* was responsible for 20.2% of the 24,179 cases of nosocomial bloodstream infections included in the SCOPE project, yielding an incidence rate of 10.3 cases of bacteremia per each 10,000 admissions. *S. aureus* bacteremia can become complicated and progress to metastatic infection, recurrence, severe sepsis, septic shock, and death. The mortality rate associated with *S. aureus* bacteremia (11–43%) has not varied over the last few decades. Six to 12% of cases present recurrence and up to 31% of patients may present metastatic infection (26-35).

Staphylococcus aureus is also reported to be the second most common cause of bloodstream infection after coagulase-negative *Staphylococcus* in patients with neoplastic disease(36). Among the oncological patients seen at Instituto Nacional de Cancerology (INC) during 2002, 57% of the 261 episodes of bloodstream infections were Gram-positive, and *S. aureus* was the main microorganism isolated (31% of all isolates)(37) Similar data were reported by Carney et al at the beginning of the 1980s in the oncology unit of the Veterans Administration Medical Center in Washington, DC, where *S. aureus* was the main causative agent of bloodstream infection (responsible for 23% of all cases) (38). However, more recent reports in developed countries have shown a lower prevalence of *S. aureus* bacteremia: 13% in 1998 and 8% in 2004 (39-45).

The risk factors predicting complications and mortality in patients with *S. aureus* bacteremia have been extensively described over the last few decades; however, the related information regarding cancer patients is scarce (46-52). The aim of the present study was to determine the mortality-predicting risk factors of *S. aureus* bacteremia in cancer patients.

The purpose of this study was to more clearly determine whether the clinical features and outcomes of *S. aureus* infections are different in elderly patients as compared with younger adults.

MATERIALS AND METHOD

Study of *S. aureus* infections started from January 2021 to December 2022, the samples were collected from male and female patient of 2 hospitals in Zakho and Duhok, to determine clinical features and outcomes of *S. aureus* infection in relation age. to showed the difference between to elderly and younger adults. were stratified into two groups by age: those aged 60 years or older were considered ‘elderly’ and those aged 15 to 59 years were defined as ‘younger’. based on the time the culture samples were obtained. We compared data of the elderly group with those of the younger group. All patients were evaluated using a structured case record form. The following information was collected from cases: baseline demographic information, underlying diseases (pulmonary disease, neoplastic disease, liver disease, heart disease, neurologic disease, renal disease, and diabetes *S. aureus* infection was defined by the isolation of *S. aureus* from a normally sterile body site (e.g., blood, cerebrospinal fluid, pleural or peritoneal fluid, aseptically obtained deep-tissue aspirates, or surgical tissue samples). *S. aureus* pneumonia was diagnosed if patients fulfilled the clinical and radiological criteria of pneumonia. and *S. aureus* was isolated from adequate lower respiratory mellitus. infection was also classified as primary bacteremia. The type of infection was determined by physicians on the basis of the isolation of *S. aureus* from the presumed portal of entry and clinical evaluation

Statistical Analyses

The ratios and were calculated., and $p < 0.05$ was considered statistically significant. The software package was used for statistical analyses.

RESULTS

A total of 481 patients with *S. aureus* infection were included in the study. Of these, 249 patients (51.67%) whose age was 60 years or older were classified as the elderly group, and the remaining 232 (48.33) patients constituted the younger group. the younger group was incidences rate (percentage) of Pulmonary disease, Cardiovascular disease, Neurologic disease, Neoplastic disease, Liver and renal disease and Diabetes mellitus was higher comparative with the elderly group (Table 1).

Clinical Characteristics	Younger	%.	Elderly	%.
Pulmonary disease	38	15.26	36	15.52
Cardiovascular disease	43	17.27	40	17.24
Neurologic disease	41	16.46	39	16.82
Neoplastic disease	32	12.86	29	12.50
Liver disease	23	9.24	21	9.05
Renal disease	23	9.24	22	9.48



Diabetes mellitus	49	19.67	45	19.39
Total	249(51.67)	100	232(48.33)	100

The most common diseases (bacteremia, Skin and soft tissue, Bone and joint infection, Surgical site infection, Endocarditis, pneumonia, Urinary tract infection) incidence rate in younger group was high comparative with elderly group was low rate (all p < 0.05) (Table 2).

Table 2: Comparison of type of infection in elderly versus younger patients with *Staphylococcus aureus* infection.

Type of Infection	Younger	%. Younger	Elderly	%. Elderly
Primary bacteremia	32	12.86	31	13.36
Skin and soft tissue infection	34	13.66	32	13.79
Bone and joint infection	31	12.45	28	12.09
Surgical site infection	11	4.42	10	4.31
Endocarditis	19	7.63	17	7.32
Pneumonia	45	18.07	43	18.53
Urinary tract infection	34	13.65	31	13.36
Concomitant bacteremia	43	17.26	40	17.24
Total	249	100	232	100

DISCUSSION

This study has provided a comprehensive evaluation of the clinical characteristics of younger patients with *S. aureus* infection, as well as those with *S. aureus* bacteremia. It appears that younger patients with *S. aureus* infection indeed have distinctive features when compared with elderly, and that younger patients have higher overall mortality than elderly patients. The presence of co-morbid conditions in elderly populations has been identified as a better predictor of impaired immunity than chronological age. (54,55) No statistically significant differences between the elderly and younger populations with regard to the clinical characteristics of patients with *S. aureus*.

However, even after adjustment for co-morbid conditions, our data showed that old age was one of the independent factors associated with increased mortality in patients with *S. aureus* infection. have also shown that younger patients have a greater risk of death with *S. aureus* bacteremia;(56). the types of infection with a poor outcome, were more common in the younger group than in the elderly group. such as lung and primary bacteremia, are associated with higher mortality in *S. aureus* bacteremia. (36).

The higher proportion of bacteremia and pneumonia in the elderly group could have influenced the mortality rate, because these infections have been found to be independent predictors of mortality in *S. aureus* infection.(36,53) Although the major focus in infectious diseases has been on young adults with infection or immunocompromised hosts, the vast majority of serious infectious diseases will be seen in the elderly population.(27) Therefore, clinicians who care for adult patients should become familiar with the clinical problems in the elderly population. We believe that providing data and information on some of the unique aspects of aging and *S. aureus* infection.

The presence of co-morbid conditions or severity of underlying illness is clearly a determinant of the mortality in patients with bacterial infections. Second, we were unable to obtain detailed information regarding the appropriateness of antimicrobial therapy for many cases. Consequently, we were unable to fully assess whether inappropriate antimicrobial therapy, which might be one of the risk factors for mortality, was more frequent in the elderly group. In addition, we did not study the effect of different available options for *S. aureus* infection on mortality. Third, we may have incorrectly identified the type of infection or have failed to identify metastatic infections in several cases, despite the prospective design of this study. However, these limitations would likely affect elderly and younger patients equally. Fourth, in our study a catheter-related bloodstream infection was classified as primary bacteremia, since the differentiation of catheter-related bloodstream infections from primary bacteremia is frequently difficult in clinical practice. However, there is a clear difference in management and outcomes for bacteremia with and without a removable focus

CONCLUSION,

our study showed that younger patients currently account for a major proportion comparative with elderly patients with *S. aureus* infection. and the clinical features of younger patients with *S. aureus* infection differed substantially from those of elderly patients in terms of underlying diseases, and type of infection. We also confirmed that *S. aureus* infection in the elderly population is a serious clinical condition, in which the mortality rate is more than twice that in younger patients.

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