



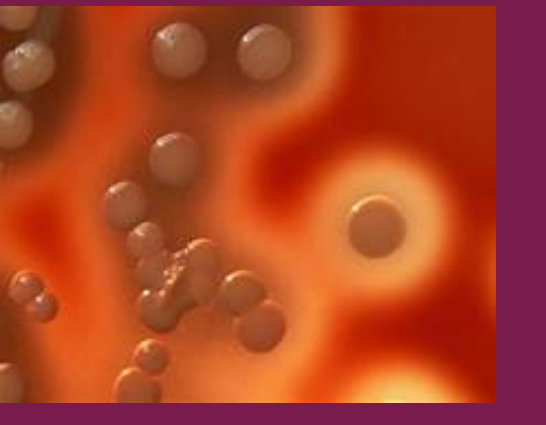
A SINGLE CENTRE EXPERIENCE: INCIDENCE OF STAPHYLOCOCCUS AUREUS BACTEREMIA IN PATIENTS ABOVE 12 YEARS OLD ADMITTED FOR DENGUE FEVER

MyAMR2024
-0027



Foong NN¹, Johari Z², Thangavelu S¹

(1) Department of Internal Medicine, Hospital Tuanku Jaafar Seremban
(2) Unit of Microbiology, Department of Pathology, Hospital Tuanku Jaafar Seremban



ABSTRACT

INTRODUCTION

Dengue is the most widespread vector-borne disease in the world and is endemic to South East Asia, usually requiring admission to healthcare centres for hydration and monitoring of symptoms and warning signs. However, complications such as hospital-acquired infections can arise during admission. We aim to investigate the characteristics and outcomes of Staphylococcus Aureus bacteraemia (SAB) in patients admitted for dengue fever.

METHOD AND RESULTS

A retrospective study was conducted looking at admissions for dengue fever in patients aged 12 years and above admitted in a single tertiary hospital in Negeri Sembilan, Malaysia who developed SAB as a hospital-acquired complication. In the year 2023, 1644 patients were admitted for dengue fever, of which 0.85% acquired SAB (14 patients) during admission. There was 1 case (7%) of Methicillin Resistant Staphylococcus Aureus (MRSA) and 13 cases (93%) of Methicillin Sensitive Staphylococcus Aureus (MSSA). 12 patients (86%) suffered from thrombophlebitis during admission prior to the positive blood culture being taken, while the remainder 2 patients (14%) were diagnosed with catheter-related blood stream infection (CRBSI). The existing medical conditions of each patient who developed SAB were characterised and the rate of each medical condition determined. Amongst the 14 patients identified, 6 patients (43%) had hypertension, 6 patients (43%) had type 2 diabetes mellitus, 2 patients (14%) had chronic kidney disease, and 2 patients (14%) suffered from end-stage renal failure on renal replacement therapy. After commencing appropriate treatment, there was a mean of 4.7 days from positive blood culture to negative blood culture (culture clearance). The majority of patients (6 patients, 43%) achieved culture clearance between 3 to 7 days. 2 patients (14%) did not have their blood cultures repeated. The most popular intravenous antibiotic administered as treatment was Cefazolin, for 6 (43%) cases. 4 patients (29%) received Cloxacillin, 1 patient (7%) received Tazocin, while the single patient (7%) with MRSA received Vancomycin. 2 patients (14%) were not treated with antibiotics. The average duration for antibiotic treatment was 17.1 days. The affected patients were admitted for an average of 21 days. Out of all 14 patients identified, there was 1 (7%) mortality.

DISCUSSION AND CONCLUSION

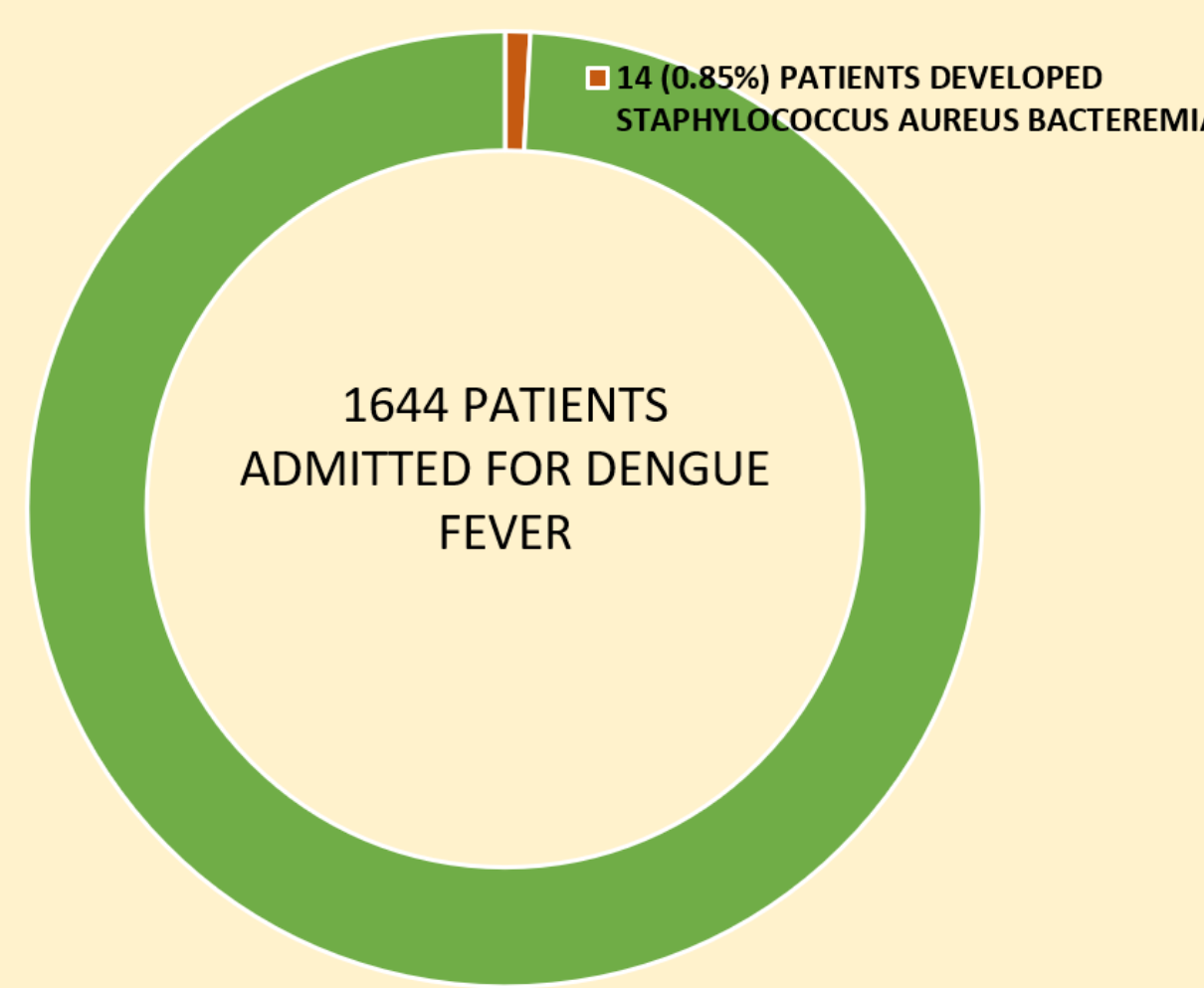
This study demonstrates that SAB is a significant complication of patients admitted for dengue fever, and likely to be acquired from thrombophlebitis. Stringent measures should be taken to reduce SAB rates and prevent prolonged hospital stay and mortality.

RESULTS

A total of 1644 patients were admitted to Hospital Tuanku Jaafar, Seremban, during the year 2023. Out of these 14 patients (0.85%) developed Staphylococcus Aureus bacteremia during the same admission (85 in 10000 patients).

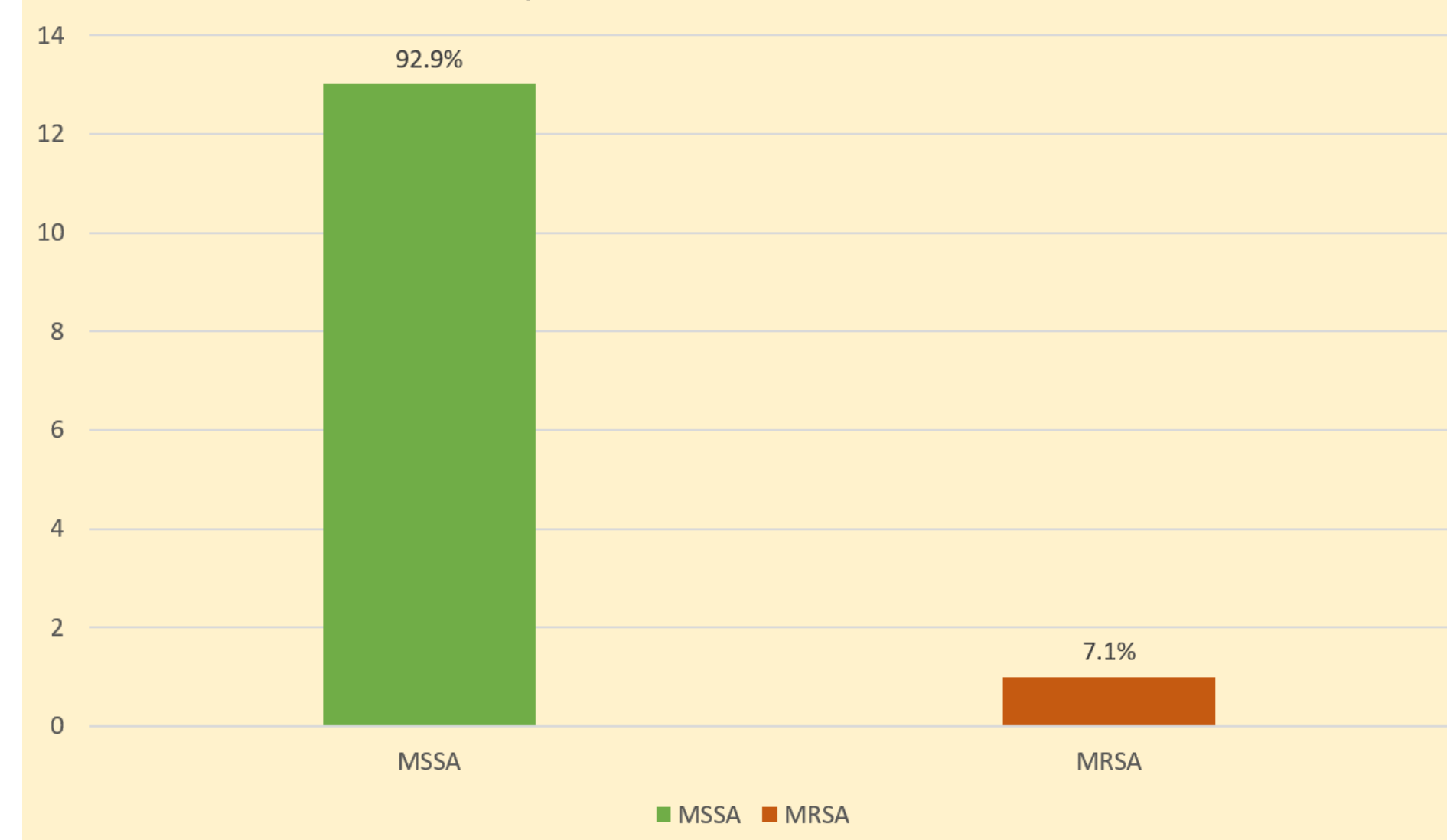
These patients were aged between 19 years old to 68 years old, with the mean age being 44.6 years old. The mean length of admission for these patients was 21 days. The study identified 1 patient (7.1%) who passed away during admission as a complication of the bacteremia. During the analysis of the co-morbidities of these patients, the majority suffered from Type 2 Diabetes Mellitus (6 patients or 42.9%), and Hypertension (6 patients or 42.9%). Other underlying medical conditions include Chronic Kidney Disease (2 patients or 14.3%), End Stage Renal Function requiring renal replacement therapy (2 patients or 14.3%), previous Cerebrovascular Accident (1 patient or 7.1%), and Down's syndrome (1 patient or 7.1%). A total of 5 patients had no known existing medical conditions.

Figure 1: Percentage of patients admitted for dengue fever in 2023 who developed Staphylococcus Aureus bacteremia



Methicillin Sensitive Staphylococcus Aureus (MSSA) was isolated from the blood cultures of 13 patients (92.9%) while the remainder 1 patient (7.1%) grew Methicillin Resistant Staphylococcus Aureus (MRSA). Only 12 (85.7%) out of these 14 patients were treated with intravenous antibiotics while inpatient. The remainder 2 patients (14.3%) were unfortunately discharged before the results of the blood culture isolated were identified as positive. The majority of treated patients (6 patients or 42.9%) received Cefazolin, 4 patients (28.6%) were treated with Cloxacillin, 1 patient (7.1%) was given Piperacillin-Tazobactam, and the single (7.1%) MRSA bacteraemia inflicted patient was treated with Vancomycin.

Figure 2: Percentage of patients admitted for dengue fever who developed MSSA and MRSA bacteremia



Antibiotic treatment ranged from a total of 0 to 50 days, with the mean treatment duration being 17.1 days.

DISCUSSION

Dengue is a viral infection transmitted to humans through the bite of an infected Aedes mosquito (1). It has emerged as the most widespread vector-borne disease in the world and is endemic in 10 Southeast Asia countries including Malaysia. The Ministry of Health Malaysia estimated a 67.5% increase in dengue cases reported in 2024 compared to the last year (2). Dengue fever will require admission for dehydration, warning signs and severe disease. (3) However, admissions to hospitals will increase the risk of developing hospital acquired bacteremia. This is due to the insertion of medical devices (4) such as intravenous lines and exposure to multidrug resistant organisms. Staphylococcus aureus is one of the most common causes of hospital acquired bacteremia (5).

In this study, a surprising total of 85 per 10000 (0.85%) admissions for dengue suffered Staphylococcus Aureus bacteremia (SAB) as a complication. Out of these, 92.9% were MSSA bacteremia. These patients spanned an age group between 19 and 68 years old, and several had multiple existing co-morbidities while 5 (35.7%) had no underlying comorbidities. This study was limited in that it did not explore the significance of the age or underlying comorbidities in the patients who developed SAB. However, all cases showed to conclude in prolonged hospital stay for intravenous antibiotics, with a mean admission length of 17.1 days. There was one case of mortality.

This study is also limited by its small sample size and short duration of observation. Ideally, data across multiple centres should be used involving a longer duration of time. Due to the retrospective nature of this study, we were unable to determine any long-term complications that could have arisen from the SAB. We also did not explore other complications that could arise from admission for dengue fever such as gram negative bacilli bacteremia (6), or admissions for other reasons that resulted in developing SAB. Therefore, in this study, admission for dengue fever was the main risk factor for developing SAB, and we speculate due to the repeated nature of blood taking and intravenous catheter insertion for the administration of intravenous fluids needed to monitor progression and treatment in dengue fever.

OBJECTIVES

1. To determine the incidence of hospital acquired Staphylococcus aureus bacteremia among patients diagnosed with dengue.
2. To study the characteristics of patients admitted for dengue fever who develop hospital acquired staphylococcus aureus bacteremia.

METHODS

This study was conducted as a single-centre retrospective study in Hospital Tuanku Jaafar, Seremban. A list of 1644 patients admitted for dengue fever in the year 2023 to Hospital Tuanku Jaafar was obtained from the state vector unit at Jabatan Kesihatan Negeri. A list of patients who were positive for Methicillin Sensitive and Resistant Staphylococcus Aureus in blood cultures was obtained from the Microbiology Unit WHONET system. These 2 lists were crossmatched to determine the number of patients who were admitted for dengue fever and grew Staphylococcus Aureus in a blood culture in the same admission, which was 14 patients. Other inclusion criteria such as age of above 12 years old at time of admission were also applied. The resulting list of patients were analysed for their co-morbidities, length of hospital stay, antibiotic type and duration received, and outcome of treatment.

CONCLUSION

Staphylococcus Aureus bacteremia is a possible and serious hospital acquired infection in patients admitted for dengue fever. It causes prolonged hospital stay, the need for intravenous antibiotics, and even mortality. Stringent measures need to be taken to prevent this complication.

REFERENCES

1. Dengue | WHO Malaysia [Internet]. [cited 2024 Apr 1]. Available from: <https://www.who.int/malaysia/emergencies/covid-19-in-malaysia/information/Dengue>
2. Dengue Situation Update 692 [Internet]. 2024; 2024. Available from: https://cdn.who.int/media/docs/default-source/wpro-documents/emergency-surveillance/dengue/dengue-20240215.pdf?sfvrsn=fc80101d_138
3. Mustafa M, Mat jelani A, Chow TS. Management of Dengue Infection In Adults (Third Edition). 2015.
4. Abraham L, Bamberger DM. Staphylococcus aureus Bacteremia: Contemporary Management. Mo Med. 2020;117(4):341-5
5. Hongsuwan M, Srisamang P, Kanoksil M, Luangsanatip N, Jatapai A, Day NP, et al. Increasing Incidence of Hospital-Acquired and Healthcare-Associated Bacteremia in Northeast Thailand: A Multicenter Surveillance Study. Selvey LA, editor. PLoS ONE. 2014 Oct 13;9(10):e109324.
6. Pancharoen C, Thiyakorn U. Coinfections in dengue patients. Paediatric Infect Dis 1998; 17:81-2