# C-31 Analysis of Clinical Profiles and Outcomes of *Pseudomonas aeruginosa* Bacteraemia

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## Introduction

*Pseudomonas aeruginosa* bacteraemia is a serious infection. The aims of this study were to: examine the clinical characteristics of *Pseudomonas aeruginosa* bacteraemia; compare the 30-day mortality among pseudomonal bacteraemia of different onsets and determine the predictors of 30-day mortality outcomes.

## Materials and Methodology

A retrospective analysis was performed to review all *Pseudomonas aeruginosa* bacteremia cases occurred between 1st January 2015 and 31st December 2019 in Seri Manjung Hospital, Perak. We included all subjects aged 12-year-old and above with a positive blood culture proven *Pseudomonas aeruginosa* bacteraemia. We excluded cases with incomplete or missing medical data. Also, index blood culture which grew more than one organism was excluded.

## Discussion/Conclusion

Cardiovascular disease and diabetes mellitus were the commonest pre-existing comorbids. The proportion of patients with underlying malignant solid tumours and haematological malignancy were considerably lower compared to the available literature.

A large number of HCA and HO pseudomonal bacteraemia required haemodialysis support and blood products transfusion. These data emphasize the importance of close monitoring of renal function and haemoglobin trend during the course of hospitalization. Also, avoidance nephrotoxic drugs during the course of treatment is crucial as they have a predisposition to develop severe renal complications.

Despite higher rate appropriate empirical antibiotic among cases with HCA and HO infections, they trend towards higher mortality compared to those who received delayed effective antibiotics. Factors such as morbid debility, multiple comorbids and advanced age which have a negative influence in prognosis could possibly explain this observation. Patients who underwent surgery had a better 30-day survival. Hence, we recommend that surgery should be considered if the pseudomonal source is surgically eradicable alongside anti-pseudomonal antibiotics.

In conclusion, CO *Pseudomonas aeruginosa* bacteraemia cases remain scarce in district hospital with majority of the cases belong to HCA and HO infections. Also, pseudomonal bacteraemia is fraught with high morbidity with increased predisposition to haemodialysis, blood transfusion, mechanical ventilator support and ICU care. Lastly, mortality prognostic factor of pseudomonal bacteraemia depends more on the severity of sepsis rather than timeliness of appropriate empiric antibiotic.

## Results

| Characteristics | CO (n=10) | HCA (n=27) | HO (n=22) | p value |
|---|---|---|---|---|
| **Age in years, median (IQR)** | 56.0 (19.8) | 65.0 (22.0) | 61.5 (19.3) | 0.652[c] |
| **Comorbidities, n(%)** | | | | |
| **Cardiovascular disease** | 7 (70.0) | 17 (63.0) | 18 (81.8) | 0.348[b] |
| **Diabetes mellitus** | 5 (50.0) | 12 (44.4) | 14 (63.6) | 0.402[b] |
| **Chronic kidney disease/end stage renal disease** | 2 (20.0) | 11 (40.7) | 9 (40.9) | 0.463[b] |
| **Old stroke** | 1 (10.0) | 2 (7.4) | 5 (22.7) | 0.358[a] |
| **Respiratory disease** | 1 (10.0) | 2 (7.4) | 5 (22.7) | 0.358[a] |
| **Genitourinary disease** | 1 (10.0) | 4 (14.8) | 1 (4.5) | 0.540[a] |
| **Solid tumour** | 0 (0.0) | 4 (14.8) | 1 (4.5) | 0.384[a] |
| **Orthopaedic disease** | 1 (10.0) | 3 (11.1) | 1 (4.5) | 0.703[a] |
| **Chronic liver disease** | 1 (10.0) | 2 (7.4) | 1 (4.5) | 0.822[a] |
| **Haematological malignancy** | 0 (0.0) | 3 (11.1) | 0 (0.0) | 0.280[a] |
| **Human immunodeficiency virus** | 1 (10.0) | 1 (3.7) | 1 (4.5) | 0.571[a] |
| **Autoimmune disease** | 2 (20.0) | 0 (0.0) | 1 (4.5) | 0.034[a] |
| **Others*** | 3 (30.0) | 6 (22.2) | 3 (13.6) | 0.426[a] |
| **SOFA score on / nearest to index blood culture date, median (IQR)** | 4.0 (3.8) | 5.0 (7.0) | 6.5 (11.0) | 0.204[c] |
| **In-patient treatment, n(%)** | | | | |
| **Blood product transfusion** | 2 (20.0) | 20 (74.1) | 17 (77.3) | 0.003[b] |
| **Haemodialysis** | 2 (20.0) | 14 (51.9) | 9 (40.9) | 0.216[b] |
| **Mechanical ventilator** | 2 (20.0) | 8 (29.6) | 14 (63.6) | 0.019[b] |
| **Surgery** | 1 (10.0) | 2 (7.4) | 5 (22.7) | 0.358[a] |
| **Appropriate empirical antibiotic use on index bacteraemia date, n(%)** | 3 (30.0) | 15 (55.6) | 11 (50.0) | 0.383[b] |

**Table 1. Comparison of clinical characteristics of *Pseudomonas aeruginosa* bacteraemia cases by onset category**

*Parkinson's disease, migraine, Bell Palsy, psychiatric disorder, gastritis, hypothyroidism, adrenal insufficiency, haemorrhoids

**Community Onset (CO); Healthcare Asociated (HCA); Hospital Onset (HO)

[a] Fisher's Exact test [b] Pearson Chi-square test [c] Kruskal-Wallis H test

| Variable | 30-day mortality, n (%) | | Adj. OR | (95% CI OR) | *p* value [a] |
|---|---|---|---|---|---|
| | No | Yes | | | |
| **Mechanical ventilator** | | | | | 0.001 |
| No | 28 (80.0) | 7 (20.0) | 1.00 | | |
| Yes | 4 (16.7) | 20 (83.3) | 67.31 | (5.58; 811.78) | |
| **Central venous line (in-patient)** | | | | | 0.018 |
| No | 20 (76.9) | 6 (23.1) | 1.00 | | |
| Yes | 12 (36.4) | 21 (63.6) | 17.54 | (1.62; 190.20) | |
| **Surgery** | | | | | 0.031 |
| No | 26 (51.0) | 25 (49.0) | 182.15 | (1.60; | |
| Yes | 6 (75.0) | 2 (25.0) | 1.00 | 20741.30) | |
| **Switching of inappropriate empirical antibiotic** | | | | | 0.012 |
| Not applicable | 13 (44.8) | 16 (55.2) | 1.00 | | |
| Switched | 16 (76.2) | 5 (23.8) | 0.88 | (0.11; 6.84) | 0.900 |
| Not switched* | 3 (33.3) | 6 (66.7) | 66.70 | (3.08; 1444.46) | 0.007 |

[a] Wald test

**Table 2. Multivariate analysis of predictors of 30-day mortality among *Pseudomonas aeruginosa* bacteraemia cases**

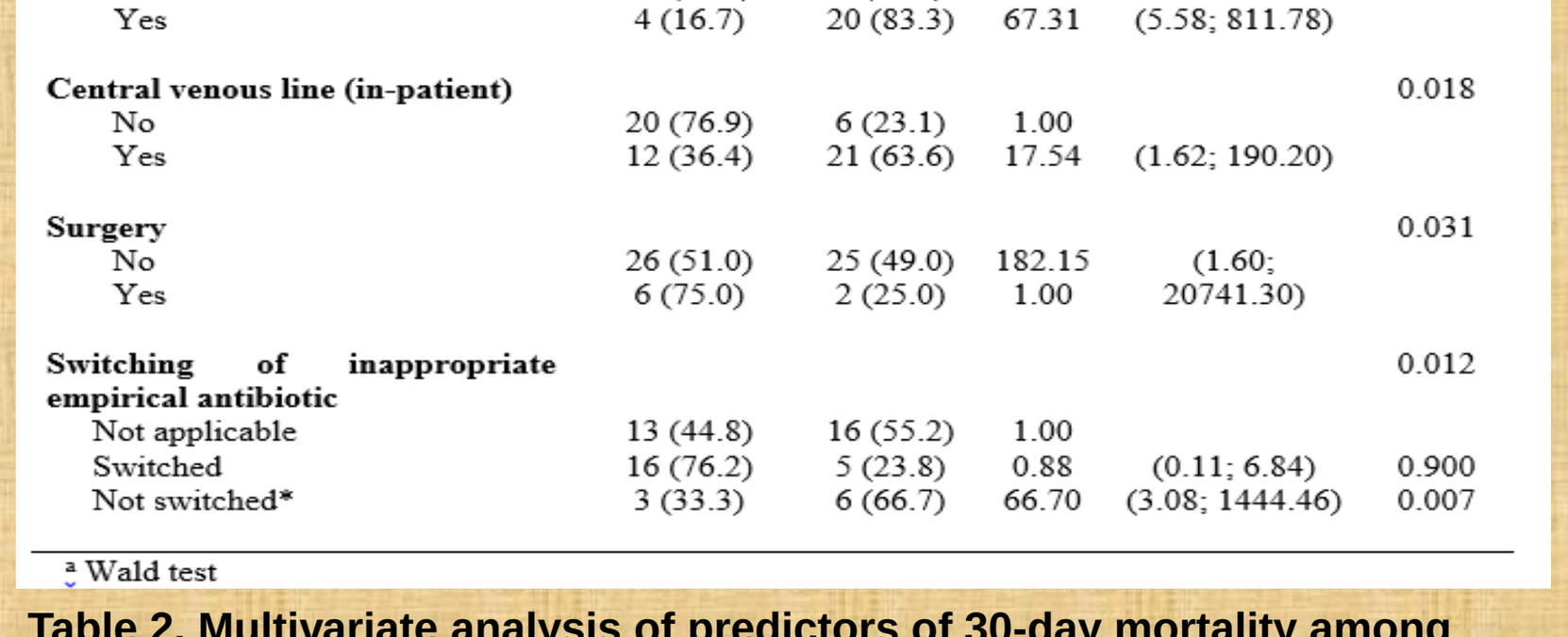


**Figure 1. Kaplan-Meier survival curve for patients with community onset VERSUS healthcare associated VERSUS hospital onset *Pseudomonas aeruginosa* bacteraemia**

It demonstrates 30.0%, 37.0% and 63.6% 30-day mortality rate in community onset, healthcare associated and hospital onset Pseudomonas aeruginosa bacteraemia respectively. (Overall log-rank test; p=0.063)