

The burden of healthcare resource utilisation in patients with complicated acute bacterial skin and skin structure infections (ABSSSI) where first line beta-lactam antibiotics were unsuitable.

Jonathan Sandoe¹, Kordo Saeed², Achyut Guleri³, Kieran Hand⁴, Ryan Dillon⁵, Mike Allen⁵, Amazigom Mayes⁵, Fiona Glen⁶, Armando Gonzalez-Ruiz⁷

¹Leeds Teaching Hospitals NHS Trust and University of Leeds; ²Hampshire Hospitals NHS Foundation Trust; ³Blackpool Teaching Hospitals; ⁴University Hospital Southampton; ⁵Merck Sharp & Dohme UK Ltd.(MSD), Hoddesdon, Hertfordshire; ⁶pH associates Ltd Marlow UK; ⁷Darent Valley Hospital Dartford



Introduction

- Acute bacterial skin and skin structure infection (ABSSSI) accounts for 15% of infections treated in English hospitals and causes considerable morbidity and sometimes mortality¹.
- Optimal infection management and responsible healthcare resource utilisation are NHS priorities.
- These priorities align with antimicrobial stewardship programs and appropriate use of outpatient parenteral antimicrobial therapy (OPAT) services.

Objectives

To describe healthcare resource utilisation in patients with complicated ABSSSI where first-line beta-lactam therapy was unsuitable in NHS hospitals across England.

Methods

Study Design

- A prospective observational study was undertaken at five NHS secondary care centres.
- The observation period extended from the date of presentation with ABSSSI (December 2015-November 2016) to date of death or 30 days after discharge from hospital care.
- Research ethics committee approval was obtained prior to study commencement.

Inclusion Criteria

- Consenting patients aged 18 or over
- Patients with a clinical diagnosis of ABSSSI and:
 - Laboratory confirmed MRSA (Methicillin-Resistant *S. aureus*) at site of infection or in blood culture **OR**
 - Suspected MRSA, in the opinion of the clinical team **OR**
 - Considered inappropriate for initiation or continuation of beta lactam antibiotic treatments
- Patients receiving treatment for ABSSSI in hospital

Exclusion Criteria

- Patients diagnosed with ABSSSI and managed solely in primary care
- Patient unwilling or unable to give consent to allow their records to be used for the study
- Patients referred to other hospitals for part of their treatment pathway or where treatment data is not available

Data Analysis

- ABSSSI-related length of stay was defined as the number of days from the date of ABSSSI diagnosis until the patient was deemed fit for discharge from secondary care.
- Cost calculations for inpatient bed days were performed using NHS reference costs² and as described previously (£26 per OPAT contact)³
- Healthcare resource use cost estimates are based on bed days saved and do not include any additional fees associated with private service providers.

Results

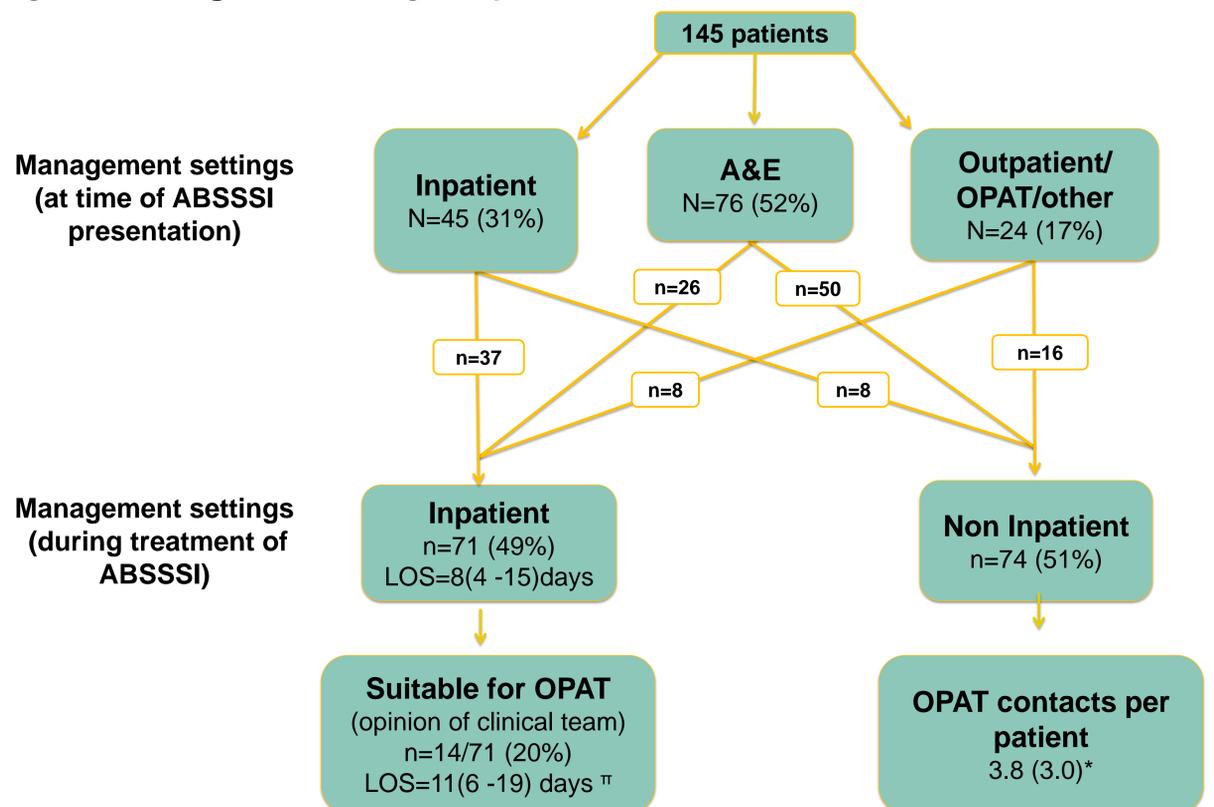
- A total of 145 patients were enrolled in the study; demographics are described in **Table 1**.
- Management pathways observed for patients with ABSSSI in the study are shown in **Figure 1**.
- The mean (standard deviation [SD]) number of OPAT contacts per patient was 3.8 (3.0) for those treated in non-inpatient settings.
- The median (interquartile range [IQR]) ABSSSI related length of stay (LOS) under secondary care responsibility was 8 days (IQR 4-15 days)
- Twenty percent (14/71) of inpatients were deemed suitable to receive OPAT (assuming non-availability of alternative oral antibiotic), despite not receiving treatment in this setting.
- These 14 patients utilised 145 ABSSSI-related inpatient bed days costing an estimated £67,759 (£4,840 per patient at £467.30 per day²)
- Treatment in the OPAT setting for these patients would have cost approximately £1,383 (based on mean of 3.8 contacts per patient), representing potential cost savings ranging from £5,159 (£368 per patient; assuming 1 inpatient day per patient replaced) to £66,375 (£4,741 per patient; assuming all inpatient bed days replaced by OPAT)

Table 1. Patient Demographics

Characteristics	N=145
Male (n,%)	69 (48%)
Age (years)*	64 (17)
Cellulitis (n,%)	116 (80%)
Unsuitable for initiation of beta lactam antibiotics (n,%)	117 (81%)
Confirmed MRSA infection (n,%)	9 (6%)
Suspected MRSA infection (n,%)	19 (13%)

*Result shown as Mean (SD)

Figure 1. Management settings for patients with ABSSSI



†Result expressed as Median (interquartile range), *Results shown as Mean (SD), LOS=length of stay in secondary care

Conclusions

This study demonstrates the healthcare resource burden associated with the management of complicated ABSSSI across 5 NHS hospitals. Although OPAT services are increasingly being developed and utilised in the NHS, there are potential opportunities for cost savings. Strategies to identify patients eligible for OPAT should be harmonised in order to minimise inappropriate resource use and the risk of preventable hospital readmissions.

References

1. Health Protection Agency. (2012) English National Point Prevalence Survey on Healthcare Associated Infections and Antimicrobial Use, 2011: Preliminary data. Health Protection Agency: London.
2. Department of Health. *National Schedule of Reference Costs: The main Schedule*. <https://www.gov.uk/government/publications/nhs-reference-costs-2015-to-2016>
3. Seaton RA, Johal S, Coia JE, Reid N, Cooper S, Jones BL. Economic evaluation of treatment for MRSA complicated skin and soft tissue infections in Glasgow hospitals. *Eur J Clin Microbiol Infect Dis*. 2014 Mar;33(3):305-11.

Acknowledgements

This study was sponsored and funded by MSD. pH Associates was commissioned by MSD to provide support with study design and management, data analysis and medical writing. Authors would like to thank Harblas Ahir and Laura Newby for assistance with protocol development.

