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Microbiology diagnostics and antibiotic treatment in diabetic foot infection in a teaching hospital

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Introduction

Deep tissue and bone samples are advised in patients with diabetic foot infections to rationalise antibiotic regime. We studied the yield of microbiological testing and whether culture results influenced final antibiotics choice and also whether the empirical choice was appropriate.

All diabetic patients who had a deep foot tissue sample between January 2012 and December 2013 at our centre were identified from microbiology laboratory database. Using the Infection Disease Society of America (IDSA) and International Working Group on the Diabetic Foot (PEDIS) classifications each patient's presenting condition was graded 1 (no infection) to 4 (severe infection), with osteomyelitis as a discrete diagnostic entity. Information was collected on the microbiology gram stain, culture and susceptibility results, as well as the antibiotics prescribed for the patient at the time of collection and at the time the final report of the culture result was received.

Scientific findings

One hundred and ten samples from 68 patients were examined. Mean age of patients was 62 years (range 27-88 years). Sixty-nine percent of the samples were taken within an operating theatre and 71% of samples were bone samples, with the rest represented by soft tissue samples.

The gram stain result showed poor correlation with the final culture results. Up to five organisms per sample (median 2) were isolated in culture. Excluding anaerobic growth, gram positive organisms were isolated in 54% of samples and gram negatives in 41%. There was no significant difference between organisms grown and grade of infection. Multiresistant organisms were isolated in 9 patients (7 MRSA and 2 VRE). In 3 cases, MRSA was isolated in patients not previously known to be colonised with this organism. Delaying sample processing until next day for samples collected out-of-hours did not seem to influence the yield in culture.

At the time the sample was taken, 70% of the patients were already on antibiotics but in only 34% the antibiotic decision was appropriate. After the final culture report was received, 86% of patients were on an appropriate antibiotic regime. This meant 70% of patients had a change of antibiotic regime in relation to the final report.

Discussion

Microbiological testing often reveals polymicrobial growth in diabetic foot infections, even at lower grades of infection, confirming the role of tissue sampling in guiding therapeutic choices. There is considerable adjustment of antibiotic regimes in response to culture results supporting that the results are clinically relevant and acted upon. Despite available local and international guidance diabetic patients are still started occasionally on inappropriate empirical antibiotics for their foot infection. In many cases this was represented by the use of a single agent with mainly gram positive coverage (such as flucloxacillin) for grade 4 infections or osteomyelitis. This may be due to clinicians erroneously considering the treatment of a diabetic foot infection to be the same as that for cellulitis in a non-diabetic patient.

Conclusions

The results confirm the polymicrobial nature of diabetic foot infection and highlight the major role played by the microbiological testing in improving the quality of antimicrobial prescribing in this group of patients.