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Background

Diabetic foot infections and osteomyelitis (OM) continue to be a costly and complicated medical problem for medical professionals. The optimal route and duration of therapy for osteomyelitis remains controversial. Amputation and wide surgical margins augments treatment with antibiotics allowing for better outcomes. Even though much has changed in the world of antibiotic therapy and surgical treatment, a 4-6 week course of IV antibiotic therapy remains the current recommendation by the IDSA for positive surgical margins, whereas negative margins require 2-5 days of antibiotics. This is primarily based on a 1970 Blockey and Watson study that treated OM with different IV antibiotic treatment durations. Prospective studies comparing oral versus IV antibiotics and duration in the setting of isolated diabetic OM are limited and there is no clear protocol for treatment. The goal of the current study is to evaluate diabetic patients’ antibiotic regimens after primarily closed partial foot amputations for osteomyelitis, and draw conclusions about the effectiveness and complications based on the route and duration. We hypothesized that the majority of the patients’ antibiotic therapy for OM treated by surgical resection does not follow the IDSA protocol and are treated for longer than the recommended time intervals.

Methods

This retrospective study evaluated diabetic patients with a primarily closed amputation. A total of 57 patients charts were reviewed from January 1st, 2012 to December 31st 2013 using CPT for foot/ankle amputations and ICD 9 codes for diabetes mellitus. Open amputations, emergent cases, and foot infections complicated by PVD were not included. A total of 57 patients with type I and type II diabetes were included. Charts were reviewed for sex, type of diabetes (I or II), advanced imaging, type of amputation, pathology and microbiology results, were clean margins obtained, antibiotic dosage and duration, follow up, outcomes, and complications. This data was analyzed to help identity average antibiotic route and length based off of intraoperative cultures in the presence of OM in a diabetic patient with a primarily closed amputation. We identified outcomes as healing without complication, wound dehiscence, re-ulceration rate, or more proximal amputation. We then compared the results to the IDSA guidelines.

Results

A total of 57 patients were included in this study. 24 patients were treated with oral antibiotic and 33 were treated with intravenous antibiotics postoperatively. The average duration of PO antibiotics was 15.6 days with clean margin samples. Of those patients taking PO antibiotics, 16 out of 24 healed without complications (67%) and 8 patients had complications requiring more proximal amputation (33%). The average duration of IV antibiotics for patients with positive cultures was 36.2 days. Of those patients, 24 out of 33 healed without complication (73%) whereas 9 patients had complications requiring proximal amputation or were lost in follow up with a non-healing wound. Antibiotic regimens were reviewed for all patients and were broken down into average duration of PO, IV and combined therapies. Overall, patients taking PO antibiotics average duration was 18 days, while IV antibiotic regimens were 33 days and combined PO/IV regimen was an average of 39 days. The average follow up time for patients in this study was 12 months.

Healing Rate and Complications After ABX Treatment

<table>
<thead>
<tr>
<th>Complications</th>
<th>PO ABX</th>
<th>IV ABX</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 TMA 1 BKA</td>
<td>5 BKA</td>
<td>2 Listrac</td>
</tr>
<tr>
<td>2 non healing wounds Lost to F/U</td>
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Healing Rate 67% 73%

Conclusion and Discussion

The diabetic foot and its sequela is a complex medical condition that debilitating many. Studies show 1 out of every 15 diabetics will have complications secondary to OM and require a subsequent amputation. Antibiotic therapy and its duration after confirmed OM and amputation has remained unclear. There has yet to be a study that encompasses a unified, standard clinical, surgical, and antibiotic protocol to address isolated OM in the foot. In 2012, the IDSA guidelines state that in the setting of diabetic OM of the foot after resection of bone with negative surgical margins merits a course of antibiotics for 2-5 days and positive surgical margins need 4-6 weeks of antibiotics. Our review found that patients with negative surgical margins antibiotic course was 10 days longer then the IDSA recommends. Those with positive surgical margins did fall within the IDSA recommendations. Interestingly, patients on both PO and IV had a similar healing rate. Moving forward, comparing the complications rates after treatment with PO vs IV antibiotics would provide further information. A prospective, randomized trial would be helpful in determining the most efficacious treatment with the least amount of complications.

Limitations of this study included a small sample size and pathology results were not always obtained or clearly identified. We also did not take into account patients with multiple amputation sites, extent of infection prior to amputation, or type of bacteria in the positive culture margins.

References