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Online Early
DOI: 10.7547/20-178

ORIGINAL ARTICLE

MORE SPECIALTIES, FEWER PROBLEMS

Using Collaborative Competency Between Infectious Disease, Podiatry, and Pathology to Improve the Care of Patients with Diabetic Foot Osteomyelitis

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Journal of the American Podiatric Medical Association

Online Early
DOI: 10.7547/20-178

This Original Article has been reviewed, accepted for publication, and approved by the author. It has not been copyedited, proofread, or typeset and is not a final version.

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Background: Diabetic Foot Osteomyelitis (DFO) is a common infection where treatment involves multiple services including Infectious Disease (ID), Podiatry, and Pathology. Despite its ubiquity in the hospital, consensus on much of its management is lacking.

Methods: Representatives from ID, Podiatry, and Pathology interested in quality improvement (QI) developed multidisciplinary institutional recommendations culminating in an educational intervention describing optimal diagnostic and therapeutic approaches to DFO. Knowledge acquisition was assessed by pre- and post-intervention surveys. Inpatients with forefoot DFO were retrospectively reviewed pre- and post- intervention to assess frequency of recommended diagnostic and therapeutic maneuvers, including appropriate definition of surgical bone margins, definitive histopathology reports, and unnecessary intravenous antibiotics or prolonged antibiotic courses.

Results: A post-intervention survey revealed significant improvements in knowledge of antibiotic treatment duration and the role of oral antibiotics in managing DFO. There were 104 consecutive patients in the pre-intervention cohort (4/1/2018-4/1/2019) and 32 patients in the post-intervention cohort (11/5/2019-03/01/2020), the latter truncated by changes in hospital practice during the COVID-19 pandemic. Non-categorizable or equivocal pathology reports

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decreased from pre-intervention to post-intervention (27.0% vs 3.3%, respectively, P=0.006). We observed non-significant improvement in correct bone margin definition (74.0% vs 87.5%, p=0.11), unnecessary PICC line placement (18.3% vs 9.4%, p=0.23), and unnecessary prolonged antibiotics (21.9% vs 5.0%, p=0.10). Additionally, by working as an interdisciplinary group, many solvable misunderstandings were identified, and processes were adjusted to improve the quality of care provided to these patients.

Conclusions: This QI initiative regarding management of DFO led to improved provider knowledge and collaborative competency between these three departments, improvements in definitive pathology reports, and non-significant improvement in several other clinical endpoints. Creating collaborative competency may be an effective local strategy to improve knowledge of diabetic foot infection and may generalize to other common multidisciplinary conditions.

According to the 2020 CDC National Diabetes Statistics Report, 10.5% of the US population is estimated to have diabetes mellitus (either type 1 or type 2).[1] Among patients with diabetes, there is up to a 34% lifetime risk of developing a foot ulcer, making it an extremely common medical problem seen in both outpatient and inpatient settings.[2,3] In fact, Medicare spends $9-13 billion/year on diabetic foot osteomyelitis (DFO).[4] Despite this high prevalence and cost, experts have not agreed on a set of diagnostic criteria for diagnosing DFO,[5] nor the optimal antibiotic management.[6] For example, while traditionally diabetic foot osteomyelitis has been

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treated with 6 weeks of IV antibiotics in the United States, oral antibiotics have been shown to be effective with similar cure rates in multiple studies,[7–9] non-inferior in a Cochrane review,[6] and are recommended in the most recent (2012) Infectious Disease Society of America (IDSA) DFO clinical practice guidelines.[10] It is difficult to generalize from studies because of heterogeneity in disease presentation and because outcome is impacted by control of diabetes, peripheral arterial disease, extent of surgical debridement, compliance with offloading, and other comorbid medical problems.

The lack of clear data and systematic research into this issue has led to wide practice variation and inefficiencies in patient care.[11–13] For example, the IDSA guidelines recommend that if there is "no remaining infected tissue" after surgical debridement for DFO, antibiotics can be discontinued within 2-5 days post-operatively, as opposed to the 4-6 weeks that is recommended for residual osteomyelitis.[10] However, there is not consensus regarding the determination of "no remaining infected tissue" - whether it is visual inspection, a microbiologic sample from the margin, or a histopathological examination of bone from the margin. The International Working Group on the Diabetic Foot (IWGDF) guidelines mention both histopathology and microbiology as potential options to evaluate the margin, but do not recommend one over the other. [14] This lack of consensus may lead to unnecessary risks of prolonged antibiotic exposure and indwelling vascular access. Furthermore, without consensus, we hypothesize providers in each of these services may have separate, siloed schemas for the

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management of DFO. Anecdotally, this has led to provider misunderstandings of the practice of other services. These siloed approaches to a common problem can lead to interspecialty disagreements, a decreased sense of community and increased physician burnout.[15]

Thus, we, as a group of Infectious disease (ID), podiatry, and pathology colleagues at a single, major, urban academic medical center, sought to harmonize our knowledge, attitudes, and practices towards the diagnosis and management of DFO, in a multi-specialty educational process known as collaborative competency.[16] We met several times to come to agreement and iteratively develop consensus on several aspects of management of DFO and improve quality. We then presented these at an institutional, multidisciplinary educational conference, and evaluated for change in knowledge and understanding by providers. Then, we assessed for the impact of knowledge changes on clinical outcomes by retrospectively analyzing charts of a pre- and post-intervention cohort of inpatients with forefoot DFO specifically analyzing improvement of appropriate designation of surgical bone margin, definitive pathology reports, unnecessary peripheral inserted central catheter (PICC) placement, and unnecessarily extended antibiotics in the presence of a osteomyelitis negative proximal bone resection margin.

Methods

Educational Intervention Design and Content

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Members from Infectious Disease (VJ, ML, WS, AWK), Podiatry (CS, JG), and Pathology (AW, IS) first met in the summer of 2019 to discusses opportunities to harmonize care in the approach to diabetic foot infection with a focus on three main topics. At our major, urban, academic medical center, patients with DFI are managed usually on the general medicine service guided by consultations from podiatry, vascular surgery, and ID. Occasional patients are treated on the podiatry or vascular surgery services with ID consultation. Our shared, overall goal was to obtain appropriate specimens from bone where osteomyelitis was suspected and to accelerate the availability pathologic reports for these bone specimens in order to decrease unnecessary antibiotics treatment and PICC lines.

To achieve this goal, we first had to ensure the appropriate specimens were being sent from the OR, so that providers could identify osteomyelitis that was surgically cured, i.e. osteomyelitic bone had been totally excised resulting in no residual infected bone. We agreed to emphasize appropriate labeling of proximal bone margins relative to excision plane and to obtain bone samples for culture from the area of infection. We agreed that these efforts would provide the most important specimens for evaluating surgical cure and tailoring antibiotic regimens, respectively.[5,17,18]

Next, we addressed the clinical scenario where the histopathology of the proximal bone margin was delayed pending bone decalcification prior to microscopic examination but patients were ready for discharge. Often at our institution, these patients were empirically started on IV

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antibiotics via a PICC or midline catheter and discharged. As a result, patients with a subsequently reported negative bone margin and thus not requiring prolonged IV antimicrobial therapy, either had their unnecessary IV access removed at their ID clinic visit or had antibiotics continued regardless. With the high rate of concomitant chronic kidney disease, unnecessary IV access should especially be avoided in this group to preserve hemodialysis options.[19] To address this, we emphasized the importance of making joint decisions with the surgery team and estimating the likelihood of residual osteomyelitis.

Lastly, even though DFO is often treated with IV antibiotics, oral antibiotics are recommended in the most recent iteration of the IDSA guidelines (2012)[10] and several studies have shown comparable outcomes for patients on IV and PO antibiotics.[7–9] We aimed to increase provider awareness regarding the option of oral therapy of osteomyelitis using highly bioavailable antibiotics. In patients where the proximal bone margin is histologically negative for osteomyelitis, using oral therapy not only allows easy discontinuation but also avoids the risk of indwelling IV access. Furthermore, oral therapy provides an acceptable treatment modality in the event there is residual osteomyelitis at the proximal bone margin. We did not advocate that all DFO to be treated with oral antibiotics but rather recognized the need for individualized therapy, given the inherent heterogeneity of DFO presentation in this patient population.[20]

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We combined these concepts into an hour-long in-person interspecialty-educational session that we jointly gave in November 2019 during the weekly ID division case conference, inviting all podiatrists, ID specialists, and relevant pathologists, including trainees, faculty, and advanced practice practitioners. Additionally, between March and July 2020, we presented the same educational session via online video platform during a podiatry grand rounds, Internal Medicine noon conference, and vascular surgery and plastic surgery grand rounds. However, only the participants from the initial educational session in November 2019 were included in the analysis of the educational intervention. We took the principles from this educational intervention and created an institutional set of guidelines that are posted to the hospital's main portal for any provider to access.

Educational Session Evaluation

To assess the efficacy of this collaborative educational intervention session, we administered a pre-test by email link to a Redcap pre-test to all invited participants to the November 2019 educational session. On the day of the session, prior to the educational intervention, we encouraged those who had not completed the pre-test to do so through a QR code with a link to the pre-test or a paper version. The pre- and post-tests were created to concisely assess the stated objectives of the educational intervention, to maximize participation, and to assess the educational intervention. With the tests we also collected participant's demographic information and experience treating diabetic foot infections. Two weeks after the session, we

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emailed a link to the Redcap post-intervention test to participants to assess the efficacy of the educational intervention. We sent three reminder emails to increase the post-test completion rate.

Chart Review

To assess the clinical impact of the educational intervention patients from the pre- and post-intervention cohorts were identified from the ID inpatient consultation log at our hospital. These were filtered to identify cases of forefoot DFO that had surgical intervention involving bone. Given there are multiple ways to diagnose DFO, a diagnosis of DFO was inferred using bone culture, bone histology, operative findings, imaging findings, and/or probe to bone testing.[21] All patients had at least one of these criteria to be included. Exclusion criteria included bone involvement proximal to the tarsal-metatarsal joint (midfoot or hindfoot), non-surgically managed DFO, patients without ID consultation, or infection that was limited to superficial planes above the bone. Data was extracted from the electronic medical record at our hospital. Redcap was used to manage data.

The primary outcome was the frequency at which bone specimens reflecting the plane of bone resection were sent for pathologic examination. Bone specimens were considered appropriately labeled if they were 1) unique bone labeled as the distal end of the residual

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bone or 2) unique bone reflecting the proximal end of the resected bone (this when obtaining a specimen from the residual bone would have violated a joint space or over shortened the first metatarsal) or 3) bone from a simple debridement rather than an amputation.

Three secondary outcomes were included. First, was the frequency of inserting unnecessary PICC or midline venous catheters at the time of hospital discharge. This was defined as placement IV access because a pathology report which subsequently did not confirm osteomyelitis at the resection plane was still pending, at the time of discharge. Second was the continuation after discharge of parenteral antibiotic therapy exclusively for presumed osteomyelitis which was subsequently not confirmed by pathology. Third, the frequency of oral antibiotic therapy for possible residual osteomyelitis when an appropriate oral highly bioavailable regimen was available. Fluoroquinolones, doxycycline, trimethoprim/sulfamethoxazole, metronidazole, and linezolid were considered oral, highly bioavailable antibiotics.

The pre-intervention cohort included consecutive patients admitted from 4/1/2018-4/1/2019 with the above inclusion criteria. Among patients undergoing multiple amputations during an admission, only the final amputation during the admission was included, where the surgical margin was the most consequential. The post-intervention cohort was truncated markedly by the COVID-19 pandemic (which required significant changes to hospital policies and practice including the end of elective procedures and limiting of provider in-person

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consultation to preserve protective equipment) and thus included only consecutive patients admitted from 11/5/2019-03/01/2020. Prior to 03/01/2020, there were no other significant changes to hospital protocol that we are aware of that would have affected the outcomes of the patients included in our analysis.

Statistical Analysis

Pre- and post-intervention survey responses were compared using McNemar's test.

For the patient chart review, chi squared tests were used to compare pre- and post-intervention cohorts, except when sample sizes were small, where Fisher's exact test was employed.

Summary statistics and all statistical analyses were completed using SAS version 9.4 (SAS Institute, Inc., Cary, NC).

Institutional Review

This project was deemed exempt by the Beth Israel Deaconess Medical Center Institutional Review Board (IRB Protocol: 2019P000455).

Results

Educational Intervention

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The session was attended by 27 participants each of whom completed pre and post-tests and are included in the analysis (Appendix A and B). 82% of participants saw at least 1-5 cases of DFO per month. (Table 1)

The results of the pre and post-tests are shown in Figure 1. Post-intervention knowledge improved significantly regarding duration of antibiotic therapy and the utility of oral antibiotics in the treatment of pedal osteomyelitis in patients with diabetes, but not in other goal content areas.

Chart Review

Baseline characteristics of patients in the pre- and post-intervention cohorts in Table 2. Patients were well matched with similar levels of Hemoglobin A1c, chronic kidney disease, and peripheral arterial disease (Table 2).

Despite the decreased post-intervention cohort size, there was a significant improvement in the ability to characterize pathology reports into categories of acute osteomyelitis, chronic osteomyelitis, acute on chronic osteomyelitis, bone marrow fibrosis, or no evidence of osteomyelitis. Both the insertion of unnecessary PICC lines and unnecessarily prolonged antibiotics in patients where bone margins that did not contain osteomyelitis decreased, although not significantly ($p= 0.23$ and $p=0.10$, respectively). Although the change

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was not statistically significant, patients in the post-intervention cohort received oral antibiotic therapy more frequently for treatment of DFO (40.6% vs 33.6%, p=0.47) (Table 3 and Figure 2).

Discussion

The educational session content and subsequent institutional guidance was created through multidisciplinary consensus building of a collaborative competency for a common, yet disputed problem in diabetic foot infection: improving knowledge of participants in the management of DFO. While there was not a significant improvement in most patient level outcomes, there was a trend towards improvement in several key areas (appropriate margin handling, decreasing unnecessary IV antibiotics, prolonged antibiotics, increasing oral antibiotic usage in appropriate settings), which may have achieved significance if our study had not been impacted by the reduction in post-intervention samples size, owing to the COVID-19 pandemic. However, at a time of significant stress and challenge, it is notable a trend toward improvements related to education and communication among three specialties, podiatry, pathology and ID, were still observed.

The intervention itself was simple, but likely will lead to long-term dividends for both our patients and their providers. By working together as a group, we identified some common misunderstandings. This was exemplified by showing that pathology reports became more definitive after our intervention, even though that was not one of the explicit major objectives of our session. However, after our meetings, these non-oncologic bone specimens were only

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read by a smaller group of specialized pathologists thus helping to standardize the report language and conclusions. Similarly, the podiatric surgeons standardized language in their operative notes to more clearly provide their assessment of the remaining bone. ID consultants increased their understanding foot anatomy and function as well as the data supporting possible surgical cure of DFO and the role of oral antibiotic treatment of selected patients with DFO. These data were communicated to medical teams when making decisions on antibiotic route and duration.

Furthermore, we aimed to increase the sustainability of our project by setting up annual meetings with our three divisions to address and develop new initiatives. We created diabetic foot infection guidelines that are now posted on our hospital portal. We have presented our work to the Vascular Surgery, Plastic and Reconstructive Surgery, and Medicine departments. We hope that by developing this collaborative competency, we will continue to break down the silos in our care system.

Limitations of this approach were its retrospective nature of chart reviews. Additionally, the inherent heterogeneity in the diabetic population with foot infection and the absence of definitive studies guiding the management these infections renders evidence-based standardization of care challenging. A plethora of factors, often concurrent, impact not only the potential outcome of care but also adverse consequences of that care. These factors, often beyond the variables noted in consensus guidelines, engender individualized care which is

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difficult to alter in an initial collaborative competency exercise. Our goal was thus not to impose oral antibiotic therapy for DFO as a standard of care but rather as a data supported approach in selected patients with DFO. Furthermore, there may be specific reasons not readily apparent in the medical record why a bone resection margin is not submitted for pathologic examination. Additionally, our post–intervention patient cohort was limited by the COVID-19 pandemic's impact on hospital policy potentially preluding our ability to demonstrate the effect of our collaborative competency exercise on patient care due to significantly smaller sample size in the post-intervention cohort.

At an academic center, there is a yearly transition of trainees which may lessen impact a single session educational intervention. However, we have tried to sustain the care goals of the intervention by creating a set of institutional DFO care guidelines, establishing yearly joint conferences to reinforce these guidelines and develop new initiatives and by developing departmental "champions " for this effort in the collaborating departments..

Conclusions

As a multidisciplinary QI group of ID, podiatry, and pathology providers, we created by consensus building an educational session that improved provider knowledge about optimal treatment of DFO. By working as a collaborative group, we have created a better community of practice, breaking down the silos that exist in our sub-specialized hospital. While the educational session did not have significant improvement in patient care, this may have been a

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DOI: 10.7547/20-178

result of a low post-intervention sample size rather than a lack of the intervention's effect, as shown by positive trends in all areas assessed. Further research will be needed to assess sustainability of the intervention.

Financial Disclosure: None reported.

Conflict of Interest: None reported**.**

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Table 1: Characteristics of Participants in the Educational Intervention.

Level of Training	**Number (N=27)**	**Percentage of Total Participants**
Nurse (or Nursing Student)	2	7%
Resident	2	7%
Pharmacist (or Pharmacy Student)	4	15%
Fellow	9	33%
Attending	10	37%
Primary Specialty		
Podiatry	3	11%
Pathology	2	7%
Infectious Disease	22	81%
Diabetic Foot Infection Cases Seen		
Less than 1 per month	5	19%
1 to 5 per month	11	41%
More than 5 per month	11	41%

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Table 2: Characteristics of patients in the pre- and post-intervention groups. Fisher's exact test was employed for the Death in 90 days calculation.

	Pre-Intervention (N=104)	**Post-Intervention (N=32)**	**P-Value**
Age, mean (SD)	62.4 (13.5)	59.4 (11.1)	0.15
Male- no. (%)	78 (75)	21 (65.6)	0.30
Peripheral Arterial Disease- no. (%)	69 (66.4)	16 (50.0)	0.09
CKD III or higher- no. (%)	52 (50)	14 (43.7)	0.54
Severe DFI classification at admission- no. (%)	12 (11.5)	4 (12.5)	0.88
Mean %Hgb A1c (SD)	8.6 (2.4)	9.1 (2.5)	0.29
Death in 90 days- no. (%)	6 (5.8)	2 (6.3)	1.00
Readmissions in 30 days- no. (%)	19 (18.3)	5 (15.6)	0.73
-Readmitted for DFI	7 (36.8)	4 (80.0)	0.10
-Readmitted for complication of therapy	2 (10.5)	1 (20.0)	0.08
Median length of stay, days (interquartile range)	10 (7.5, 15.5) days	9 (7, 13) days	0.11
Median time until pathology report finalized, days (interquartile range)	5 (4,6) days	5 (4,7) days	0.23

Abbreviations: SD, Standard Deviation; No., number; CKD, chronic kidney disease; Hgb A1c, Hemoglobin A1c; DFI, Diabetic Foot Infection

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Table 3: Outcomes from Intervention. All N's are for the entire cohort unless otherwise specified. Fisher's exact test was employed for the question prolonged antibiotics in the setting of a negative margin.

	Pre-Intervention (N=104)	**Post-Intervention (N=32)**	**P-Value**
Bone resection margins handled appropriately- no. (%)	77 (74.0%)	28 (87.5%)	0.11
Pathology report of bone margin was unable to be categorized (Denominator = total margins sent)	27/100 (27.0%)	1/30 (3.3%)	0.006
Unnecessary PICC line or midline	19 (18.3%)	3 (9.4%)	0.23
Prolonged antibiotics in the setting of negative bone margin[#]	16/73 (21.9%)	1/20 (5.0%)	0.10
Oral antibiotics used when an oral option available	35 (33.6%)	13 (40.6%)	0.47

[#]**Osteomyelitis not detected histopathologically in bone specimen**

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DOI: 10.7547/20-178

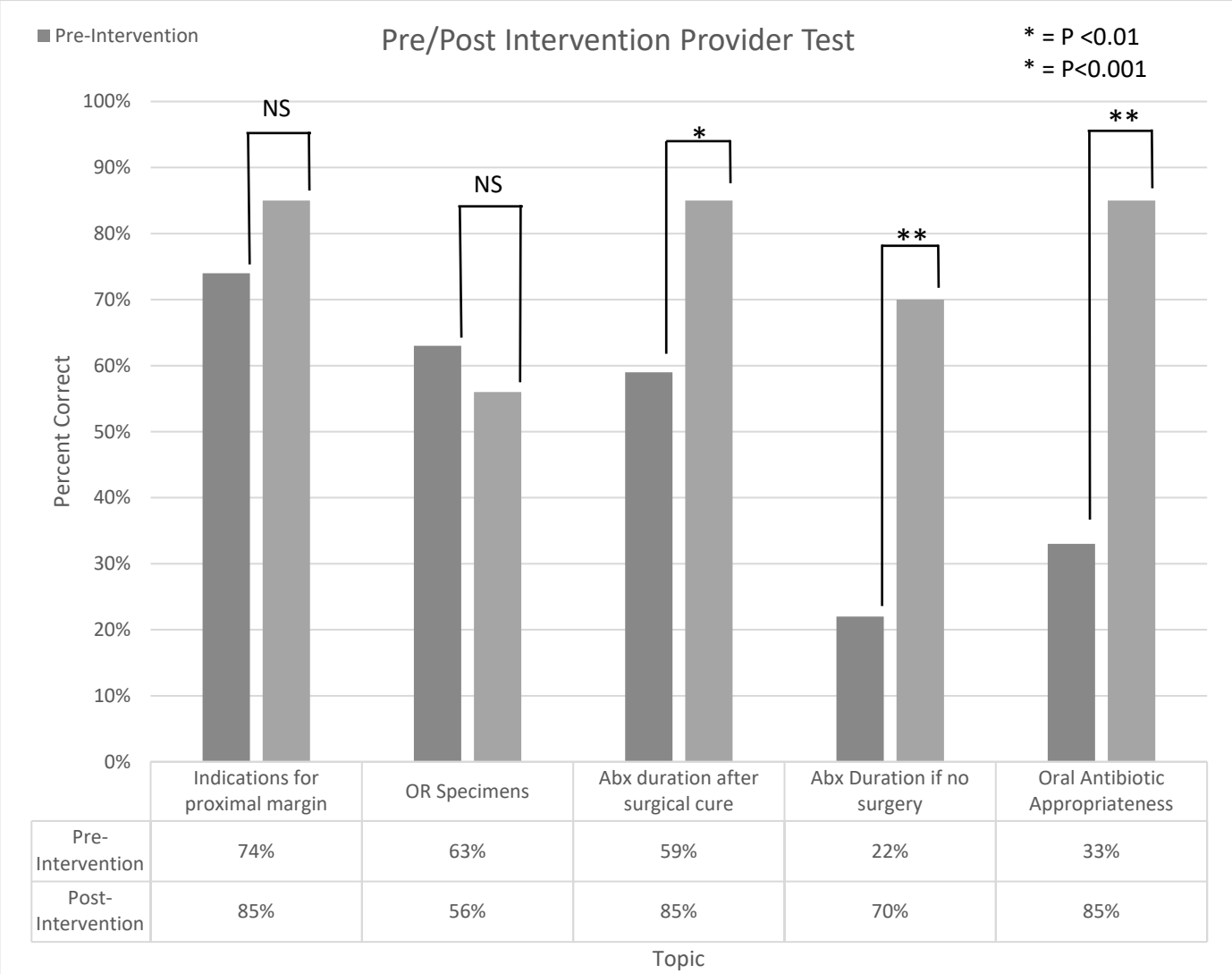

Figure 1: Results from the Pre and Post Tests of Providers after the Educational Session. “Indications for proximal margin” tested on when a proximal margin may or may not be indicated. “OR specimens” tested the learner’s understanding of the value of the potential OR specimens. “Abx duration after surgical cure” assessed if respondents knew that antibiotics can be discontinued a few days after full surgical resection. “Abx duration if no surgery” tested on the concept that 12 weeks of therapy may be necessary in undebrided DFO per IDSA guidelines, “Oral antibiotic appropriateness” assessed whether respondents could identify times where oral antibiotics may be safe and beneficial to use in DFO (e.g. likely surgical cure and patient ready for discharge, but pathology is pending).

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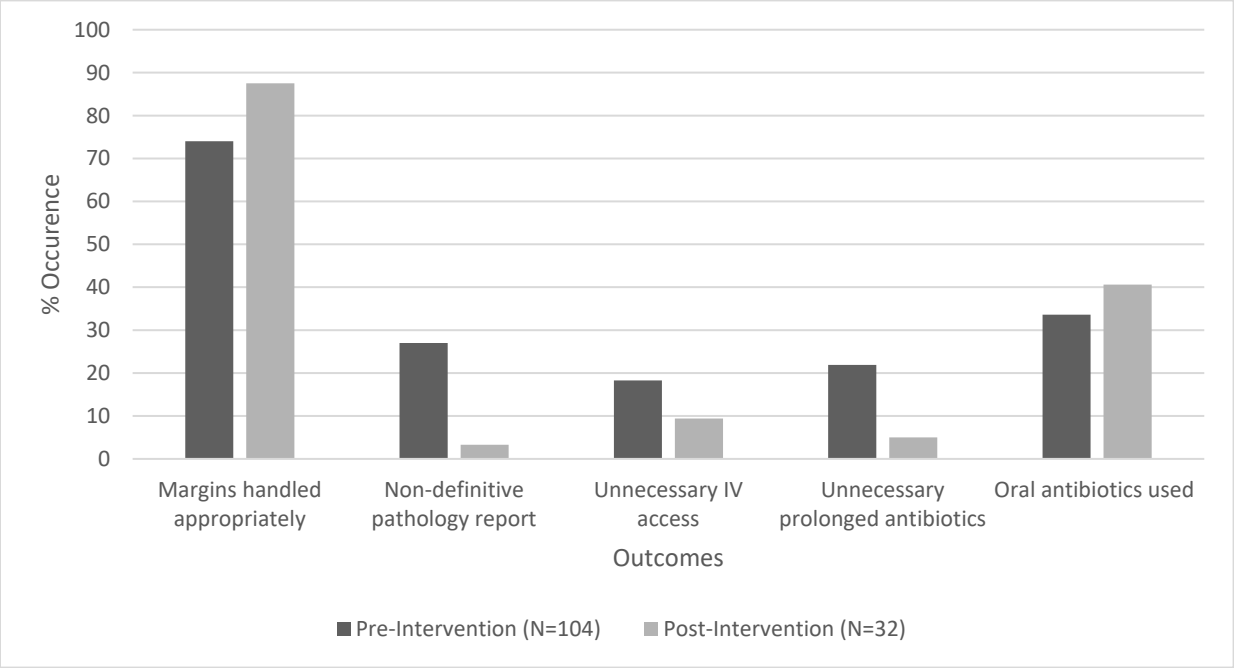

Figure 2: Patient level outcomes pre- and post-intervention.

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Appendix A

Diabetic Foot Infection Provider Pre-Survey

Diabetic Foot Infection Provider Pre-Survey

Please complete the survey below.

Thank you!

What are the last four digits of your cell phone number? _____

Level of Training/Role

◯ Medical Student
◯ Resident
◯ Fellow
◯ Nurse (or Nursing Student)
◯ Pharmacist (or Pharmacy Student/Resident)
◯ Advance Practice Practitioner (NP/PA)
◯ Attending Physician

What is your primary medical specialty?

◯ Podiatry
◯ Infectious Disease
◯ Vascular Surgery
◯ Pathology
◯ Other

What is your specialty? _____

How frequently do you see patients with Diabetic Foot Infections in your clinical practice?

◯ < 1 month
◯ 1-5 per month
◯ >5 per month

---

1 A 56 yo F with a hx of DM2 (A1c = 10.8%), peripheral arterial disease, recurrent diabetic foot wounds who presents with a non-healing 1st digit plantar ulcer that probes to bone. She was seen first in podiatry clinic where it was debrided and cultures are pending. DP pulses are 2+. Gram stain reveals 2+ GNRs, 1+ GPCs in pairs/chains, 1+ GPRs. Her ESR is 109 and she is otherwise clinically stable. She was admitted over the weekend and is planning to go for 1st ray (removal of digit and part of metatarsal bone) amputation today for presumed diabetic foot osteomyelitis. Of the specimens below, which two would you rank as the most important for making treatment decisions regarding antibiotic selection and duration? (Select 2 only)

☐ In the area of infection, deep swab for microbiology
☐ In the area of infection, bone sample for microbiology
☐ In the area of infection, bone sample for pathology
☐ Surgical margin bone sample for microbiology
☐ Surgical margin bone sample for pathology

---

2 Which of the following clinical scenarios warrant sending a proximal margin?

◯ Below the knee amputation for non-healing and infected transmetatarsal amputation stump
◯ Metatarsal head resection for ulcer over the 3rd digit
◯ Disarticulation of the 1st metatarasal-phalanx joint for a distal great toe ulcer

3 (True/False) If the patient's partial 1st ray amputation surgical site is not initially closed, the remaining stump of the 1st metatarsal is presumed to have osteomyelitis since it is exposed.

◯ True
◯ False

4 The following clinical scenario applies to questions 5 and 6.

The patient undergoes 1st ray amputation and remains hemodynamically stable. The operative note comments on "resecting to healthy, bleeding bone." She is set up with wound care and VNA services at home. Cultures grew out Pseudomonas Aeruginosa (Ceftazidime R, Cefepime S, Pip-Tazo R, Levofloxacin S), Group A streptococcus, and Corynebacterium spp.

You inspect the wound bed which is notable for a well approximated incision, stitches intact, no streaking erythema, fluctuance, or abscess. Blood cultures drawn on admission are negative. WBC count has dropped to 7 and she has been afebrile. The primary team is looking to discharge home. Pathology at the margin is pending.

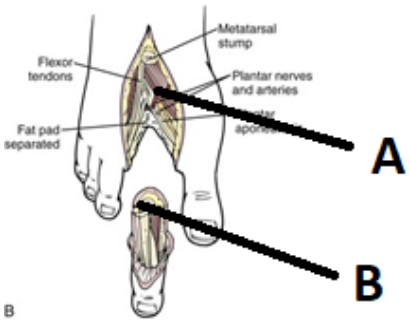
What would you recommend?

◯ Place PICC line, start IV antibiotics for a 6 week course, regardless of margins
◯ Start PO antibiotics (Levofloxacin) for a possible 6 week course with ID follow up, with the option to shorten based on pathology results
◯ Recommend patient stay in hospital and see if pathology can be expedited, and make decision after pathology returns.
◯ Place PICC line, start IV antibiotics for possible 6 week course, but d/c antibiotics earlier if margin pathology is negative
◯ Since it looks like all the infection has been surgically removed, stop antibiotics at discharge.

5 If pathology is negative at the surgical margin, and there is no remaining soft tissue component of infection, what should be the duration of treatment (Day 1=date of OR)?

◯ Depends on margin microbiology
◯ 2-5 days
◯ 2 weeks
◯ 4-6 weeks

Please use the following diagram to answer the next question:



6 The above diagram illustrates a ray amputation. Please answer where margins should be obtained for evaluation by pathology and/or microbiology.

◯ A- distal portion of remaining bone
◯ B- proximal portion of amputated bone
◯ A+ B
◯ Other

7 If a patient is treated medically for diabetic foot osteomyelitis (no surgery), per IDSA guidelines what should be the duration of antibiotics?

◯ 4 weeks
◯ 6 weeks
◯ 8 weeks
◯ 12 weeks
◯ It is not recommended to treat diabetic foot osteomyelitis with antibiotics alone

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Online Early
DOI: 10.7547/20-178

Appendix B

Diabetic Foot Infection Provider Post-Survey

Diabetic Foot Infection Provider Post-Survey

Please complete the survey below.

Thank you!

What are the last four digits of your cell phone number? _____

Did you attend the in-person educational session on 11/5 at 12:30PM at CLS-921 (or listen by phone)?

◯ Yes
◯ No

Would you recommend this session to a colleague? ◯ Yes ◯ No

Level of Training/Role

◯ Medical Student
◯ Resident
◯ Fellow
◯ Nurse (or Nursing Student)
◯ Pharmacist (or Pharmacy Student/Resident)
◯ Advance Practice Practitioner (NP/PA)
◯ Attending Physician

What is your primary medical specialty?

◯ Podiatry
◯ Infectious Disease
◯ Vascular Surgery
◯ Pathology
◯ Other

What is your specialty? _____

---

1 (True/False) If the patient's partial 1st ray amputation surgical site is not initially closed, the remaining stump of the 1st metatarsal is presumed to have osteomyelitis since it is exposed.

◯ True
◯ False

---

2 A 73 yo M with a hx of DM2 (A1c = 9.2%), recurrent diabetic foot wounds who presents with a non-healing 5th digit plantar ulcer that probes to bone. She was seen first in podiatry clinic where it was debrided and cultures are pending. DP pulses are 2+. Gram stain reveals 2+ GNRs, 1+ GPCs in pairs/clusters. Her ESR is 89 and she is otherwise clinically stable. She is going to go for 1st ray (removal of digit and part of metatarsal bone) amputation today for presumed diabetic foot osteomyelitis.
Of the specimens below, which two would you rank as the most important for making treatment decisions regarding antibiotic selection and duration? (Select 2 only)

☐ In the area of infection, deep swab for microbiology
☐ In the area of infection, bone sample for microbiology
☐ In the area of infection, bone sample for pathology
☐ Surgical margin bone sample for microbiology
☐ Surgical margin bone sample for pathology

3 Which of the following clinical scenarios warrant sending a proximal margin?

◯ Below the knee amputation for non-healing and infected transmetatarsal amputation stump
◯ Metatarsal head resection for ulcer over the 3rd digit
◯ Disarticulation of the 1st metatarasal-phalanx joint for a distal great toe ulcer

4 The following clinical scenario applies to questions 4 and 5.

The patient undergoes 5th ray amputation and remains hemodynamically stable. The operative note comments on "resecting to healthy, bleeding bone." She is set up with wound care and VNA services at home. Cultures grew out Pseudomonas Aeruginosa (Ceftazidime R, Cefepime S, Pip-Tazo R, Levofloxacin S, Meropenem S), Group A streptococcus.

You inspect the wound bed which is notable for a well approximated incision, stitches intact, no streaking erythema, fluctuance, or abscess. Blood cultures drawn on admission are negative. WBC count has dropped to 7 and she has been afebrile. The primary team is looking to discharge home. Pathology at the margin is pending.

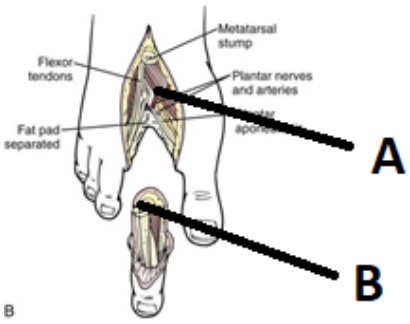
What would you recommend?

◯ Place PICC line, start IV antibiotics for a 6 week course, regardless of margins
◯ Start PO antibiotics (Levofloxacin) for a possible 6 week course with ID follow up, with the option to shorten based on pathology results
◯ Recommend patient stay in hospital and see if pathology can be expedited, and make decision after pathology returns.
◯ Place PICC line, start IV antibiotics for possible 6 week course, but d/c antibiotics earlier if margin pathology is negative
◯ Since it looks like all the infection has been surgically removed, stop antibiotics at discharge.

5 If pathology is negative at the surgical margin, and there is no remaining soft tissue component of infection, what should be the duration of treatment (Day 1=date of OR)?

◯ Depends on margin microbiology
◯ 2-5 days
◯ 2 weeks
◯ 4-6 weeks

Please use the following diagram to answer the next question:



6 The above diagram illustrates a ray amputation. Please answer where margins should be obtained for evaluation by pathology and/or microbiology.

◯ A- distal portion of remaining bone
◯ B- proximal portion of amputated bone
◯ A+ B
◯ Other

7 If a patient is treated medically for diabetic foot osteomyelitis (no surgery), per IDSA guidelines what should be the duration of antibiotics?

◯ 4 weeks
◯ 6 weeks
◯ 8 weeks
◯ 12 weeks
◯ It is not recommended to treat diabetic foot osteomyelitis with antibiotics alone