



Beaumont Multidisciplinary Diabetic Foot Care Symposium

Date: June 19th, 2024.

Location: RCSI Smurfit Building, Beaumont Hospital, Dublin 9, Ireland.

Academic Session Chairs: Mr Seamus McHugh, Prof Diarmuid Smith & Ms Helen Strapp.

1st Prize – Pauline Wilson “What is the clinical utility of SEM measurement in the discernment of DFU”.

2nd Prize – Michael Lockhart “Corynebacterium sp. in Diabetic Foot Ulcers – A Retrospective, Single-Centre, Observational Descriptive Study from a Tertiary Hospital”.

Meeting coordinated by Mr Elrasheid Kheireseid, Consultant Vascular Surgeon, and Ms Megan Power Foley, Specialist Registrar in Vascular Surgery.

The impact of practitioner neuro-divergence on clinical documentation development in the Chronic Disease HUB in CHO7

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Abstract

Introduction

Healthcare staff includes people of varying levels of proficiency including those with common neuro-divergence issues such as dyslexia, dyspraxia and colour blindness. Excellent patient care involves maintaining good patient records. Initial patient assessment provides a baseline against which a patient's care plan can be evaluated. Standardised patient documentation needs to be adopted. Cumbersome documents can introduce excessive subjectivity, incompleteness, increase electronic health record burden and difficulty for practitioners with neuro-divergence.

Methods

Historical documentation used in the high risk and diabetic foot clinics in the Podiatry departments in CHO7 did not consider neuro-divergence during design. New versions were developed through end user feedback including those with neuro-divergence. Changes included; color-coding sections, introducing tick boxes, alerts, and improved layout, all aimed at reducing load on working memory and executive function.

Results

Results included standardisation of notes, time-saving, reduced unnecessary subjectivity and a significant increase in full documentation completion notably by those with neuro-divergence. In line with the research, qualitative feedback highlighted, tick boxes along with colour coding as having the most impact.

Discussion

High risk and diabetic foot assessment can be very complex and a simple, standardised approach is essential to promote full document completion and interdisciplinary and multidisciplinary interpretation. It is imperative that all practitioner's neuro-divergence and practitioner feedback is taken into account when developing patient documentation.

An exploration of lower extremity amputation before, during and after Covid-19

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Abstract

Introduction

The COVID-19 pandemic has had an impact on curtailment of ambulatory care services and non-critical hospital services . In areas where multi-disciplinary diabetic foot teams (MDfTs) have been curtailed, the rate of lower extremity amputation (LEA) and poor outcomes have been noted to increase (Casciato et al 2020). In the current study location the MDfT services were not reduced or curtailed throughout the COVID-19 pandemic. Patients who preferred to use telemedicine were encouraged to do so although face-to-face appointments continued as necessary.

Methods

The rates of LEAs were collected both in total and secondary to diabetic foot disease were collated for the years 2019, 2020 and 2021 as is standard practice. These were analysed against EHR to identify those occurring subsequent to intervention of the MDfT. The rate of all-cause amputations was also analysed

Results

The rate of both major and minor amputations remained unchanged between the three years. This was true for all cause amputation (table 1) and those related to DM (table 2) Anticipated spike in rate of amputations after the pandemic did not materialise. In 2021 the rate of minor amputations actually reduced.

Table 1 – all cause amputation

Type of Amputation	2019	2020	2021
Major	22	27	24
Minor	59	68	56

Table 2 – DM related amputation

Type of Amputation	2019	2020	2021
Major	6	6	6
Minor	42	47	39

Discussion

The MDfT is an effective method of amputation prevention and management of DFD and should be maintained at all times. We note that throughout the pandemic as services were maintained, no increase in the rate of LEA was observed. The anticipated rise in amputations as suggested following the pandemic did not occur in this centre either for those with DM related amputation or for overall amputation rates supporting the need for continuity of service.

The Oral Cavity: a Potential Reservoir for Diabetic-Foot Ulcer Infections

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Abstract

Introduction

Periodontal disease, is more prevalent and severe in patients with diabetes, for whom oral health is commonly overlooked. Staphylococcal bacteria, highly prevalent in the oro-nasal cavities (ONC) of people with periodontal disease, are the predominant cause of diabetic foot ulcer (DFU) infections (DFUIs). This study compared ONC and DFU staphylococcal populations to determine if the ONC is a reservoir for DFUIs using additional members within a multidisciplinary diabetic foot team.

Methods

Participants with type II diabetes with ($N=76$) and without ($N=76$) DFUs provided clinical specimens from various anatomical sites in conjunction with a comprehensive oral examination. Staphylococci were recovered on SaSelect™ chromogenic medium (BioRad, Germany). Isolates ($N=2185$) selected on the basis of distinct colony colours, anatomical sites and individuals were definitively identified by Pastorex latex-agglutination testing (BioRad), *S. aureus*-/*S. epidermidis*-specific PCRs, 16S rRNA-sequencing and MALDI-TOF-MS. Close relatedness of *S. aureus* and *S. epidermidis* isolates, respectively, was determined using whole- genome multilocus sequence typing (wgMLST).

Results

Oro-nasal *S. aureus* and *S. epidermidis* prevalence in non-DFU patients was lower (31/76 [40.7%] and 62/76 [81.5%]), respectively, compared with DFU patients (60/76 [78.9%] and 70/76 [92.1%]), respectively. *Staphylococcus aureus* was significantly more prevalent across all anatomical sites of DFU patients than non-DFUs patients ($P<0.05$). Identical species were

recovered from the ONC and DFUs of 38 DFU patients (*S. aureus* [28/40, 70%], *S. epidermidis* [10/40, 25%], *S. haemolyticus* [2/40, 5%], *S. pettenkoferi* [1/40, 2.5%], *S. saprophyticus* [1/40, 2.5%]). Comparative wgMLST analysis identified oro-nasal and ulcer *S. aureus* and *S. epidermidis* separated by ≤ 24 allelic differences (i.e. closely related) in 19/26 (73.1%) and 4/10 (40.0%) participants, respectively.

Discussion

Oro-nasal *S. aureus* and *S. epidermidis* prevalence is higher in DFU patients than non-DFU patients. The detection of closely-related oral and ulcer *S. aureus* and *S. epidermidis* in patients with DFUs provides evidence for oro-nasal reservoirs for DFUIs.

The Role of the Diabetic Foot Round in Fulminant Diabetic Foot Sepsis

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Abstract

Introduction

Diabetic foot infections are particularly challenging to manage. It has previously been demonstrated that multidisciplinary input in this cohort of patients can reduce adverse outcomes. Within Galway University Hospital (GUH), the diabetic foot round (DFR) aims to bring cohesive MDT input to these patients. The aim of this study was to establish the impact of the DFR patients admitted with fulminant diabetic foot sepsis.

Methods

This was a retrospective review of all patient's admitted under the Vascular Surgical team who required urgent debridement for diabetic foot sepsis. All patients admitted from July 2023 to January 2024 were included. Demographic information and clinical outcomes were gathered from patient notes. Information pertaining to multidisciplinary input and the DFR was obtained from a prospectively managed database of patients reviewed on the diabetic foot round.

Results

9 patients were admitted under the vascular team for urgent surgical debridement of diabetic foot sepsis. 8 were male and the median age was 63.50 years (Interquartile range (IQR) 51.50-70). Patients were admitted for a median of 23 days (IQR 19.5-30.25). Initial surgical intervention included debridement (1), amputation of hallux (2), multiple toes (4),

transmetatarsal amputation (2). One patient underwent concurrent revascularisation (common iliac to above knee bypass). 7 of the patients were reviewed on the diabetic foot round. One patient ultimately progressed to above knee amputation and one patient died 42 days following debridement for diabetic foot sepsis. On discharge 4 patients required follow up with podiatry either in Galway or elsewhere, 2 were seen in complex foot clinic. 4 patients were reviewed in the endocrinology outpatients.

Discussion

The diabetic foot round is an important part of the multi-disciplinary management of patients with diabetic foot infections. Within Galway University Hospital, the majority of patients presenting with fulminant diabetic foot sepsis are reviewed by the DFR.

Retrospective analysis of diabetes foot osteomyelitis management and outcomes in a specialised outpatient multi-disciplinary diabetes foot clinic

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Abstract

Introduction

Incidence of Diabetes Mellitus (DM) is increasing and Diabetes Foot Disease (DFD) will increase in tandem. Osteomyelitis (OM) is a problematic complication of DFD that increases the risk of Lower Extremity Amputation (LEA). This study retrospectively analysed cases of OM managed in a Multi-Disciplinary Complex Foot Clinic (CFC).

Methods

A retrospective case analysis was conducted between November 2018- May 2020. Subjects were identified via the Diamond (Hicom™) database and were included/excluded based on the study criteria.

Results

Forty-nine cases of OM were deemed appropriate for inclusion. Forty subjects (85.1%) were male, mean age at diagnosis was 70 years and mean HbA1c was 64.47mmol/mol. Most cases of OM involved subjects with T2DM (89.8%). Mean DM duration was 13.8 years. Most OM cases seen in this clinic were managed medically without surgical intervention (n=38; 76%). Mean ulcer duration was 240 days. The majority of patients diagnosed with OM were managed on PO antibiotics as outpatients (55.1%). Thirty-nine cases (79.6%) achieved full wound closure. Twenty-three cases (46.9%) required admission with an average length of stay of 14.2 days. An IV to PO antibiotic switch was used in 40.8% of cases. Eight cases (16.3%) required amputation. Single digit amputation was the most common surgical intervention in this cohort (10.3%). Thirty-eight cases (77.6%) receive ongoing podiatric care as of May 2022.

Discussion

This study retrospectively analysed OM cases in a medically led diabetic foot clinic. Most cases

were managed as outpatients with targeted antibiotic therapy. This is supported by a growing body of research advocating the use of antibiotic therapy in cases of OM. Minor amputations represented the majority of surgical interventions in this cohort. Further research should analyse microbiological sample culture and sensitivities and gather data from multiple sites. Further efforts should be made to integrate the wider MDT in order to enhance patient outcomes.

***Corynebacterium sp.* in Diabetic Foot Ulcers – A Retrospective, Single-Centre, Observational Descriptive Study from a Tertiary Hospital**

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Abstract

Introduction

Corynebacterium sp. has long been understood to be a colonising bacteria in diabetic foot infections. We present a retrospective study to describe the experience of *Corynebacterium sp.* in a cohort of inpatients with active diabetic foot disease (DFD) in a tertiary referral centre.

Methods

We included all inpatients attending our tertiary referral centre who were admitted with a DFD-related presenting complaint and who were seen on the multidisciplinary diabetic foot round (DFR) between September 2023 and March 2024. The primary outcome of the study was the presence of *Corynebacterium sp.* growth in superficial or deep tissue cultures. The secondary outcome was correlation of *Corynebacterium sp.* growth on bone/tissue samples with superficial swab samples.

Results

In total, 62 new patients were reviewed on the DFR in this 6-month period. 2 of these patients had a second admission for a DFD-related presenting complaint within the study period, and so 64 patient episodes were included in the study. Of these patient episodes, 56 had samples sent for culture. 30 (54%) had superficial swabs, 5 (9%) had deep tissue samples and 21 (37%) had bone samples sent as their highest-quality sample. *Corynebacterium sp.* were cultured on 9 of 56 patient episodes with culture samples sent in the study period (16%). Of these, 8 were detected on bone culture (7 intra-operative samples, 1 bedside sample) and 1 on deep tissue culture; no superficial wound swabs grew *Corynebacterium sp.*

during the study period. None of these positive culture results was consistent with growth from a superficial swab within 3 months of the positive sample.

Discussion

In this cohort, *Corynebacterium sp.* were present only in bone or deep tissue samples with no superficial sample correlation. This study adds to the growing understanding of this microorganism's importance in diabetic foot infections. If we wish to adequately target potentially pathogenic microorganisms like *Corynebacterium sp.*, we must push for deep tissue samples to be sent in all of our patients with diabetic foot infections.

A Real-World, Single-Centre Experience of Vascular Specialist Input on the Multidisciplinary Diabetic Foot Round in a Tertiary Hospital – an Observational Study

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Abstract

Introduction

Diabetic Foot Disease (DFD) is a common complication of diabetes associated with significant morbidity and mortality. Multidisciplinary Foot Team (MDFT) input is a cornerstone of national and international best-practice guidelines for the management of active DFD. This study describes the experience of an inpatient DFD ward round (DFR) in a tertiary hospital over two three-month periods, one year apart. One cohort had direct input from vascular surgical specialists at the time of the DFR, and one cohort did not.

Methods

We prospectively captured data from the DFR in our hospital over two three-month periods: September to December 2022 and September to December 2023. This weekly ward round reviews inpatients with active DFD on a consults basis and is attended by Endocrinology, Infectious Diseases and Vascular Surgery specialists, podiatrists, tissue viability, infectious diseases and diabetes nurse specialists. During the 2022 time period, no vascular surgical

specialists were available to be in attendance at the time of the round. The primary outcome measure was rate of amputation. Secondary measures included length of stay, microbiology and imaging investigations, vascular studies, HbA1c, diabetes classification and prior history of amputation and ulceration. Categorical data were compared using Chi-squared test. Numerical data were compared using Mann-Whitney U test.

Results

Over the study period, 24 individual patients who were admitted with a primary diabetic foot-related presenting complaint were reviewed on the DFR between September and December 2022. Between September and December 2023, there were 23 such reviews. There was a statistically significant increase in amputation rates between 2022 and 2023 [χ^2 (1, N = 47) = 4.04, p = 0.044]. There were 3 minor and 2 major amputations in the 2022 period (1 patient underwent both a minor and major amputation during the admission). There were 10 minor and 0 major amputations in the 2023 period. Average length of stay was not significantly different between the two groups (30 days vs 29 days, p = 0.889)

Discussion

The presence of vascular surgical input on the DFR was associated with a significantly higher rate of minor amputations. We believe this change reflects prompt vascular input leading to timely definitive management. It is possible that patients in the 2022 cohort left the hospital prior to MDFT discussion with vascular surgery input, which could potentially have led to a delay in definitive treatment. This study highlights the powerful role that a comprehensive MDFT assessment plays in altering patient outcomes.

A decade of OPAT for Diabetic foot infection in a large urban teaching hospital

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Abstract

Background

The use of intravenous antibiotics is recommended for the management of moderate to severe DFI. In the absence of surgical resection extended courses of intravenous antibiotics are often used thus increasing patients length of hospital stay. Outpatient antibiotic therapy (OPAT) allows for such services to be delivered to stable patients at home thus reducing the burden on inpatient services.

Methods

Data was collected between 2013 and 2023 and retrospectively reviewed for length of treatments; number of patients with DFI; bed days saved and overall cost savings.

Results

The results show that using OPAT in conjunction with other standards of care was useful in admission avoidance for DFI during the period. The number of bed days saved and costs are presented in the table below. The average cost saving is € 21362 per patient. No complications were observed in any of the participants related to the OPAT treatment.

Discussion

The use of OPAT for stable moderate and severe infections is an effective admission avoidance strategy in those with DFI and yields significant cost savings.

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Bed days saved	356	472	216	209	213	363	290	589	368	817	1011
Mean length of OPAT	29.66	29.5	30.8	26.12	13.31	28	32	28	31	29	25
Patients treated with OPAT	12	16	7	8	16	13	9	22	12	28	40
Cost saving @ €895 per night	318620	422440	193320	187055	190635	324885	259550	527155	329360	731215	904845
Mean cost saving per patient (€)	26551	26402	27617	23381	11914	24991	28838	23961	27446	25955	22375

What is the clinical utility of SEM measurement in the discernment of DFU

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Abstract

Introduction

Previous research has shown that the measurement of sub-epidermal moisture (SEM) identifies increased risk of PU by early identification of cellular oedema. This study aimed to assess the effectiveness of SEM in the early identification of DFU.

Methods

In this prospective observational study SEM measurements using the SEM ScannerTM were taken from 216 individuals attending outpatient diabetes clinics in a large urban teaching hospital in Ireland. Measurements were taken at foot sites associated with ulceration-plantar hallux, first metatarsophalangeal joint, fifth metatarsophalangeal joint and the heel. Those participants identified at increased risk at baseline had an additional 2 assessments within the next 7 days.

Results

Of the 216 participants, 22% (n=47) were identified as high risk using standard assessment, 70% (n=152) had suboptimal diabetes control, 23% (n=49) had loss of protective sensation and 2% (n=5) had non-palpable pulses. Elevated SEM was identified in 32% (n=69). There was agreement between SEM and standard risk assessment tools in 62% (n=42) of these cases. Of the 13% (n=9) of the high risk participants who developed a visual DFU during the 7 day period, 88% (n= 8) had an elevated SEM prior to ulceration. Abnormal SEM was correlated with DFU and this correlation was statistically significant. SEM readings had a high sensitivity and specificity.

Discussion

Whilst tentative, initial analysis from this study shows that similar to early stage PU

identification, that SEM measurement can also result in the earlier detection of DFU through identifying cellular oedema and local inflammation.

Risk status	No DFU			DFU			Sensitivity	Specificity
	Low	Moderate	High	Low	Moderate	High		
SEM								
Normal (<0.5)	92 (90%)	55 (82%)	8 (21%)	0	0	1 (11%)	88.9% (52.8% to	74.9% (68.4% to
Abnormal (≥ 0.5)	10 (10%)	12 (18%)	30 (79%)	0	0	8 (89%)	99.7%)	81.0%)

Multidisciplinary diabetic foot clinic initiative in a high-volume Irish tertiary referral center, A Quality improvement project

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Abstract

Introduction

Diabetic foot disease is a complex multifactorial pathology that constitutes a large burden for both patients and physicians. It's complications also places a substantial burden on the patient's family.

(1) The current set up in SVUH is very encouraging to set the foundation for a multidisciplinary team (MDT) input for this challenging cohort of patients.

Methodology

We aimed to set up an MDT diabetic foot clinic (DFC) utilizing the variety of disciplines available in our center. A formal email that invited the potential teams and a meeting to discuss the options available was convened. The project was met with great interest from the different team representatives. The Outpatient Antimicrobial Therapy (OPAT) clinic was chosen to incorporate the MDT DFC. This clinic is already set up for wound review and has some members from the teams needed to set up the clinic, so that with some minor adjustments it can encompass the full MDT foot care service.

Results

From January 2023 to July 2023, 26 clinic sessions were held. 31 patients were reviewed in

the MDT DFC. 9 patients achieved complete wound healing (29%). Sixteen patients were changed to a chronic wound without a surgical intervention (52%). Three patients required minor amputation (10%). Nine patients had significant peripheral arterial disease (29%) (Mean absolute toe pressure of 36 mmHg) out of which, 6 had reconstructible options and underwent balloon angioplasty. New endocrinology referrals were sent for 6 patients (19%). Referrals were made to treating endocrinologists if the patients were found to have a poor glycemic control. Twelve new referrals were made for custom made footwear (39%).

Discussion

We believe that as an initiative, the MDT DFC is a project that is showing great potential in a large volume centre as SVUH. This would encourage to expand and formalize the project.