

What Patient Factors Predict Success in Conservative Management of Diabetic Foot Osteomyelitis?

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Aims:

Diabetic foot ulcers are one of the most common diabetes related complications resulting in hospital admission. Ulceration often leads to osteomyelitis (DFO), which often precedes lower extremity amputation. Several retrospective cohort studies have demonstrated conservative medical management with antibiotics can induce remission in 58-80% of cases. Where surgery is required, there is evidence that early intervention improves patient outcomes. Hence being able to predict from the outset those patients likely to achieve remission with medical management alone would be of benefit to patients and the health economy. We compared amputation and remission rates in a case series of conservatively treated DFO against previously published data. Secondly we evaluated the influence of several patient variables on outcomes of medical management.

Methods:

A retrospective study of consecutive DFO cases presenting to a tertiary centre between 2007 to 2011 that were initially treated with conservative medical management. Patients underwent standard medical management by a multidisciplinary team. Remission was defined as wound healing with no clinical or radiological signs of osteomyelitis at the initial or adjacent sites for at least 1 year after cessation of antibiotic therapy. Nine demographic and clinical variables were analysed.

Results:

One-hundred cases were identified. Fifteen died within one year of follow up and were excluded from further analysis. After a 12 month follow up period, 56 (66%) had achieved remission with conservative medical management alone with a median (IQR) duration of antibiotic treatment of 10.8 (10.1) weeks. Descriptive data on patients and osteomyelitis episodes are given in the table opposite. Those with absent foot pulses required a significantly longer duration of antibiotic therapy to achieve remission (P=0.003). Osteomyelitis affecting the metatarsal was more significantly more likely to be amputated than other sites of the foot (P= 0.016).

Discussion:

The present study shows that remission was induced in 66% of DFO treated with conservative medical management which is consistent with previous reports. Osteomyelitis of the metatarsal is more likely to undergo amputation than at other sites in the foot. This should be a consideration in determining initial treatment strategy in DFO. Additionally, the absence of foot pulses was associated with requiring a longer duration of antibiotic therapy to achieve remission. This is likely explained by the impaired perfusion and tissue penetration of the antimicrobial to the site of infection and also a retardation of tissue repair. Yet this sub-group are not significantly more likely to require amputation. Therefore, we would expect slower progress in this group of patients and prolonged conservative medical management should be tried before considering amputation. Further work is required to delineate factors that predict outcome in DFO to advise management approach. This may include utilising increasingly sophisticated and accessible radiological techniques in addition to clinical characteristics.

Characteristic	All	Not amputated	Amputated	Effect size (95%CI)	P-value
N	85 (100%)	56 (66)	29 (34)	--	--
Age (yrs) (mean, SD)	68 (12)	69 (12)	64 (12)	4.75 (-0.81; 10.30)	0.09
HbA1C (mmol/l)(mean, SD)	63 (15)	63 (15)	64 (13)	-0.7 (-7.5; 6.06)	0.84
EGFR <29	6 (7)	6 (11)	0	N/A	0.07
Pedal pulse detected in at least one foot	49 (59)	29 (54)	20 (69)	1.92 (0.74; 4.96)	0.18
Location on foot:-					
Metatarsal head	21 (25)	8 (15)	13 (45)	0.016-- (ref.cat)	0.016
Proximal phalanx	17 (20)	10 (18)	7 (24)	0.43 (0.12; 1.59)	
Distal phalanx	33 (39)	26 (47)	7 (24)	0.17 (0.05; 0.56)	
Heel	3 (4)	3 (5)	0	N/A	
Mid phalanx	10 (12)	8 (15)	2 (7)	0.15 (0.03; 0.91)	
Previous ulcer at this site	17 (20)	10 (18)	7 (24)	1.43 (0.48;4.27)	0.52
Previous osteomyelitis	33 (39)	20 (36)	13 (45)	1.42 (0.57; 3.55)	0.45
Previous amputation	20 (24)	11 (20)	9 (31)	1.8 (0.64; 5.03)	0.26
Culture grown	59 (71)	36 (67)	23 (79)	1.92 (0.66; 5.54)	0.23
Streptococcus	8 (10)	5 (9)	3 (10)	1.15 (0.26; 5.21)	0.85
Staph-aureus	35 (42)	23 (42)	12 (41)	0.98 (0.39; 2.46)	0.97
MRSA	3 (4)	1 (2)	2 (7)	4.0 (0.35; 46.1)	0.27
Coliforms	16 (19)	11 (20)	5 (17)	0.83 (0.26; 2.7)	0.76
Pseudomonas	8 (10)	7 (13)	1 (4)	0.25 (0.03; 2.10)	0.25

Table 1. Characteristics of osteomyelitis cases, and comparison between those whose antibiotic treatment ended with amputation or not. Data are n (%) unless otherwise indicated

Conclusions:

1. The absence of foot pulses on the affected side is associated with requiring a significantly longer duration of antibiotics.
2. Diabetic foot osteomyelitis of the metatarsal is significantly more likely to undergo amputation than other sites in the foot.