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Cost and mortality data of a regional limb salvage and hyperbaric medicine program for Wagner Grade 3 or 4 diabetic foot ulcers

J.V. Eggert¹, E.R. Worth^{1,2}, C.C. Van Gils³

¹ Hyperbaric Medicine Department, Dixie Regional Medical Center, St. George, Utah, U.S.

² Department of Anesthesiology, Center for Hyperbaric Medicine and Environmental Physiology, Duke University Medical Center, Durham, North Carolina, U.S.

³ Wound Care Department, Dixie Regional Medical Center, St. George, Utah, U.S.

CORRESPONDING AUTHOR: Joan V. Eggert, M.D. – jveggert@msn.com

ABSTRACT

We obtained costs and mortality data in two retrospective cohorts totaling 159 patients who have diabetes mellitus and onset of a diabetic foot ulcer (DFU). Data were collected from 2005 to 2013, with a follow-up period through September 30, 2014. A total of 106 patients entered an evidence-based limb salvage protocol (LSP) for Wagner Grade 3 or 4 (WG3/4) DFU and intention-to-treat adjunctive hyperbaric oxygen (HBO₂) therapy. A second cohort of 53 patients had a primary lower extremity amputation (LEA), either below the knee (BKA) or above the knee (AKA) and were not part of the LSP.

Ninety-six of 106 patients completed the LSP/HBO₂ with an average cost of USD \$33,100. Eighty-eight of 96 patients (91.7%) who completed the LSP/HBO₂ had intact lower extremities at one year. Thirty-four of the 96 patients (35.4%) died during the follow-up period. Costs for a historical cohort of 53 patients having a primary major LEA range from USD \$66,300 to USD \$73,000. Twenty-five of the 53 patients (47.2%) died. The difference in cost of care and mortality between an LSP with adjunctive HBO₂ therapy vs. primary LEA is staggering. We conclude that an aggressive limb salvage program that includes HBO₂ therapy is cost-effective.

and payments made by third-party payers [19]. We found only one other group that tried to define the actual cost of care using institutional financial data [20]. Gomez-Castillo, et al. determined costs for HBO₂ treatments in Sydney, Australia. At Prince of Wales Hospital, each HBO₂ treatment costs approximately USD \$300. In comparison, each HBO₂ treatment at our hospital costs USD \$630.

One of the first studies to show the cost benefit of HBO₂ as part of an integrated team approach in patients with limb-threatening DFU was Cianci, et al. [16]. They reported an 89% success rate in limb salvage similar to our rate of 91.7%. They demonstrated that hospital charges for wound care and HBO₂ treatments were considerably lower than those for major LEA.

Cianci and Hunt then followed a total of 42 patients with DFU who had at least seven HBO₂ treatments between 1983 and 1990. Follow-up data were collected in 1991 and 1993. In 1993, six patients were deceased (27%), but 15 of the 16 living (94%) had an intact limb for a durable repair lasting 55 months [17]. These rates are consistent with the results of the High Risk Foot Clinic at the Phoenix Veterans Administration Hospital, with an 85% limb salvage rate over an average follow-up of 55 months [14]. In our study, 59 of 96 patients (61.5%) now have been followed for 57 months, with a comparable durable repair of 93%.

Two studies have used a hypothetical patient model to show that adjunctive HBO₂ was cost-effective for DFU patients. Chuck, et al. used clinical outcomes from

[22]. Both of these studies show limb salvage to be cost-effective and positively influences overall quality of life.

Current study

The patients in our study who followed the LSP and completed HBO₂ therapy had an overall 35.4% (34 of 96) mortality rate, while there was a 50% and 44% mortality rate for the BKA and AKA groups respectively. Our reported LSP/HBO₂ mortality rate is higher, but it is consistent with the 27% mortality rate reported by Cianci and Hunt [16,17]. In a study of midfoot amputations for DFU, Stone, et al. report one- and three-year mortality rates of 33% for transmetatarsal amputation [23]. They also noted that functional ambulation occurred in 92% of patients.

Our data of avoiding a delayed amputation in 93 of 96 patients (93%) is similar to the 94% reported by Cianci and Hunt [17]. We have a reamputation rate of four of 28 patients (14.3%) converting a BKA to an AKA. This rate is identical to Ploeg, et al. [24].

LEA comparisons

In our LEA cohort, there was an overall mortality rate of 25 of 53 patients (47.2%). Ploeg, et al. reported on a series of LEA with a five-year mortality of 71% [24]. Using Medicare claims data from 1996, Dillingham, et al. documented a 33% mortality within one year of the index LEA [18]. Johannesson, et al. reported a 45% mortality among Swedish diabetes patients within one year of the index LEA [25].

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CONCLUSION

Wagner Grades 3 and 4 diabetic foot ulcers, as well as below-the-knee and above-the-knee amputation, are associated with high five-year costs and mortality. Our limb salvage protocol, which includes HBO₂ therapy as part of the series of care, resulted in 88 of 96 patients (91.7%) healing at approximately half of the first-year costs of a lower extremity amputation. In addition, 82 of 88 of those patients (93.2%) initially healed and did not require a delayed amputation.

We conclude that a key impact on DFU healing is a collaborative, multidisciplinary team where all members of the team function with the highest level of expertise. Following an evidence-based protocol is cost-effective vs. having a primary LEA.



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Causative Pathogens and Antibiotic Resistance in Diabetic Foot Infections: A Prospective Multi-Center Study

Mustafa Hatipoglu^{a,*}, Mesut Mutluoglu^b, Vedat Turhan^c, Gunalp Uzun^d, Benjamin A. Lipsky^{e,f} Turk-DAY Study Group

Erol Sevim^c, Hayati Demiraslan^d, Esmâ Eryilmaz^d, Cem Ozuguz^e, Ali Memis^a, Hakan Ay^a, Bilgin Arda^f, Serhat Uysal^f, Vicdan Koksaldi Motor^g, Cigdem Kader^h, Ayse Erturkⁱ, Omer Coskun^j, Fazilet Duygu^k, Selma Guler^l, Fatma Aybala Altay^m, Aziz Ogutluⁿ, Sibel Bolukcu^o, Senol Yildiz^b, Ozlem Kandemir^p, Halide Aslaner^q, Arife Polat^q, Mustafa K. Karahocagil^r, Kadriye Kart Yasar^s, Emine Sehmen^t, Sirri Kilic^t, Mustafa Sunbul^u, Serap Gencer^v, Fatma Bozkurt^w, Tugba Yanik^u, Nefise Oztoprak Cuvalci^x, Ayse Batirel^v, Hamdi Sozen^y, Inci Kilic^z, Ilhami Celik^z, Bengisu Ay^{aa}, Selma Tosun^{aa}, Ayten Kadanali^{ab}, Senol Comoglu^{ab}, Affan Denk^{ac}, Salih Hosoglu^w, Ozlem Aydin^{ad}, Nazif Elaldi^{ae}, Serife Akalin^{af}, Bahar Kandemir^{ag}, Ayhan Akbulut^{ac}, Tuna Demirdal^{ah}, Recep Balik^{ah}, Emel Azak^{ai}, Gonul Sengoz^{aj}

^a Department of Infectious Diseases and Clinical Microbiology, Canakkale Military Hospital, Canakkale, Turkey

^b Department of Underwater and Hyperbaric Medicine, Gulhane Military Medical Academy, Ankara, Turkey

^c Department of Infectious Diseases and Clinical Microbiology, Gulhane Military Medical Academy Haydarpaşa Training Hospital, Istanbul, Turkey

^d Department of Infectious Diseases, Faculty of Medicine, Erciyes University, Kayseri, Turkey

^e Department of Infectious Diseases and Clinical Microbiology, Eskisehir Military Hospital, Eskisehir, Turkey

^f Department of Infectious Diseases and Clinical Microbiology, Ege University School of Medicine, Izmir, Turkey

^g Department of Infectious Diseases and Clinical Microbiology, Mustafa Kemal University Medical School, Hatay, Turkey

^h Department of Infectious Diseases and Clinical Microbiology, Baskent University School of Medicine, Yozgat, Turkey

ⁱ Department of Infectious Diseases and Clinical Microbiology, School of Medicine, Recep Tayyip Erdogan University, Rize, Turkey

^j Department of Infectious Diseases and Clinical Microbiology, Gulhane Medical Academy, Ankara, Turkey

^k Department of Infectious Diseases and Clinical Microbiology, Gaziosmanpaşa University Medical School, Tokat, Turkey

^l Department of Infectious Diseases and Clinical Microbiology, Sutcu Imam University, School of Medicine, Kahramanmaraş, Turkey

^m Department of Infectious Diseases and Clinical Microbiology, Selçuk University, Faculty of Medicine, Samsun, Turkey

Predictors for limb loss among patient with diabetic foot infections: an observational retrospective multicentric study in Turkey.

Saltoğlu N¹, Yemisen M², Ergonul O³, Kadanali A⁴, Karagoz G⁴, Batirel A⁵, Ak O⁵, Eraksoy H⁶, Cağatay A⁶, Vatan A², Sengoz G⁷, Pehlivanoglu F⁷, Aslan T⁸, Akkoyunlu Y⁸, Engin D⁹, Ceran N⁹, Erturk B¹⁰, Mulazimoğlu L¹⁰, Oncul O¹¹, Ay H¹¹, Sargin F¹², Ozgunes N¹², Simsek F¹³, Yildirmak T¹³, Tuna N¹⁴, Karabay O¹⁴, Yasar K¹⁵, Uzun N¹⁶, Kucukardali Y¹⁷, Sonmezoglu M¹⁷, Yilmaz F¹², Tozalcan U¹⁸, Ozer S⁵, Ozyazar M²; KLIMIK Turkish Society, Diabetic Foot Study Group.

⊕ Author information

Abstract

We aimed to investigate the predictors for limb loss among patients with diabetes who have complicated skin/soft-tissue infections. In this observational study, consecutive patients with diabetic foot infection (DFI) from 17 centres in Turkey, between May 2011 and May 2013 were included. The Turkish DFI Working Group performed the study. Predictors of limb loss were investigated by multivariate analysis. In total, 455 patients with DFI were included. Median age was 61 years, 68% were male, 65% of the patients were hospitalized, 52% of the patients had used antibiotics within the last month, and 121 (27%) had osteomyelitis. Of the 208 microorganisms isolated, 92 (44.2%) were Gram-positive cocci and 114 (54.8%) were Gram-negative rods (GNR). The most common GNR was *Pseudomonas*; the second was *Escherichia coli*, with extended spectrum β -lactamase positivity of 33%. Methicillin-resistant *Staphylococcus* species were found in 14% (29/208). Amputations were performed in 126/455 (28%) patients, 44/126 (34%) of these were major amputations. In multivariate analysis, significant predictors for limb loss were, male gender (OR 1.75, 95% CI 1.04-2.96, p 0.034), duration of diabetes >20 years (OR 1.9, 95% CI 1.18-3.11, p 0.008), infected ulcer versus cellulitis (OR 1.9, 95% CI 1.11-3.18, p 0.019), history of peripheral vascular disease (OR 2, 95% CI 1.26-3.27, p 0.004), retinopathy (OR 2.25, 95% CI 1.19-4.25, p 0.012), erythrocyte sedimentation rate >70 mm/hr (OR 1.6, 95% CI 1.01-2.68, p 0.05), and infection with GNR (OR 1.8, 95% CI 1.08-3.02, p 0.02). Multivariate analysis revealed that, besides the known risk factors such as male gender, duration of diabetes >20 years, infected ulcers, history of peripheral vascular disease and retinopathy, detection of GNR was a significant predictor of limb loss.

Increasing incidence of Gram-negative organisms in bacterial agents isolated from diabetic foot ulcers

Vedat Turhan^{1*}, Mesut Mutluoglu^{2*}, Ali Acar¹, Mustafa Hatipoğlu¹, Yalçın Önem³, Gunalp Uzun², Hakan Ay², Oral Öncül¹, Levent Görenek¹

¹ Gata Haydarpaşa Training Hospital, Department Of Infectious Diseases And Clinical Microbiology, Istanbul, Turkey

² Gata Haydarpaşa Training Hospital, Department of Underwater and Hyperbaric Medicine, Istanbul, Turkey

³ Gata Haydarpaşa Training Hospital, Department of Internal Medicine, Istanbul, Turkey

*Vedat Turhan and Mesut Mutluoglu have contributed equally to this manuscript and hold equal authorship

Abstract

Introduction: In the present study, we sought to identify the bacterial organisms associated with diabetic foot infections (DFIs) and their antibiotic sensitivity profiles.

Methodology: We retrospectively reviewed the records of wound cultures collected from diabetic patients with foot infections between May 2005 and July 2010.

Results: We identified a total of 298 culture specimens (165 [55%] wound swab, 108 [36%] tissue samples, and 25 [9%] bone samples) from 107 patients (74 [69%] males and 33 [31%] females, mean age 62 ± 13 yr) with a DFI. Among all cultures 83.5% (223/267) were monomicrobial and 16.4% (44/267) were polymicrobial. Gram-negative bacterial isolates ($n = 191$; 61.3%) significantly outnumbered Gram-positive isolates ($n = 121$; 38.7%). The most frequently isolated bacteria were *Pseudomonas* species (29.8%), *Staphylococcus aureus* (16.7%), *Enterococcus* species (11.5%), *Escherichia coli* (7.1%), and *Enterobacter* species (7.1%), respectively. While 13.2% of the Gram-negative isolates were inducible beta-lactamase positive, 44.2% of *Staphylococcus aureus* isolates were methicillin resistant.

Conclusions: Our results support the recent view that Gram-negative organisms, depending on the geographical location, may predominate in DFIs.

Antibiotherapy with and without bone debridement in diabetic foot osteomyelitis: A retrospective cohort study

Asim Ulcay¹, Ahmet Karakas², Mesut Mutluoglu³,
Gunalp Uzun⁴, Vedat Turhan⁵, Hakan Ay⁶

ABSTRACT

Background and Objective: The treatment of diabetic foot osteomyelitis (DFO) is a controversial issue, with disagreement regarding whether the best treatment is surgical or conservative. The purpose of this study was to compare the outcome of patients with DFO who were treated with antibiotherapy alone and those who underwent concurrent minor amputation.

Methods: Hospital records of patients who were diagnosed as having DFO within a 2-year study period were retrospectively reviewed. Patients were divided into two groups: those who received antibiotherapy alone and those who underwent concurrent minor amputation. Groups were compared in terms of duration in hospitalization, antibiotherapy, and wound healing.

Results: Thirty seven patients were included in the study. These comprised patients who received antibiotherapy alone (ABG, n=15) and patients who underwent concurrent minor amputation (AB-MAG, n=22). Hospitalization duration was 37.2 (\pm 16.2) days in ABG and 52.8 (\pm 40.2) days in AB-MAG (p = 0.166). Mean duration of antibiotherapy was 45.0 (\pm 21.7) days in ABG and 47.7 (\pm 19) days in AB-MAG (p = 0.689). Wound healing duration was 265.2 (\pm 132.7) days in ABG and 222.6 (\pm 85.9) days in AB-MAG (p = 0.243). None of the outcome measures were significantly different between ABG and AB-MAG.

Conclusions: Our results have shown similar outcomes for both patient groups who received antibiotherapy alone and who underwent concurrent minor amputations. Considering the small sample sizes in this study, it is important to confirm these results on a larger scale.

Bir kent prevalansı

13 HBO tedavi merkezi

Tedaviye alınan kronik yara: 220

Yaklaşık % 65 diyabetik ayak

Tedaviye alınmadan takip edilen :
yaklaşık 75



