

Poster session 16: Surgery

P16.01

Surgical treatment of first ray lesions and ulcer recurrence in the diabetic foot

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Background: treatment of first metatarsal head ulceration with underlying osteomyelitis consist in extensive debridement of infected bone and soft tissue or often first ray amputation. Both treatment have, consequences in biomechanical of foot, deformities, transfer lesions, second toe lesions and shoe fit problems.

Aim of the study: to evaluate outcome of surgical treatment of first ray in the diabetic foot; incidence, kind and causes of secondary lesions.

Materials and Methods: Between August 2008 and December 2013, we surgically treated 96 lesions in 95 diabetic patients with grade 3 of Texas classification. All patients have type 2 diabetes, mean age was 70 ± 10.4 years (mean \pm SD), 18 were female and 77 male, presented a long history of diabetes 17 ± 10.9 years. Peripheral neuropathy was present in 91 patients (95%); peripheral arterial disease in 65 patients (68%), of them 48 (50%) underwent revascularization.

Results: we perform 34 first ray amputation and 62 resection of first metatarsophalangeal joint, 9 cases with pin stabilization. We compare characteristics of patients with amputation of first ray and patients with conservative surgery. Patients with amputation of first ray compared to patients with conservative treatment were not significantly older (72 ± 9 vs 68 ± 11 $p=0.07$); have significant higher incidence of peripheral vascular disease (85% vs 56% $p < 0.004$) and higher percentage required revascularization (70% vs 39% $p < 0.003$). Mean follow up was of 23.4 ± 12.3 months. At follow up 14 patients died.

Group with ray amputation experienced a high percentage (50% vs 30% $p=0.01$) of secondary lesions during follow up compared to, patients treated conservatively. Kind of secondary lesions are shown in table 1., Analysis of causes of secondary lesions demonstrate: inadequate shoes 51%, foot deformity 27%, ischaemia 22%.

Conclusions: data from this study indicate that conservative surgery of first ray presented less incidence of secondary lesions than first ray amputation., Ulceration of the second toe is the more frequent secondary lesion, while local relapse was evidenced only in conservative surgery. Like underlined in other studies important attention in adequate shoe utilization after healing stump is fundamental for relapse prevention.

	Ray amputation	First MPJ removal
Number	34	62
Total secondary lesions, , , n. (%)	17 (50%)	19 (30%)
Second toe lesions	5 (15%)	5 (8%)
First ray relapse	0 (0%)	5 (8%)
Transfer plantar lesions	5 (15%)	5 (8%)
Forefoot amputation	5 (15%)	2 (3%)
Panmetatarsal realignment	2 (6%)	1 (2%)

P16.02

Surgical management of the neuropathic acute foot-attack –, the value of C-reactive protein, in prioritizing the 'door to table' time.

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The diabetic 'foot-attack' is analogous to a myocardial infarction except the former is a micro-organism led devitalisation. We believe acute phase indicators, can be used to standardize timely surgical intervention. Our aim was to examine the relationship of C-reactive protein (CRP) to timing of index surgical debridement and need for repeat debridement.

Patients were identified between January 2013 to December 2014 with acute infected non-ischaemic foot-attack requiring surgery using theatre database. Demographic details (age, diabetes type and co-morbidities), inflammatory parameters (CRP, total white cell count (WCC), neutrophil levels), clinical treatment (timing to and total number of debridements per individual) were assessed. Statistical analysis of CRP values was undertaken and compared with number of debridements and thus length of stay. Further statistical analysis was undertaken to provide, relative risk.

Results: Sixty-eight patients were studied. The mean group CRP was 112.4 mg/l (65.5 – 307.7), Creatinine 113.6 μ mol/L (48.6-7.5), WCC 10.5210S9/l (24.2-5.4), Neutrophils 8.15210S9/l (21.2- 2.8). As a group patients who underwent multiple debridements had a higher CRP at admission 155.9 ± 74.4 vs 72.2 ± 52.4 mg/l for those who had one definitive debridement. All patients who had a CRP over 180 mg/l at admission required multiple debridements., Length of stay was 9.1 days longer if multiple debridements were undertaken as compared to one definitive debridement. Overall, the relative risk of multiple debridement was 1.9 (p=0.02) when the CRP was above 100 mg/l at admission and the patient did not undergo surgical infection clearance within 24 hrs.

Our data suggests an admission CRP provides an objective risk assessment whereby a CRP >100 mg/l at presentation doubles the risk of multiple debridement if surgery is not undertaken within 24hrs and CRP >150 mg/l virtually guarantees the need for multiple debridement in an acute foot attack.

Such patients should be prioritized for urgent surgical debridement within 24 hours, with a focused intra-operative approach towards infection clearance and warned about potential need for further debridement. It is time we started talking door to table times - after all, time is tissue.



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P16.04

Multiple limb salvage attempts for diabetic foot infections, –, is it worth it?

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Aims: This is a study of patients undergoing below knee amputation (BKA) for diabetic foot infections. We seek to study the patients' functional status, ability to return to normal life, prosthesis usage and perspectives on multiple limb salvage procedures that culminated in BKA to review their opinion if they would undertake the similar path all over again.

Methods: This is a retrospective review of 108 patients who underwent BKA from July 2011 to June 2013. They were divided to primary and creeping (prior multiple salvage procedures) amputations. The Barthel's Index (BI) and the Reintegration to Normal Living Index (RNLI) were utilized to demonstrate functional status and ability to return to normal life after amputation. A telephonic survey on whether the patient would undergo the same multiple attempts at limb salvage again if faced with the same problem was employed.

Results: 41 patients were available for review after inclusion criteria were satisfied. The average age was 60 (45 to 83 years). There were 24 primary and 17 creeping amputations. All patients had good average BI of 14.2 (3 - 20) and RNLI of 73.2 (31 - 100). Only 24 (58.5%) patients actively used a prosthesis with an average daily usage of 4.4 (0 -12 hours). There were no differences in prosthesis usage, BI and RNLI between both groups. We found that 16 (94.1%), out of 17 patients with creeping amputation surveyed would undergo the same multiple salvage procedures if given the similar option. Conversely, only 15 (62.5%) patients with primary amputation would do the same again while the other 9 (37.5%) patients choose to do everything possible to save their leg if faced with similar situation (p=0.001), ,

Conclusion: The majority of patients preferred to undergo multiple procedures to salvage the limb from diabetic foot infections even if it ultimately concluded with a major amputation.

P16.05

Treatment of ingrowing nail infection patients who have severe vasculopathy by K-D application.

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Purpose: The purpose of this study is to evaluate the effect of K-D application for the treatment of, ingrowing nail infection with severe vasculopathy patients.

Material and methods: We studied 15 Ingrowing nail infection patients who have severe vasculopathy. We examined vasculopathy with sonography. If we find severe vasculopathy, treated with the endovascular procedure. And then corrected ingrowing nail with K-D application and debridement .

Results: Some ingrowing nail infection patients with the severe vasculopathy who did the convenient partial onychectomy(winograde) become toe necrosis. After develop toe necrosis, we should do toe amputation. But after use of K-D and endovascular procedure to the 15 patients who have ingrowing nail infection with severe vasculopathy become good condition without toe necrosis or doing amputation.,

Conclusion: The infection of ingrowing nail who have vasculopathy make aggravation toe necrosis rapidly. Some kinds of operation should be able to treat infection but sometimes it make worse the necrosis. The use of K-D with endovascular procedure can protect aggravation of ingrowing nail infection and toe necrosis who have severe vasculopathy .



Fig. 1. Infection of Ingrowing nail patient who have severe vasculopathy should do toe amputation.

P16.06

Use of free flap complicated by venous congestion for wound coverage of tibial osteomyelitis: a case report of diabetic limb salvage

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Aim: Chronic osteomyelitis (OM) is a challenging condition to treat, often resulting in significant soft tissue and bone defects. Soft tissue coverage may be provided by a free flap or local muscle rotational flap. Flap failure can be attributed to many causes including coagulopathy and infection. Factor V Leiden, the most common hereditary coagulopathy in humans, can be present in up to 5% of patients, causing thrombotic occlusion leading to venous congestion. Leeches, producers of powerful vasodilators and anticoagulants, are useful adjuncts in helping relieve venous congestion leading to flap survival. This is a case report of a 74-year-old patient with chronic tibial OM and coagulopathy treated with free flap and tibialis anterior muscle flap.

Methods: A case report of a 74-year-old female with diabetes mellitus and an old gunshot wound to the tibia with a draining sinus tract. She had OM confirmed by magnetic resonance imaging and an angular deformity of the tibia. Arteriogram demonstrated stenosis of the tibial arteries with bacterial liquefaction noted upon debridement. The remaining soft tissue deficit required a rectus femoris free flap for wound coverage. The flap demonstrated venous congestion during the post-op dangling period, necessitating leech therapy. Despite this adjunct, subsequent flap necrosis ensued, requiring a tibialis anterior muscle flap, several skin substitutes, and eventual skin grafting.

Results: This case report demonstrates several options for wound coverage in patients with OM. With a known coagulopathy and arterial compromise, a free flap was unsuccessful in this patient. However, with a local muscle flap, the patient was ambulating with minimal assistance 8 weeks later.

Discussion: Chronic wounds complicated by OM are notoriously difficult limb salvage cases. A flap may provide wound coverage, however, patients should always be screened for arterial insufficiency and coagulopathies, factors that can doom a flap to failure. Perhaps patients with a poor flap prognosis can be spared a lengthy hospital stay with a more promising closure method, including local flaps and grafts.

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P16.07

Conservative surgical treatment of infected ulceration of the first metatarsophalangeal joint with osteomyelitis in diabetic patients

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Ulceration of the plantar aspect of the first metatarsophalangeal joint is a common localization in diabetic foot. Conservative treatment of this lesion is a challenging problem and is carried out through soft tissues and bone debridement. In a cohort of 28 diabetic patients affected by diabetes mellitus and first ray lesion penetrating the bone, after surgical debridement with removal of the infected bone we have positioned antibiotic loaded bone cement and stabilized the treated area with an external fixator. All neuroischemic patients had the vascular disease treated before the procedure. The mean follow up was 12.2 ± 6.9 months. Four patients developed a relapse of ulceration after the procedure. In the postoperative period, 1 (3.57%) patient had a dehiscence of the surgical site and underwent a second procedure. In the follow-up period, 2 (7.14%) patients had bone cement dislocation. In one of these patients, a new ulceration was observed dorsally to the surgical site. The approach was surgical revision with bone cement replacement and stabilization with a new external fixator. In the other case, given the absence of ulcerations, cement was removed and arthrodesis with internal stabilization by means of 2 cannulated screws was performed. One patient (3.57%) who had a relapse of ulceration following recurrent critical ischemia underwent percutaneous revascularization procedure and transmetatarsal amputation. At follow-up, no ulceration recurrences, transfer ulcerations, shoe-fit problems or gait abnormalities were detected in the other 24 patients. Our study shows the results of a technique requiring a one-stage surgical approach to a relatively common problem, which is often hard to solve.

P16.09

Topically applied vancomycin powder reduces the rate of surgical site infection in diabetic patients undergoing foot and ankle surgery

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Aim: To evaluate the efficacy of topically applied vancomycin powder in reducing the rate of surgical site infections (SSI) in patients with diabetes (DM) undergoing foot and ankle surgery. **Methods:** 81 patients with diabetes who underwent reconstructions of foot and ankle deformity and/or trauma and had topically applied vancomycin were matched to 81 diabetic patients who did not receive topically applied vancomycin.,

Results: The mean age was 60.6 years in the vancomycin group and 59.4 years in the control group ($p < 0.05$). The two groups were similar with regard to gender, BMI, duration of DM, short and longer term glycemic control and length of surgery. The overall likelihood of SSI was decreased by 73% in patients who received topically applied vancomycin [OR 0.267 (0.089-0.803), $p = 0.0188$]. The rate of superficial infection was not significantly different between the two groups [OR 0.400 (0.078-2.062), $p = 0.2734$], however deep infections were 80% less likely in patients who received vancomycin powder [OR 0.200 (0.044-0.913), $p = 0.0377$].-_

Conclusion: High-risk diabetic patients undergoing foot and ankle surgery are significantly less likely to develop a SSI with the use of topically applied vancomycin powder in the surgical wound, particularly with regard to deep infections. Topically applied vancomycin is associated with a very low rate of complications and is inexpensive (US 5.00 per 1000 mg)., Reducing the rate of SSI in patients with DM is associated with a decrease in healthcare costs and a potential reduction in the rate of major and minor amputations. Based on this study, foot and ankle surgeons may consider applying 500-1000 mg of vancomycin powder prior to skin closure in diabetic patients who are not allergic to vancomycin.