



Fast-track pathway for diabetic foot ulceration during COVID-19 crisis: A document from International Diabetic Foot Care Group and D-Foot International

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1 | INTRODUCTION

The COVID-19 crisis has led to significant changes in the management of persons with chronic disease around the world.¹ The reorganisation of health care systems to contain the COVID-19 emergency has altered standard practice leaving a large number of patients without care, including those with diabetic foot ulceration (DFU).

Delay in DFU management, mainly in the case of ischaemia and infection, increases the risk of amputation and mortality.²⁻⁴ However, in these times limitation of hospital admission are essential to reduce the risk of exposure to COVID-19. Especially as this patient group has a number of concomitant co-morbidities, placing them at high risk as observed in frail persons with COVID-19 infection.^{5,6}

Therefore, a simple reproducible triage pathway allows early detection of foot problems in the community avoiding late referral and limit hospital episodes for unnecessary visits.

Accordingly, the International Diabetic Foot Care Group (IDFCG) and D-Foot International have developed an adapted Covid-19 fast-track pathway (FTP)⁷ for DFUs aiming to reduce late referral for cases who need early evaluation by specialised diabetic foot services (DFS) and avoid hospital admission for stable clinical cases.

1.1 | Fast-track pathway for DFU

Recently, IDFCG and D-Foot International developed a simple FTP as an easy tool for clinicians working in primary care treating DFU.⁷ The FTP provides a global assessment of DFU through a holist approach evaluating medical history, clinical examination, co-morbidities and wound features. It allows health care professionals (HCPs) to recognise conditions which are non-limb threatening that can be treated in the community and differentiate them from the limb and/or life-threatening condition.

Accordingly, patients are fast-tracked into three levels of severity and care:

1. Uncomplicated DFUs defined as superficial, not infected and not ischaemic ulcers. Uncomplicated DFUs can be monitored by HCPs and should be referred to specialised DFS in the case of absence of clinical improvement (reduction of ulcer area >30% or absence of granulation tissue or signs of re-epithelisation) after 2 weeks of standard of care (SoC)
2. Complicated DFUs defined as suspected ischaemic ulcers or infected or deep (bone, muscle or tendons exposure) ulcers

and/or any kind of ulcers in patients with active heart failure or end stage renal disease. Complicated DFUs should be referred to specialised DFS within 4 days from the first assessment and after the resolution of acute phase they can be managed in cooperation with the community

3. Severely complicated DFUs defined as wet gangrene, abscess, phlegmons or foot ulceration in patients with fever or signs of sepsis. Severely complicated DFUs need urgent hospitalisation in specialised DFS within 24 h from the diagnosis

The FTP is designed for the non-specialist HCPs who work in primary care and are the primary responder with little specialist knowledge. It stresses that the clinical evaluation of severity and characteristics of DFUs should drive decision making and treatment. Therefore, ischemic ulcers or suspected ischaemic ulcers are considered in the case of absent foot pulses and/or the presences of necrosis. Infection should be detected according to the clinical signs in the respect of International guidance as well the SoC reflects the recommendations of guidance.⁸

1.2 | The need of an adapted fast-track pathway to COVID-19 crisis and beyond.

The current emergency health care situation, new clinical needs have been redrawn in the adapted COVID-19 FTP to reduce the risk of virus exposure: to avoid unnecessary hospital episodes either as an outpatient, or avoid/defer hospitalisation and reduce surgical intervention in patients with stable DFUs. Specialist/Diabetic foot clinics will need to support community colleagues to provide ongoing case reviews and advice on the safe adjustment of management plans for patients. The mode of care will vary according to location and available technology, for example, telephone, video and tele-medicine.

In these times a basic holistic assessment will include the potential clinical signs/symptoms of COVID-19 before treating patients at admission. High temperature, new continuous cough, a loss or change in the sense of smell or taste, and diarrhoea or vomiting should be considered as symptoms consistent with COVID-19.⁹ In the new adapted pathway, both in patients with new or chronic DFU's, some clinical sign of alert should be considered for early referral to specialised DFS: the presence of superimposed infection (hyperemia around the wound, cellulitis, pus secretion, new area of wet gangrene, oedema, pain and fever), the presence of superimposed ischaemia or ischaemia evolution (new areas of necrosis or gangrene, rest pain and hyperemia of the foot) and the worsening of target wound (extension of ulcer size, involvement of soft tissues/bone and signs of ischaemia or infection as above).

Two new clinical states have been added to define key stages in DFU management they help identify DFU's should be referred or not from primary care to specialised DFS. This is the stable and unstable DFU respectively:

1. Stable DFU is considered an ulcer, that is, healing or not healing but not impairing
2. Unstable DFU is considered a foot ulcer, that is, progressing due to underlying infection or ischaemia or with impairment in size and depth.

Uncomplicated DFUs should be managed by primary care and supported with tele-medicine in the respect of SoC. In the case of unstable uncomplicated DFU during the follow-up, patients should be referred within 48–72 to specialised DFS not to ensure the cause of progression is identified (Figure 1).

Complicated DFU should be referred within 48–72 to specialised DFS as already recommended. If the clinical framework is stable and foot surgery or revascularisation are not required or can be postponed, patients can be managed as outpatient, or in community setting or monitored by tele-medicine. As outlined in Figure 1, an unstable complicated DFU during the follow-up, the new clinical pattern should be reconsidered and managed as complicated DFU (and referred within 48–72 h) or severely complicated DFU's (and referred within 24 h) in the respect of new ulcer' severity. As unstable complicated DFU in which early foot surgery and/or early revascularisation is required, the patient needs to be managed in a hospital setting (Figure 1).

Patients with severely complicated DFU should be referred within 24 h to specialised DFS and urgently managed in a hospital setting. After the acute phase, including the resolution of infections and the restoration of foot perfusion in ischaemic subjects, patients should be stepped down in the community setting or by tele-medicine follow-up with specialised DFS (Figure 1).

The adapted FTP is accompanied by the principles of SoC including off-loading, restoration of foot perfusion, treatments of infection, metabolic control/holistic management and local wound care in the respect of guidance.⁸ In addition, an associate table with the signs of alert has been developed for helping not-expert clinicians involving in the primary care.

2 | DISCUSSION

Notwithstanding the new health care emergency, the adequate management of DFUs should be ensured. Accordingly, the COVID-19 FTP has been developed to reduce the possible cases of late referral and limit the risk of hospital COVID-19 infection. Late referral is still a common theme worldwide,¹⁰ and prompt management of DFUs by diabetic foot specialists increases the chance of healing and reduces the rate of amputation.^{3,11}

The need to provide adequate management of DFUs during COVID-19 emergency has been taken into consideration by many experts. The America podiatrists proposed a pathway in relation to different clinical conditions including ulceration.¹² The International Working Group on the Diabetic Foot has developed some specific recommendation for the management of persons with diabetic foot

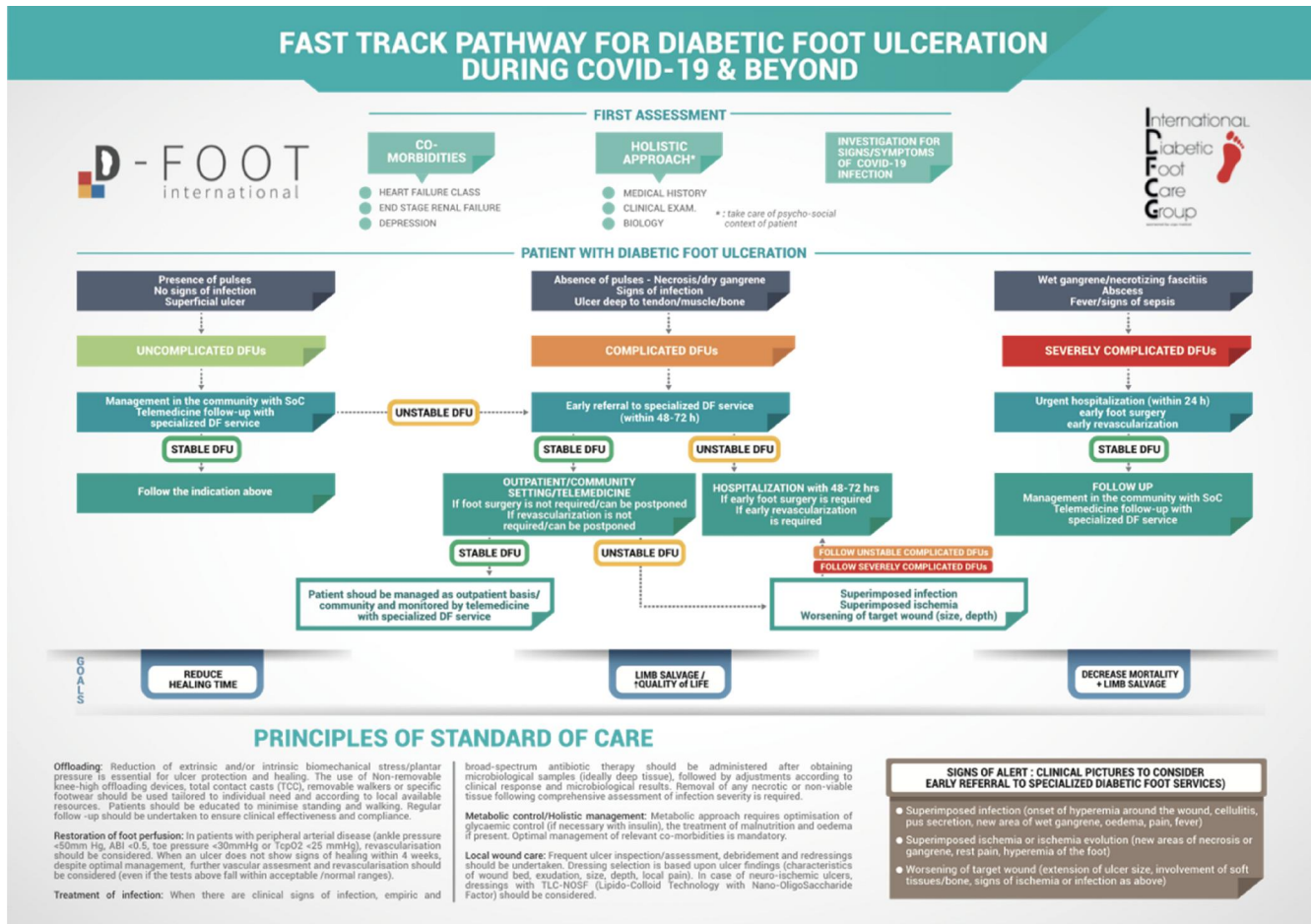


FIGURE 1 COVID-19 fast-track pathway for diabetic foot ulceration

disease during the COVID-19 crisis.¹³ In Italy, a triage pathway driven by the ulcer's severity and number of co-morbidities has been proposed to reduce the risk of virus exposure in very frail patients with good results in terms of limb salvage.¹⁴

In addition, Kelahmetoglu et al. have recommended the use of thorax computed tomography for preoperative screening in DFU patients requiring urgent surgery for both the detection of the possible COVID-19 infection and protection of the surgical team.¹⁵

The current document focuses on the DFU to support non-specialist-HCPs' primary care. The proposed triage pathway shows a dynamic flow in which acute phase and follow-up are together considered. Furthermore, new concepts of stable and unstable DFU allows the users to assess the state, and progression of DFU and identify the next steps including the conditions which can be managed by outpatients, community setting and tele-medicine and, otherwise, the clinical framework which need hospitalisation for urgent surgery or revascularisation. The need for hospitalisation, urgent surgery or revascularisation and individual evaluation is by expert clinicians working in a DFS, following an early appropriate referral from supporting services in the community.

3 | SUMMARY

IFDCG and D-Foot International aim to implement the adapted FTP across the world-wide foot network during the current COVID-19 pandemic and its recovery through the involvement of non-specialist HCPs and local authorities improving the understanding and efficacy of treatment.

The authors highlight the key principles of FTP but are aware due to the significant health care differences and pathway infrastructure.¹⁶ The document can be modified to the specific requirements, guidelines and legislation of local and national programs.

A pre-set triage before clinical visit to investigate symptoms of COVID-19 infection is mandatory and included. Patients with several comorbidities, are triaged to follow-up by tele-medicine and community management if appropriate and HCP's are empowered to define DFU status.

CONFLICT OF INTEREST

The authors declare they have not any conflict of interest.

AUTHOR CONTRIBUTIONS

Marco Meloni, Jose Luis Lazaro Martinez and Benjamin Bouillet have made substantial contributions to conception and design. Marco Meloni, Jose Luis Lazaro Martinez, Benjamin Bouillet and Raju Ahluwalia have been involved in drafting the manuscript and revising it critically for important intellectual content; Marco Meloni, Jose Luis Lazaro Martinez, Benjamin Bouillet, Raju Ahluwalia, Claas Lüdemann, Juan Pedro Sánchez-Ríos and Elisabetta Iacopi have given final approval of the version to be published.

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