Consensus on diabetic foot

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Abstract

The 1st Hospital Meeting took place on the 16th March 1996 having as theme "Diabetic Foot". Eighteen physicians of different specialties gathered in Coimbra, who had spent most of their professional lives managing this condition. From that informal exchange of knowledge and personal experience, with sharing of successes and failures, had as outcome a number of consensuses that are presented in this paper, along with recent views from several authors who also support them. This paper aims to be a practical help to all those who are fighting against that social problem in our country.

Key words: diabetes, diabetic foot, physiopathology, prophylaxis, treatment, consensus.

Introduction

Inter-Hospital Meetings, as they were called, were conceived as an informal forum for physicians dedicated to a particular pathology, with the aim of promoting broad, clear and pragmatic exchange of ideas on the subject in hand.

Physicians, and their patients, stand only to benefit from not isolating themselves and exchanging, among themselves, experiences and information, keeping abreast of what others are doing and discussing among themselves diagnostic processes, forms of treatment, and results obtained. Those who restrict themselves to their own activity, ignoring what their colleagues are doing always run the imminent risk of stagnation, of being restricted, and of no longer offering their patients the best options. All will agree with this, and yet look at how much separation there is among doctors of various hospitals, among Services within the same hospital, and often even within the same Service!

Scientific congresses are certainly of great importance in broadcasting new knowledge, and its consequent acquisition by those who attend the various workshops, but clearly, they are no substitute for working alongside somebody in the daily practice, discussion of cases as they are happening, presentation of difficulties found, and of concrete ways of resolving or avoiding them, that are experienced in real-life situations. In short, team work.

This is why the idea for these Inter-Hospital Meetings arose, planned as regular meetings on a specific theme, preferably involving various disciplines, between groups of experienced doctors dedicated to practice in the proposed area. In other words, a group of fifteen to twenty colleagues of different specializations, from hospitals and primary health care, dedicated to improve their professional performance, each in their own field, coming together to discuss difficulties encountered, and the proposed solutions.

Each Meeting has a moderator, who will direct the discussion, and who is also a co-organizer of this session, i.e. this person helps prepare this meeting, and subsequently reports on what was discussed and the consensus arrived at.

The diabetic foot

The 1st Inter-Hospital Meeting was held on 16th March 1996, and was dedicated to the subject of the "Diabetic Foot". Eighteen physicians took part who had, for a number of years, dedicated a large part of their professional lives to this pathology, working in various different branches of Medicine. Thus, the specialities of General Surgery, Vascular Surgery, Endocrinology, Internal Medicine, Orthopaedics and General Practice were represented. The places where they worked were equally varied, including hospital centres, district hospitals and health centres, which also helped give a complete perspective of the problem, seen from different angles.

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The discussion among professionals resulted in a set of ideas, procedural guidelines and practical activities that all the participants agreed on as being, for them, based on their own knowledge and experience, the best way of dealing with this pathological condition. This consensus on this subject is presented here, in the form of points, together with a recent bibliographic review of the subject, and it is hoped that this work will constitute a tool of an essentially practical nature for all those who, in our country, are faced with this real social scourge.

Thus:

1 – Diabetes is an endocrine and metabolic disease that in the medium and long term, produces major complex and multifocal vascular and neurological lesions. These lesions become clinically evident some years after the start of the disease, affecting the eyes (retina), the kidneys, the large and medium calibre vessels (macrovascular disease, with possibility of cerebral vascular accident) myocardial infarction and ischemia of the lower limbs) and the feet.[1,2,3,4,5]

2 – The complications of diabetes in the diabetic foot may have their origins in macrovascular disease or atherosclerosis, affecting the irrigation of the lower limbs, or in a series of vascular, neuropathic and infectious disturbances known as "diabetic foot", or even in both situations simultaneously.

3 – Ischemia of the lower limbs (due to trunk or macrovascular disease) in diabetics, besides being twenty times more frequent, generally has a worse prognosis than in non-diabetics. This is because the atherosclerotic lesions found are more disseminated and more distally located (affecting mainly the femoral-popliteal-tibial sector), which makes surgical revascularization more difficult to perform, with poorer results, and they are commonly associated with so-called diabetic foot.

4 – Diabetic foot leads to a range of neurological, vascular and infectious complications that are associated with, and affect each other.

5 – In the neurological field, [6,7,8,9,10,11] the decreased sensitivity to heat and pain ultimately results in the loss of a protection mechanism against injury caused by traumatism. The paresis of some intrinsic muscles of the foot, causing deformities or malpositions, often imperceptible to the eye, can lead to the onset of anomalous pressure zones, with the development of pressure ulcers, but without pain. Meanwhile, disturbances in autonomic innervation of the foot lead to maladaptation of the vasodilator reflex following local traumas. There is also a possibility of the appearance of some painful form of peripheral neuropathy associated with diabetes (painful diabetic neuropathy).

6 – From a vascular point of view,[12,13,14,15,16,17,18] along with deficient redistribution of blood according to the local conditions, due to autonomic nervous injury, microangiopathic injuries are also reported, with thickening of the basal membrane, preventing adequate nourishment of the tissues and migration of leucocytes to the infected zones. Contributing to the disturbance in microcirculation, there is a tendency towards intravascular coagulation, largely due to functional alterations in the platelets.

7 – The susceptibility of diabetics to developing infections is widely known, and its most common site of occurrence is in the feet.[19,20] In fact, it is recognized that infection is a very important factor, contributing to morbidity of the diabetic foot. The bacteria gain access to the tissues, almost always as a result of traumatisms. Their multiplication is favored by vascular disturbances and by a decrease in cellular and systemic response to inflammation, and the neuropathy enables the infection to proceed without being detected.

8 – These complications of diabetes are, then, the three factors that predispose to the appearance of diabetic foot. When this condition sets in, it is often called "vascular foot", "neurological foot", or "septic foot", depending on the clinical prevalence of one of these situations, but they practically coexist, always to a greater or lesser extent.[21,22] Vascular disturbances are always present, whatever the situation.

9 – Together with diabetic foot, as an aggravating factor, there is often a situation of ischemia of the lower limbs. In fact, when a diabetic patient has foot problems as a result of the diabetes, in 50% of cases there is a trunk or macrovascular ischemia of the lower limbs, which often goes unnoticed because of the neuropathy, "protecting" the patient from the pain of intermittent claudication – whether intermittent or in repose.

10 – But despite the complications that are inherent to the disease, not all diabetics end up having diabetic foot. This is because besides the predisposing factors cited above, which all patients will eventually suffer from (at least after some time of evolution of the diabetes), there must also be a causal factor: a local traumatism, generally mechanical or heat-related. In

reality, diabetic foot is the result of a series of predisposing causal factors.

11 – The best way to deal with diabetic foot is to prevent its appearance. But once the sores occur, they should be treated as early as possible.

12 – To achieve this, it is necessary to view ALL diabetics as having affected feet, and deal with them according to this premise. It is necessary to create diabetic foot clinics, or open foot clinics within the regular diabetes clinics. And whenever a diabetic patient has a consultation, the feet should be carefully observed, based on the premise that there are predisposing conditions for the development of diabetic foot sores.

13 – The prevention of all the complications of diabetes (including this one) should include, above all, careful control of glycaemia, keeping the levels as close as normal for as long as possible.[23,14]

14 – Physicians should have a constant concern with the feet of their diabetic patients, and demonstrate this to the patients themselves, so that they too can also be concerned, and take the necessary steps to prevent diabetic foot from developing.[25]

15 – Patients should be encouraged to maintain perfect hygiene of the feet, washing them only in lukewarm water, never hot water, and ensuring that the feet are thoroughly dried. A habit of daily methodical observation should be instilled in them, looking for areas of greater pressure, small sores or skin irritations, hyperkeratosis, etc.

16 – Patients should be advised to keep their toe nails short, in order to avoid ingrown toe nails, and to deal with calluses that emerge, as well as sores between the toes, caused by skin irritations, possibly of mycotic origin. Removal of hyperkeratoses and debridement of existing calluses is very important, as these are, in themselves, and due to their volume, responsible for abnormal pressure maintained on one point of the foot.[26]

This task can be done by the patients themselves, or by other concerned parties, provided they are duly industrious. Even with such attention, it can often lead to severe complications that place the foot at serious risk. In the absence of professionals among us who are duly trained in this task ("podiatrists" as they are known in English), it is down to the physicians and nurses of diabetic foot consultancies, at least in more difficult cases, to perform it. These are understood as the determining factors for preventing severe lesions in patients' feet.[27]

17 – Diabetics should be advised to persistently and carefully avoid all types of traumatism. For this reason, it should first be ascertained whether the patient is wearing appropriate footwear, and whether there are any signs of pressure on any particular point of the foot.

18 – If specific causes are found for this, such as deformities or malpositions of susceptible feet that can lead to pressure sores or zones of abnormal pressure, the physician should not hesitate to refer the patient to an orthopaedist, preferably at a clinic that specializes in diabetic foot. This will enable proper examination of the feet, including carrying out podograms, and measures prescribed such as corrective soles, or even special shoes, seeking to prevent the appearance of these sores.[28,29,20,31]

At this point, it should be noted that provided there are no anomalies in the shape or positioning of the foot, slip-on shoes (or trainers) of the correct size, and reasonably well-constructed, although inexpensive, may be an acceptable option that is preferable to poor quality uppers.[32]

19 – Sometimes it is necessary, or possible to use orthopaedic surgical interventions to correct focal pressure points on the foot generated by sores of the diabetic foot.[33]

20 – In the routine objective examination of a diabetic patient, a fundamental practice is palpation of the distal pulses of the lower limbs, pedis, and posterior tibial arteries. If these are not present, or are very weak, the patient should be referred to a vascular clinic, or at least, a Doppler exam obtained of the circulation of the lower limbs. And I note, in this regard, that in some diabetics, due to calcification of the tunica media of the arterial walls, which makes them less compressible, the segmental pressure values in the ankle may be normal when in reality, the patient has ischemia. If the clinical examination raises this doubt, the non-invasive study should be continued, normally by performing a stress test. Bear in mind, however, that a diabetic may have ischemia of the lower limbs of some severity, without having any pain, due to their neuropathy.

21 – In a patient so liable to develop atherosclerosis, it is clearly essential to formally, energetically and radically urge the patient not to smoke.

22 – Finally, diabetic patients should be urged to seek medical attention even for small sores on the foot which, in a non-diabetic, would be insignificant. Any

sores on a diabetic foot are potentially dangerous.
23 – When the patient presents sores of diabetic foot, he or she should be seen by a multidisciplinary team including a diabetologist, an orthopaedist, and a surgeon, preferably gathered in a diabetic foot consultation. Besides the therapeutic measures, the prophylactic care mentioned above should be continued.
24 – Close control of glycaemia is absolutely essential. And in this regard, it is very important to remember that difficulty in managing to stabilize a diabetic who has thus far been stabilized may be the first signal of a diabetic foot, albeit still subclinical.
25 – The septic component of the diabetic foot is extremely important, and should be dealt with from the outset.[34,35,36,37] Draining the infected region is essential, and in more advanced cases, urgent. An incision should be made, to drain any existing pus and surgically clean the wound, removing necrotic tissue, which could lead to open amputation of one or more fingers. Such situations obviously require emergency admission, and parenteral antibiotics.
26 – The antibiotics should always be adjusted according to the sensitivity to the germs in question, but it was unanimously considered that in most cases, the results of the bacteriological exams with AST arrive too late to be of use in the therapy. This does not mean we should not continue to request these exams, collecting the samples from deep inside the lesions, and not from the surface of the skin, and evaluating the results, to provide guidance as to the antibiotics to be used.
27 – The use of wide-spectrum antibiotics is essential, and all those present reported that they use combinations of antibiotics. Those cited were: ceftizoxime + aminoglycoside, quinolone + clindamycin, clindamycin + amoxicillin-clavulanic acid, clindamycin + aminoglycoside, penicillin + aminoglycoside. In terms of single antibiotic, ceftizoxime, quinolones or amoxicillin-clavulanic acid may be sufficient, as well as imipenem, which is usually reserved for more complicated cases.
28 – With regard to ulcers, whether neuropathic or vascular, these should be cleaned (remembering that the sensitivity is generally reduced), with removal of necrotic tissue, whether infected or liable to infection, washing with Dakin's solution, and the application of BetadineÒ. But above all, it should ensure that traumatism that caused the sores is no longer present, and prevent its recurrence. Large dressings, "protective", as they me be, are of no use, as their volume, when in contact with the floor or pavement, simply causes increased localized pressure on one point of the foot that is still ulcerated at this point.
29 – Infection of the bone tissue requires excision. Simple radiography of the foot reveals lesions of osteomyelitis, but does not always show us the true extent of the infection. For this purpose, we can use scintigraphic exam, which may also be useful for differentiating between an osteomyelitis and a Charcot osteoarthropathy. Nuclear magnetic resonance imaging also enables us to better evaluate the extent of septic penetration in a foot.[38]
30 – Diabetes mellitus is the main cause of Charcot osteoarthropathy, or neurogenic arthropathy. Its physiopathology is still unclear, but its relationship with neurological disturbances (sensitive, motor and autonomic) is clearly established. It is characterized by multiple pathological fractures, with an exuberant repair mechanism, which can lead to deformities of the foot. It is often confused with osteomyelitis, whether clinically or radiologically, but it is important to make this differentiation early on, to prevent unnecessary amputations. For a correct and accurate diagnosis, bone biopsy is sometimes necessary. This is a progressive situation but one which, if treated in time with immobilization, can help preserve the foot.
31 – And in the final analysis, in a diabetic foot, the extent of the osteomyelitis will determine the extent of the amputation to be performed. And in this field, we should be as restrained as possible, seeking only to amputate those parts that cannot be healed. This means we should make use of any medical and surgical measures that enable any amputation needed to be kept to a minimum.[39,40]
32 – Amputation is a therapeutic measure. When amputating a necrotic and infected part of a foot (which orthopaedists can do, but which they generally relegate to surgeons...) if it is possible to save the remaining foot, keeping it viable, then this should be done.
33 – In these cases of hand-to-hand, or millimetre to millimetre combat, Iloprost has proven useful for saving as much of the diabetic foot as possible.
34 – Not all those present had experience with this drug (a synthetic substance that is an analogue of prostacyclin PG12), but those who had were unanimous in the good results achieved. It is administered intravenously, at a very slow rate, which requires the

use of an infusion pump. The reactions presented by the patient may take various forms, but never lead to interruption of the treatment (although sometimes, the rate of infusion is decreased). It should be administered for around four weeks. There is a notion that this drug definitively helps in the healing of ulcers and decreases the need for, or extent, of the amputation.[41,42,43,44]

35 – In patients with significant ischaemia of the lower limbs, which complicates the diabetic foot, the vascular surgeon has something to say. A revascularization procedure should therefore be considered, which will often need to be very distal, with a greater degree of difficulty and a less safe result. It is a surgical effort that can, however, be beneficial, helping to save the patient's limb.[45,46,47,48] In these cases which are problematic due to run off deficit, in which the vascular surgeon would be glad for an extra help, there appears to be some evidence of a beneficial effect of pre- or post-operative use of prostacyclin.[49]

36 – Where this revascularization is not possible at all (or where it is attempted but unsuccessful, due to thrombosis), we have two weapons at our disposal: lumbar sympathectomy and, once again, Iloprost. Although diabetic autonomic lesions often correspond to a true sympathectomy, one can never be certain of this in each patient, therefore in these almost desperate cases, it is always worth performing. As for Iloprost, this can significantly relieve complaints resulting from ischaemia, an effect that is maintained for some time.

37 – In conclusion, the treatment of diabetic foot consists of a set of measures that seek to prevent amputation or reduce it as far as possible. But the best results can prevent the diabetics' feet from becoming "diabetic feet".

38 – To keep diabetics walking on their feet, we must provide them with all the necessary care. In short, we must treat as if they were porcelain... ■

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