

Opinions that matter:

# Patient's perspective of their perioperative management during surgery for diabetic foot

## ABSTRACT

### Introduction

To obtain patients' perspective of the perioperative experience related to surgical management of diabetic foot (DF) in a highly specialised centre.

### Method

In total, 34 consecutive patients undergoing surgery at our specialised DF centre in November 2015 met our inclusion criteria. Patients completed the Diabetic Foot Surgical Experience Inventory questionnaire about their experience. The questionnaire included three parts: phase I, the pre-operative preparatory phase; phase II, the surgical period; and phase III, the post-operative observation period in the recovery room. For each phase, five yes/no questions were asked about the main aspects of the procedure, and pain, stress, and satisfaction were evaluated using a numerical rating scale (NRS; 0-10, with 10 = maximum).

### Results

Overall, 28 patients (age,  $62.8 \pm 17.4$  y; diabetes duration,  $19.3 \pm 8.9$  y; HbA1c,  $8.3 \pm 1.25\%$ ) completed the questionnaire. Phase I satisfaction VAS score was  $7.9 \pm 2.1$ ; 7 patients noted a long delay before admission to the operating room (OR), 5 indicated pain during their local anaesthetic procedures (LAPs), and 3 indicated that LAPs were stressful. Phase II VAS satisfaction score was  $8.8 \pm 1.2$ ; 1 patient reported problems with OR bed positioning and 1 noted that the surgery was stressful. Phase III satisfaction VAS score was  $8.9 \pm 1.7$ , with 1 patient noting a long delay before transfer to the ward. VAS pain scores were similar in all phases. Stress was significantly ( $p < 0.05$ ) higher in phase I ( $3.1 \pm 2.1$ )

than in phases II ( $1.2 \pm 0.7$ ) and III ( $1.1 \pm 0.8$ ).

### Conclusions

In a generally well-tolerated context, the pre-operative phase and LAPs seem to be more problematic and painful for patients with DF compared with other aspects of the perioperative experiences. This was possibly related to perceived anticipatory stress.

## INTRODUCTION

Diabetic foot (DF) is a frequent and complex chronic ulcerative condition affecting 20% of patients with diabetes at least once in their life.<sup>1</sup> Its progressive clinical course and increasing severity are associated with a 20 times higher risk of lower extremity amputation than in the general population, as well as a mortality rate higher than that of many forms of cancer.<sup>2, 3</sup>

The therapeutic approach to DF is multidisciplinary and encompasses many different aspects aimed at addressing factors that create and sustain the pathology. It involves either surgical or endovascular revascularization to restore blood flow in the ischemic foot, offloading to prevent negative effects of postural trauma on the affected foot, and systemic antibiotic therapy to combat infections<sup>4</sup>.

A crucial aspect of DF treatment involves local care of foot ulcers, which represent the cause of lower extremity amputation in 85% of patients.<sup>5</sup> Beyond local care and dressings, surgical management of ulcers associated with DF has become increasingly common and important in the overall multidisciplinary management of this pathology.<sup>6, 7</sup>



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None

Indications for DF surgery have increased over the years, and a classification system for DF surgery has been introduced and implemented. This has helped caregivers identify the correct surgical procedure for a growing number of indications. The procedures range from correction of neuropathic deformities that would eventually lead to ulceration, to the removal of infected and necrotic tissues that interfere with wound healing, to the transposition of tendons to correct an unbalanced foot, among many others<sup>8</sup>.

With the expanded indications, patients with DF have increasingly more occasions to undergo a surgical procedure in the course of their disease, for both conservative and more aggressive interventions. In this context, subjective evaluation of the surgical experience from the patients' perspective - an issue neglected by the current literature - would be of extreme interest to understand how pain, stress, and discomfort associated with DF surgery is perceived by patients. The ultimate goal would be to use this knowledge to improve quality of care from the patients' point of view. Investigating these outcomes directly in the clinical setting by the same nurses who participate in preparation and management of patients undergoing DF surgery would help bridge the gaps between perioperative nursing protocols and the factors considered most important by patients.

### **Aim**

The aim of this study is to explore patients' perceptions of their perioperative experience related to surgery for DF. To accomplish this, we studied a group of consecutive patients undergoing surgery at in our DF Section, a highly specialised referral centre for DF in Tuscany, Italy.

### **METHODS**

We designed this study to evaluate patients' perception of stress, pain, and discomfort related to their surgical procedures for DF pathology. The study was submitted to and approved by the ethics committee of our hospital. Written informed consent was obtained upon arrival in the operating room (OR) area, one hour before surgery. All patients consecutively undergoing surgery at our specialised DF centre during November 2015 were screened for the following inclusion criteria: type 1 or type 2 diabetes, presence of an acute DF ulcer, and a surgical procedure proposed by an experienced specialist of the DF Team. Exclusion criteria were the presence of an emergent/urgent condition, diagnosis of a psychiatric disease, chronically receiving medications that may interfere with mood, inability to provide informed consent for the intervention, inability to understand the questionnaire questions, and a DF ulcer-related surgical procedure in the previous 12 months.

In all patients, the surgery was performed under locoregional anaesthesia, which consisted of popliteal and saphenous nerve blocks at the knee. These blocks (referred to collectively as local anaesthetic procedures in this report) were administered pre-operatively. No sedation was administered to patients before or during the operations.

The patients' perioperative experience was assessed using the Diabetic Foot Surgical Experience Inventory (DFSEI) questionnaire (Appendix 1). This questionnaire was divided into three parts, corresponding to the three perioperative phases: the first explored the pre-operative preparatory phase (phase I), which included admission to the OR area, identification of the patient, confirmation of the surgical indication and procedure, and preparation and execution of local anaesthetic procedures; the second part involved the surgical phase (phase II), which included entry into the OR, preparation for the operation, and the surgery itself; and the third part explored the post-operative observation period in the post-anaesthesia care unit (PACU) (phase III), during which patients were transferred to the PACU and continuously monitored until discharged to the ward. The DFSEI was designed to explore how much stress, discomfort, or pain patients experienced for each of the three phases, through the use of direct simple questions. It was created by one of the authors (AP) and validated in patients undergoing surgical procedures in the same setting but for non-DF pathologies. For each phase, five yes/no questions asked about the main aspects of the phase. The questionnaire also assessed pain, stress, and overall satisfaction during each phase using a Numerical Rating Scale (NRS; 0 = none to 10 = maximum).

The questionnaire was administered by one of the nurses who assisted with the DF surgical procedure (LB, SG, CM). Most questions were completed immediately before the patient left the PACU, although the question related to transfer from the PACU to the ward was completed after arrival on the ward. The total time required to complete the questionnaire was 5 minutes or less, from the first to the last question.

### **Statistical Analysis**

The DFSEI results were collected and analysed as both qualitative and quantitative data. The yes/no answers were grouped for each phase to identify problems related to specific aspects characterizing each phase. They were expressed as percentages. NRS scores were analysed as continuous data. They were expressed as mean±standard deviation and analysed with the Mann-Whitney test for non-parametric data, setting the value of significance at 5% ( $p < 0.05$ ).

**Table 1: Number and characteristics of patients.**

Number or characteristic	Value
Patients fulfilling inclusion criteria (n)	34
Patients completing the questionnaire (n)	28
Males/Females (n)	16/12
Age (years)	62.8±17.4
Duration of diabetes (years)	19.3±8.9
Glycated haemoglobin (%)	8.3±1.2

Data are number or mean±standard deviation.

**Table 2: Rate of patients indicating problems in each perioperative phase.**

Item	Pre-operative phase	Operative phase	Post-operative phase
Transfer	0	0	0
Positioning	0	3.6%	0
Delay	25.0%	0	3.6%
Stress	10.7%	3.6%	0
Pain	17.8%	0	0

## RESULTS

Of the 48 patients undergoing surgery during the study period, 34 fulfilled the inclusion criteria, but only 28 were enrolled in the study and completed the questionnaire. Of the 6 non-participants, 3 had one or more exclusion criteria and 3 did not provide informed consent. The patient characteristics are shown in Table 1.

The surgical interventions were conservative surgery in 18 patients and minor amputation in 10 patients. The latter were performed for gangrene or chronic osteomyelitis and involved amputation of one or more lesser toes in 4 patients, amputation of the first toe in 3 patients, and transmetatarsal amputation in 3 patients. No major amputations were performed in this group of patients. The DFSEI questionnaire results for problems related to each phase are summarized in Table 2. The majority of perceived problems occurred in the pre-operative phase, whereas the post-operative phase was the least problematic period. In the pre-operative phase, 7 patients indicated that there was a long delay before admission to the OR, 5 noted pain during the local anaesthetic procedures, and 3 indicated that the local anaesthetic procedures were stressful. In phase II, 1 patient noted that positioning on the OR bed was a problem and 1 patient noted that the surgical procedure was stressful. In phase 3, 1 patient indicated that there was a long delay before transfer to the ward.

The results of NRS scores for overall satisfaction during each phase are shown in Figure 1. The NRS satisfaction score was 7.9±2.1 for phase I, 8.8±1.2 for phase II, and 8.9±1.7 for phase III. These were not significantly different.

*Figure 1: see next page*

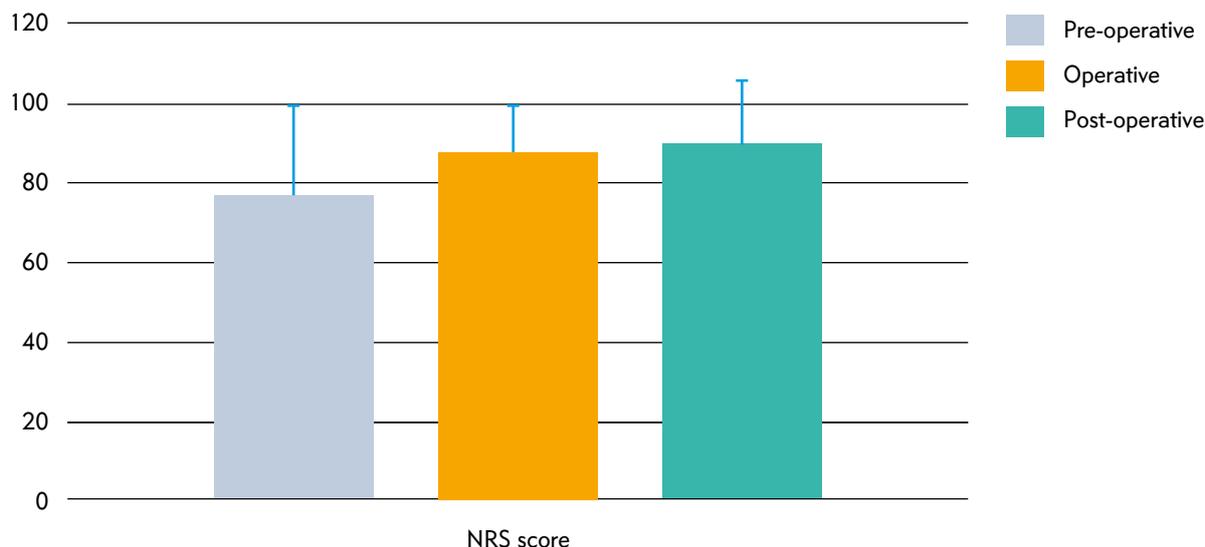
NRS scores for pain and stress are shown in Figure 2. Pain was not significantly different among the three phases. However, stress was significantly ( $p<0.05$ ) higher in phase I (3.1±2.1) compared with phases II (1.2±0.7) and III (1.1±0.8).

*Figure 2: see next page*

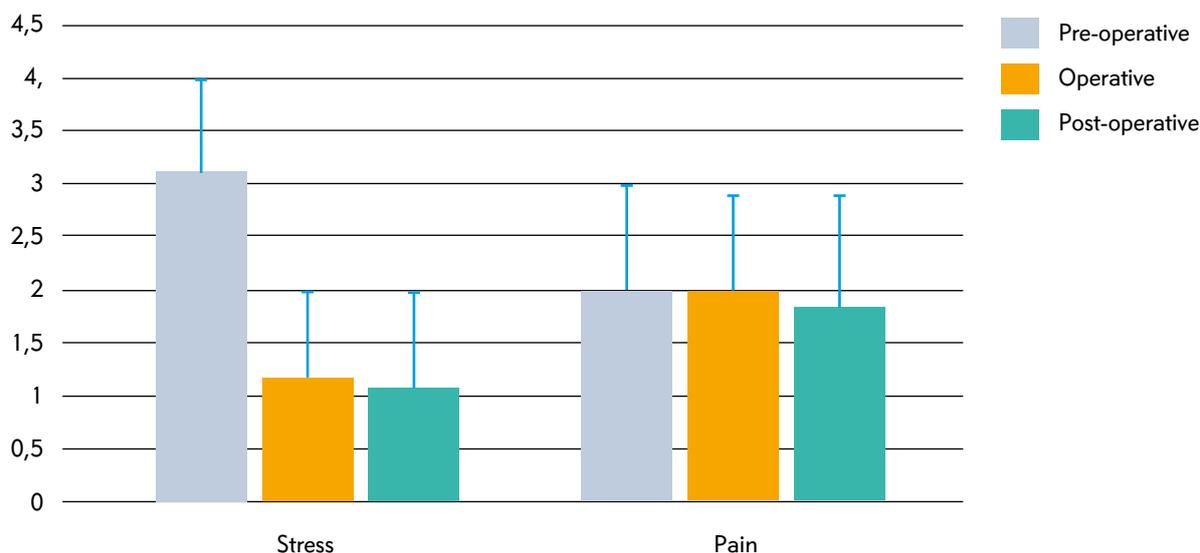
No differences were detected when the results were analysed separately for conservative surgery versus minor amputations for all of the items evaluated.

## DISCUSSION

Surgery is a potentially stressful event for patients; even minor interventions, performed under locoregional anaesthesia may be negatively perceived by patients, irrespective of the indications and clinical outcomes.<sup>9</sup> A recent study, performed in a group of 21 patients undergoing surgery for Dupuytren's disease identified how patients' character, previous experiences, and expectations influenced their perceived experience and appraisal of the results, and



**Figure 1: Numerical rating scale (NRS) scores for level of overall satisfaction (0 - 10, with 10 indicating maximum satisfaction) reported by patients in each of the three perioperative phases.**



**Figure 2: Numerical rating scale (NRS) scores for levels of stress and pain (0 - 10, with 10 indicating maximum stress or pain) reported by patients in each of the three perioperative phases. \* $p < 0.05$  pre-operative vs operative and post-operative phases.**

potentially affected their clinical outcomes.<sup>10</sup> Although this close relationship has been confirmed for a number of conditions and their surgical management, the role of perioperative stress in DF surgery has not been heretofore ascertained.<sup>11,12</sup>

DF is a chronic condition associated with stress and anxiety, which has been demonstrated to negatively affect wellbeing.<sup>13</sup> Our current study demonstrates that DF surgery performed in a dedicated setting using locoregional anaesthesia is generally well tolerated, providing an overall positive evaluation of the experience. However,

some aspects are still perceived as problems. Dividing the surgical experience into the three phases composing the full perioperative course of DF surgery (from admission to the OR area to transfer back to the ward), we noted that the pre-operative phase was the main period when patients reported problems and the phase during which stress was highest.

Our results are not unexpected, as a patient's anxiety, and thus the level of perceived stress is amplified by the uncertainty of a new experience. This "catastrophic thinking" may not only influence the experience of patients, but it

may also negatively impact outcomes, such as increasing complications and reducing mobility and autonomy [14]. The most common problem reported by patients for the pre-operative phase was related to the long delay before surgery (25%). This may have been at least partly due to anticipatory anxiety. Additionally, 18% of patients reported pain and 11% reported stress associated with the pre-operative local anaesthetic procedures.

The importance of this study lies mainly in its provision of a better understanding of patients' perspectives of their perioperative experience and the finding that the pre-operative phase is the most stressful period. Better preparation of patients, with more proactive nursing in this phase and paying close attention to patients' psychological reactions, may improve the patients' experience of the surgical procedure which has been demonstrated to also influence wound healing outcomes.<sup>15-17</sup>

We acknowledge some limitations of the present study. For example, the study had no control group. Furthermore, the results were based on subjective assessments by patients, using a questionnaire that has not been standardised in other institutions. In addition, the study was performed in a single centre, which limits the generalizability of its results.<sup>18,19</sup>

## CONCLUSIONS

Our study, the first of its kind in DF surgery, identified that the perioperative experience is well perceived and tolerated by the majority of patients, when adequately performed by a dedicated team. Some aspects of the pre-operative phase, related to both pain associated with the local anaesthetic procedure and anxiety associated with anticipation, emerged as problematic in approximately 1 out of 4 patients. However, perceptions in the pre-operative phase did not appear to influence perceptions in the later phases. The results of our study are important in a field like DF surgery, which is rapidly expanding and for which no such information is available. Understanding patients' perception of management-related stressful events may facilitate the development of strategies to greatly improve the quality of the perioperative experience and possibly improve clinical outcomes.

## Further research

- Patients undergoing DF surgery may interpret their perioperative experience in different ways depending on their personal experiences. Thus, a further study might inquire about the possible relationship between previous surgical interventions and perceived levels of stress.

- Patient awareness regarding their condition may influence their level of anxiety related to the surgical procedure. A study evaluating patient knowledge and its relationship to the perceived surgical experience might aid in better preparing patients for surgery.

## Implications for clinical practice

- The personal and psychological dimensions of surgical patients with DF are often inadequately considered by caregivers.
- The role of nurses in helping patients navigate the complex phases of a surgical intervention for DF is important to help reduce patient stress and pain in this setting.
- All health professionals involved in preparing and delivering surgery for patients with DF should realize that the pre-operative phase is the most critical period from the patient's perspective and should focus on efforts to try to shorten the phase and prevent pain related to the pre-operative anaesthetic procedures.

Acknowledgements/Authors' Contributions: LB, SG, CM, CG, and AP conceived and designed the study; LB, SG, and CM collected the data; CG supervised and double-checked the data collection; AP and CG wrote the manuscript; and LB, SG, CM, CG, and AP revised the manuscript and approved it for publication. ►

## Appendix 1 Diabetic Foot Surgical Experience Inventory (DFSEI)

### Pre-operative phase

1. Was the transfer from the ward to the preparatory room adequate?  Yes  No
2. Did you find the waiting time in the preparatory room adequate?  Yes  No
3. Did you find the local anaesthesia procedure stressful?  Yes  No
4. Did you find the local anaesthesia procedure painful?  Yes  No
5. Was the transfer from the preparatory room to O.R. adequate?  Yes  No

*Please score 0 to 10 the amount of stress in the pre-operative phase*

*Please score 0 to 10 the amount of pain in the pre-operative phase*

*Please score 0 to 10 your overall satisfaction for the pre-operative phase*

### Operative phase

1. Was the positioning on the operatory bed adequate?  Yes  No
2. Did you find the waiting time in the O.R. adequate?  Yes  No
3. Did you find the surgical procedure stressful?  Yes  No
4. Did you find the surgical procedure painful?  Yes  No
5. Was the transfer from the O.R. to the recovery room adequate?  Yes  No

*Please score 0 to 10 the amount of stress in the operative phase*

*Please score 0 to 10 the amount of pain in the operative phase*

*Please score 0 to 10 your overall satisfaction for the operative phase*

### Post-operative phase

1. Was the positioning in the recovery room adequate?  Yes  No
2. Did you find the waiting time in the recovery room adequate?  Yes  No
3. Did you find the post-operative monitoring procedures stressful?  Yes  No
4. Did you find the post-operative monitoring procedures painful?  Yes  No
5. Was the transfer from the recovery room to the ward adequate?  Yes  No

*Please score 0 to 10 the amount of stress in the post-operative phase*

*Please score 0 to 10 the amount of pain in the post-operative phase*

*Please score 0 to 10 your overall satisfaction for the post-operative phase*

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