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Letter to the Editor

Is malnutrition associated with orthopaedic infections? A single-centre pilot evaluation☆

Sir,

Malnutrition is frequent among adult surgical patients [1–3]. Some authors suggest that malnutrition may be an independent risk factor for orthopaedic infections. There are, however, few strong original data addressing this issue. It was thus decided to perform a prospective pilot quality evaluation for patients at risk of surgical site infection (SSI) or community-acquired orthopaedic infection. During February 2017 to March 2017, the nutritional status of 23 infected (nosocomial and community-acquired infections) and 18 uninfected patients, consecutively hospitalized in our orthopaedic service, was prospectively surveyed. To estimate the presence of malnutrition, nine different clinical and laboratory parameters were used, such as the Mini Nutritional Assessment Tool (MNA®) of the Nestlé Nutrition Institute, the body mass index, weight, history of weight loss in the last three months, presence of gastrointestinal diseases or diabetes mellitus, serum albumin levels, serum total protein, and the serum pre-albumin levels at admission [1,2,4]. Whether patients finished their meals during hospitalization was also recorded.

Due to its small sample size, the non-invasiveness, and the use of already sampled parameters at admission, the quality evaluation was waived from formal written consent.

The main outcome was that there was no single difference between those with and without infections in any of these nine standard nutritional parameters (Table I).

We cannot fully explain this complete absence of difference. Many colleagues think that there is a strong scientific link between malnutrition and SSI. The mechanism by which malnutrition would increase the risk for SSI equally remains obscure. In reality, available scientific literature is scant and national and international guidelines attribute a very low quality of evidence for this association. For example, the Centers for Disease Control and Prevention guidelines of 1999 remain vague [5]. The recent global World Health Organization guidelines state that 'The panel suggests considering the administration of oral or enteral multiple nutrient-enhanced nutritional formulas for the purpose of preventing SSI in underweight patients [only] who undergo major surgical operations', taxing the strength of their own recommendations as 'conditional' and the quality of evidence as 'very low' [6].

It might be that the value of the current diagnostic schema for malnutrition lies essentially in identifying sicker patients. To cite a frequent example, most author groups use hypoalbuminaemia with a cut-off of 3.5 g/dL as the most important marker for malnutrition [1,7,8]. However, although albumin may be a reliable serum marker of chronic nutritional status, it is not specific, in that inflammation or stress may also cause hypoalbuminaemia without associated malnutrition [1]. Likewise, malnutrition is a confusing and complex term. It includes phenomena related to starvation, and it includes patients who are overweight as well as those with low nutritional intake. Whereas obesity is a clear risk factor for SSI, other aspects of malnutrition might not be [1].

The present study has three important limitations. Without doubt, the sample size would be too small compared to a

Table I
Comparing patients with and without infections with emphasis on nutritional parameters

Characteristic/parameter	Infection ($N = 23$)	No infection ($N = 18$)	*P*-value[a]
Female sex	12 (52%)	9 (50%)	0.89
Median age (years)	74.0	74.5	0.49
Immune suppression	7 (30%)	7 (39%)	0.57
Diabetes mellitus	7 (30%)	6 (33%)	0.84
Elective surgery	2 (9%)	4 (22%)	0.22
Weight (kg) (median)	80	72	0.13
Weight loss in the last 3 months (median)	3	0	0.21
Body mass index (kg/mm^2) (median)	28.9	24.3	0.45
Gastrointestinal disease	3 (13%)	2 (11%)	0.85
Serum albumin (g/L) (median)	32	33	0.11
Serum pre-albumin (g/L) (median)	170	174	0.89
Serum proteins (g/L) (median)	65	63	0.31
Finishes meal[b]	100%	100%	0.47
MNA[c] questionnaire (points) (median)	9	9	0.79

[a] Pearson-χ^2 and Wilcoxon rank-sum tests, as appropriate.
[b] Percentage of meal finished according to the (auxiliary) nurses.
[c] Mini Nutritional Assessment.

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randomized trial or a case—control study. Indeed, this study cannot address interventional issues and it is unlikely to be valuable as a platform from which to launch a full study of the topic. By contrast, this study was a prospective pilot evaluation in preparation of a possible interventional trial by searching the best parameters to influence in such a possible future trial. Second, in our evaluation, even if we compared nine different parameters, we omitted other literature markers such as total lymphocyte count, serum zinc levels, iron/transferrin, pyridoxin and vitamin-D levels, lymphocyte/monocyte ratios, the measurement of healing time, or anthropometric measurements such as calf and arm muscle circumference or triceps skinfolds (none of which is routinely assessed on admission). These are all markers of malnutrition and SSI. Future trials would also need to consider not only gross protein and carbohydrate intake but also (and perhaps especially) micronutrients; and perhaps to concentrate on nutritional status independently of confounders such as diabetes and high alcohol intake, gastrointestinal disease, and immune suppression [1,8]. Accepting that these are important, any proposed trial would need to determine whether preoperative nutritional optimization might be more feasible without their inclusion. Finally, a literature bias in favour of positive associations is not entirely excluded. Negative results might be less conducive to publication. Our pilot study is one such negative evaluation.

Conflict of interest statement
None declared.

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