

## Higher proportion of cellulitis in severe lymphoedema

Dear Editor, We read with interest the *BJD* article by Burian *et al.* discussing the prevalence and risk factors of cellulitis in chronic leg oedema.<sup>1</sup> This is important because cellulitis is more prevalent and complex in patients with lymphoedema, leading to significant disease burden, specialist care requirements and large financial costs.<sup>1,2</sup> We investigated how applicable these results were in the real-world setting of our specialist lymphoedema service over 12 years through a service evaluation. The primary analysis explored the association between cellulitis and severity of lymphoedema. Subgroup analysis studied the noniatrogenic lymphoedema cohort.

We included adults referred to a specialist outpatient service at the Norfolk and Norwich University Hospital, in the East of England, for lymphoedema assessment between 22 February 2010 and 7 February 2022. Patients were referred from general dermatology clinics, cellulitis clinics and plastic surgery departments. Specialist nurses completed a proforma at the first visit to the lymphoedema service to establish a database. Patients lacking any data recorded on lymphoedema stage or history of cellulitis episodes were excluded. Severity of lymphoedema was determined using International Society of Lymphology staging.<sup>3</sup> Stage 0 lymphoedema included patients who were at risk of developing

lymphoedema, such as following lymph node surgery. The subgroup with at least one episode of cellulitis in the Stage 0 or Stage 1 lymphoedema groups was compared with Stage 2 and Stage 3 lymphoedema groups using the  $\chi^2$  test. The overall cohort and noniatrogenic lymphoedema subgroup were powered to detect a difference in cellulitis occurrence by lymphoedema severity ( $\alpha=0.05$ ,  $\beta=0.8$ ). The iatrogenic lymphoedema subgroup, which included patients following sentinel lymph node biopsy, was inadequately powered and thus was not analysed.

We included 304 patients with lymphoedema: 243 patients (79.9%) with noniatrogenic, 59 (19.4%) with iatrogenic and 2 (0.7%) with unknown origin (see Table 1). Bilateral lower limb lymphoedema was the most common site of lymphoedema (218, 71.7%). In total, 114 (37.5%) patients reported at least one prior episode of cellulitis. The subgroup with at least one prior episode of cellulitis in each lymphoedema severity group is reported in Table 1. Most patients were managed with skin care advice (297, 97.7%) and compression garments (233, 76.6%). The proportion with at least one prior episode of cellulitis was significantly greater in those with stage 2 or 3 lymphoedema than in those with stage 0 or 1 lymphoedema ( $\chi^2$ ;  $P<0.0001$ ). Among the noniatrogenic lymphoedema cohort, 106 (43.6%) patients had at least one prior episode of cellulitis. The subgroup of patients in each noniatrogenic lymphoedema severity group with at least one prior episode of cellulitis is shown in Table 1. The

**Table 1** Patient characteristics of lymphoedema (total and noniatrogenic) cohort

Characteristics	Prior history of cellulitis, n (%)		Total, n (%)
	Yes, $\geq 1$ episode	No	
Sites of lymphoedema			
Bilateral lower limb			218 (71.7)
Unilateral lower limb			58 (19.1)
Unilateral upper limb			22 (7.2)
Other			6 (2.0)
Lymphoedema stage			
<i>Total cohort 2010–22</i>	114 (37.5)	190 (62.5)	304
0	2 (8.3)	22 (91.7)	24 (7.9)
1	29 (27.1)	78 (72.9)	107 (35.2)
2	73 (45.9)	86 (54.1)	159 (52.3)
3	10 (71.4)	4 (28.6)	14 (4.6)
<i>Noniatrogenic cohort 2010–22</i>	106 (43.6)	137 (56.4)	243 (79.9%)
0	2 (25.0)	6 (75.0)	8 (3.3)
1	24 (31.6)	52 (68.4)	76 (31.3)
2	70 (47.9)	76 (52.1)	146 (60.1)
3	10 (76.9)	3 (23.1)	13 (5.3)
Lymphoedema management			
Skin care advice			297 (97.7)
Compression garments			233 (76.6)
Dressings			48 (15.8)
Simple lymphatic drainage			16 (5.3)
Manual lymphatic drainage			2 (0.7)

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proportion with at least one episode of cellulitis was significantly greater in those with stage 2 or 3 lymphoedema than in individuals with stage 0 or 1 lymphoedema ( $\chi^2$ ;  $P=0.004$ ).

This analysis showed that a history of cellulitis was more common in patients with more severe lymphoedema. In total, 114 (37.5%) patients reported at least one episode of cellulitis, and another study found that 37.6% of their patients had experienced one or more cellulitis episodes.<sup>4</sup> These results are consistent with the findings reported from Burian *et al.*,<sup>1</sup> suggesting that they are applicable in real-life practice.

Our study found that 76.6% of our cohort of patients with lymphoedema received compression garments, a rate similar to that seen in an international study on patients with lymphoedema.<sup>5</sup> It was not possible to confirm whether compression was used correctly in our cohort. Controlling lymphatic swelling through using compression garments may reduce episodes of cellulitis, recurrence of cellulitis and acute care costs.<sup>1,6,7</sup>

The main limitations of our study are its retrospective design, and the potential recall bias introduced as patients reported a history of previous episodes of cellulitis. Furthermore, it was unclear from the records whether the episodes of cellulitis occurred after development of lymphoedema or before. The participants represented a population referred to a secondary service and seen by specialists. Consequently, the results may not be generalizable to patients with lymphoedema in primary care. However, understanding this complex cohort was clinically relevant, as they presented with more complex management challenges and required increased service utilization.

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## References

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