Impact of Bariatric Surgery on Hidradenitis Suppurativa

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Hidradenitis suppurativa (HS) is a chronic inflammatory disease affecting the follicular epithelium of skin folds, characterized by recurrent painful nodules and abscesses, impairing patients'quality of life (1). Patients with HS frequently exhibit metabolic syndrome (MS); obesity is an identified risk factor, with almost 20% of obese patients experiencing HS compared with 1% in the general population (2–4). The standard of care is to encourage obese patients with HS to lose weight. However, few studies have evaluated the impact of weight loss on HS, especially with bariatric surgery (BS), and results are discordant.

The aim of the current study was to determinate the impact of BS on the evolution of severity of HS in obese patients.

MATERIALS AND METHODS

This retrospective study included patients with HS who had been hospitalized in the day hospital of the centre specialized in obesity in Reims University Hospital, France, between 2012 and 2019. Inclusion criteria were HS diagnosis confirmed by a dermatologist, BMI $\geq$35 kg/m^2, and follow-up $\geq$12 months after the day hospital visit.

Two groups of patients were retrospectively constituted: patients who had undergone BS (BS group) and a control group of patients receiving only nutritional care (NC) (NC group), following the day hospital visit. The aim was to study the evolution of HS activity in the BS group at least 12 months after BS compared with the NC group.

Due to the COVID-19 pandemic, the study was conducted using a standardized questionnaire administered by phone call between March and June 2020. Data collected were sex, age at onset of HS, duration of HS, current age, current smoking, current Dermatology Life Quality Index (DLQI), and treatment(s) received for HS after the day hospital visit to the time of the current evaluation, including surgery and laser hair removal from sites affected by HS.

This study also collected data on weight and BMI, number of anatomical affected sites (14 specific sites were pre-defined) and HS activity based on a visual analogue scale (VAS, 0–10 cm) before and after BS or NC. Finally, the initial Hurley stage was determined.

Student *t*-test for independent samples was used to compare the BS and NC groups and *t*-test for paired samples to analyse the evolution after BS or NC for each group.

RESULTS

A total of 19 patients with HS were included, 12 had undergone BS (8 sleeve surgeries, 4 by-pass surgeries) (BS group), and 7 received NC (NC group), following the day hospital visit (**Table I**).

Before BS or NC, the 2 groups did not differ in sex ratio, age at HS onset, weight or BMI, number of anatomical sites affected by HS, HS activity or Hurley stage.

The mean follow-up after BS was 44.4 months (range 12–72), and 27.6 months (range 12–36) after NC.

At the time of the survey, the 2 groups did not differ in active smoking, duration of HS, current systemic treatment for HS or number of patients with a history of wide surgical removal of HS sites performed between the initial day hospital visit and the survey.

Mean weight and BMI were 120 kg (range 95–157) and 43.8 kg/m^2 (range 35.0–50.2), respectively, before BS vs 91 kg (range 70–129) and 33.1 kg/m^2 (range 27.4–41.2) after BS. The mean weight at the time of the survey was significantly lower in the BS than NC group (91 vs 115 kg; $p=0.01$).

Improvement in HS was seen only in the BS group, with a decreased number of anatomical sites affected

Table I. Main epidemiological and clinical evolutive characteristics of patients with obesity and hidradenitis suppurativa (HS) undergoing bariatric surgery (BS) or nutritional care (NC)

	BS ($n=12$)	NC ($n=7$)	*p*-value
F/M ratio, *n*	10/2	6/1	0.90
Age, years, mean (range)	49.6 (37–58)	38.6 (21–50)	**0.03**
Age at HS onset, years, mean (range)	24.8 (15–49)	19.7 (14–44)	0.39
HS duration, years, mean (range)	25.3 (7–50)	18.7 (5–34)	0.28
Hurley stage, *n*			
I	2	1	0.90
II	8	4	0.70
III	2	2	0.57
Patients currently smoking	5	6	0.07
Current systemic treatment(s) for HS, *n*	6	3	0.78
Doxycycline	0	2	
Acitretin	1	0	
Methotrexate	1	1	
Anti-tumour necrosis factor agent	4	1	
History of wide surgical removal*, *n*	7	5	0.60
Laser hair removal*, *n*	1	0	
Initial weight, kg, mean (range)	120 (95–157)	114 (84–156)	0.56
Current weight, kg, mean (range)	91 (70–129)	115 (95–147)	**0.01**
Initial BMI, kg/m^2, mean (range)	43.8 (35.0–50.2)	42.2 (35–54.4)	0.56
Current BMI, kg/m^2, mean (range)	33.1 (27.4–41.2)	42.3 (36.9–54)	**0.001**
Initial number of HS affected sites, mean (range)	7.33 (2–10)	6.86 (2–12)	0.74
Current number of HS affected sites, mean (range)	2.25 (0–7)	4. 42 (0–11)	0.19
Change in number of HS affected sites	Δ 5.08, $\mathbf{p<0.001}$	Δ 2.42, $p=0.063$	
Initial HS activity score (VAS, 0–10 cm), mean (range)	6.4 (0–10)	6.7 (2–9)	0.81
Current HS activity, mean (range)	3.1 (0–8)	4.7 (2–8)	0.19
Change in HS activity	Δ 3.3, $\mathbf{p<0.001}$	Δ 2.0, $p=0.12$	
Current DLQI, mean (range)	4.25 (0–18)	12.29 (3–26)	**0.04**

*Since day hospital visit.
DLQI: Dermatology Life Quality Index; BMI: body mass index; WSR: wide surgical removal.

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by HS after BS (2.25 vs 7.33 initially; –69%; Δ5.08; $p<0.001$). There was a decrease in HS activity after BS measured on a VAS (3.1 vs 6.4 initially; –50%; Δ3.3; $p<0.001$).

Quality of life, measured at the time of the survey by DLQI, was significantly less affected by HS in the BS vs NC group (mean DLQI 4.25 (range 0–18) vs 12.29 (range 3–26); $p=0.04$).

DISCUSSION

In our series of obese patients with HS, only those who had undergone BS significantly lost weight and showed less impact of HS on quality of life. The significant decrease in number of HS-affected sites and HS global activity after BS could suggest that the improvement in HS was related to the weight loss achieved by BS.

Despite its retrospective design and limited number of patients included, this study has the advantages of a diagnosis of HS confirmed by a dermatologist, assessment of patients' quality of life and inclusion of a control group.

These results agree with some case studies reporting a great improvement in HS after BS in obese patients (5, 6) and with another retrospective study (4) (Table SI[1]). The latter study was a postal questionnaire sent to obese patients who had undergone BS (bypass or gastric banding operations) in Denmark to identify those with HS and to study the impact of BS on HS activity. The diagnosis of HS was only based on patients' answers. Of the 35 patients with HS who significantly lost weight with BS, 70% reported an improvement or a complete resolution of HS .

However, another study raised the issue of an apparent paradoxical HS onset secondary to BS (7) (Table SI[1]) also described by some obese patients on social networks (8). Among patients with HS already followed by a dermatologist, the study identified those who had undergone BS. For most patients (10/12; 83%), HS developed after a bilio-pancreatic diversion, with frequent zinc deficiency, which was not observed in a control group of patients with HS without BS (7). This situation could be linked to the type of BS: a sleeve is only a restrictive technique, whereas bypass and bilio-pancreatic diversion are restrictive and malabsorptive surgeries. Malabsorption can lead to deficiency of zinc, a regulator of skin homeostasis and the innate immune response whom low serum levels are associated with increased severity of HS lesions (9). Therefore, zinc deficiency induced by malabsorptive BS could trigger HS onset. Mechanical stress, is a triggering factor for HS (10), and although weight loss can lead to reduced friction on skin folds, some patients may have skin excess after BS, which increases skin friction and contributes to the HS onset or worsening after BS.

Nevertheless, there are several pathophysiological hypotheses to explain the favourable HS evolution observed after BS in the current study. Visceral adipose tissue is an endocrine organ producing hormones promoting insulin resistance and inducing pro-inflammatory cytokines, notably tumour necrosis factor (TNF)-α, interleukin (IL) 6 and IL-1B (2, 11). Enhanced levels of pro-inflammatory cytokines, such as TNF-α, IL-1B, IL-17 and IL-23, in HS lesional and perilesional skin, is a hallmark of HS pathogenesis (12). Fat loss, achieved with BS, enables a decrease in pro-inflammatory cytokine levels and reduces MS (13). Thus, a lower global inflammatory state and better control of MS may alleviate HS. Moreover, the treatments' bioavailability in obese patients is deeply modified (14), and many studies have suggested that patients with psoriasis and BMI > 30 kg/m^2 were less likely to achieve clinical remission with different systemic treatments (15). Therefore, weight loss could also contribute to improved treatment effectiveness in patients with HS.

Altogether, weight loss secondary to BS might improve the outcome of HS in obese patients. These encouraging results should be confirmed in a multicentre prospective study, including a larger number of patients, paying particular attention to the BS techniques used, both restrictive and malabsorptive.

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