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CORRESPONDENCE AND COMMUNICATION

Quantitative assessment for the efficacy of the osmidrosis treatment using liposuction plus shaver

Sir,

Osmidrosis is an annoying problem that mainly affects young and middle-aged people living in the low latitudes. The technique of surgical intervention has evolved from traditional open method[1,2] to the current "scarless" approaches using various sophisticated instruments.[3–5] In this report, we embarked on a combined approach utilizing two different tools in a three-phase sequential manner (namely, liposuction- shaver- liposuction). In order to evaluate the therapeutic efficacy objectively, the author conducted a quantitative histologic study to measure the volumetric changes of glandular tissue following operation.

A total of 29 patients received the said surgical procedure at Cheng Kung University Hospital, Tainan, Taiwan from 1994 to 2008. Five (3 males, 2 females; age ranged from 19 to 39 years, with a mean of 28.4) of the 29 patients were randomly selected and recruited into the study herein. Just before commencement of the osmidrosis surgery, punch skin biopsy was taken from the central point of the right axillary fossa. After operation, an additional punch skin biopsy was obtained from the controlateral (left) side and both specimens were sent for histologic examination. Each patient was given a serial code name coined as A, B, C, D, and E, respectively. Pre-operative sample is designated as alphabet-1, and post-operative one as alphabet-2. All the slides were inspected under microscope, and the microphotographs were stored digitally and analyzed using computerized image processing software (Image Pro). The variables investigated included the total area of measurement (TAM), the measured area of tissue containing the sweat glands (MSG), the area of tissue consisting of the apocrine glands (MAG), and the amount of the apocrine glands (AG). The variance of those parameters between the pre- and post-operative groups was analyzed using SPSS 17.0 software. A probability of error of less than 0.05 was set as the level of significance. The study protocol was approved by the institutional review board of National Cheng Kung University Hospital.

The pre-operative microphotograph from patient A is shown in Figure 1A. The regions of interest were highlighted with looping circles. The microphotograph for specimen taken post-operatively from the controlateral axilla is illustrated in Figure 1B. All patients' data are tabulated as in Table 1. The result showed that the size of the pre-operative specimen was comparable to that of the post-operative one (0.0152 cm^3 & 0.012 cm^3; $P = 0.34$) Comparison of pre- and post-operative MSG data revealed a significant difference ($P = 0.019$) between each other, the same was true for the data of MAG and AG ($P = 0.004$, $P = 0.024$, respectively), which signified a substantial decrease of both the eccrine and the apocrine gland following surgery. Besides that, the ratio of MAG/TAM and MAG/MSG had both demonstrated statistically significant changes ($P = 0.011$, $P = 0.001$, respectively) between pre-treatment and post-treatment data. Verbal interview with the subjects affirmed a generally favorable response after the surgery.

Inaba and Ezaki in 1977[3] first advocated the use of subcutaneous tissue shaver as a scraping instrument to treat osmidrosis with high satisfaction rate. The earliest report using liposuction technique was given by Kesselring in 1982.[4] Those methods had a number of advantages such as tiny to invisible scars, little change of hair distribution pattern, simplicity in postoperative care with a short down time.

The rationale of using two types of instruments is to put together all the merits of both techniques as to maximize the efficiency and safety of the procedure. The blunt tipped liposuction is less traumatic and thus suitable for a prompt development of a proper dissection plane as well as for the first wave swoop on the target glands. That same instrument is used again at the final stage to clean up the remnant glandular tissues and thus enhancing the radicality. The cartilage shaver is more aggressive in its destructive capability and constitutes the main attack force in the surgical undertaking.

Another noteworthy point is related to the method that we used for outcome analysis. Most of the precedent studies relied on qualitative parameter assessment, which usually included subjective items like patient satisfaction, disappearance of the malodor and improvement of

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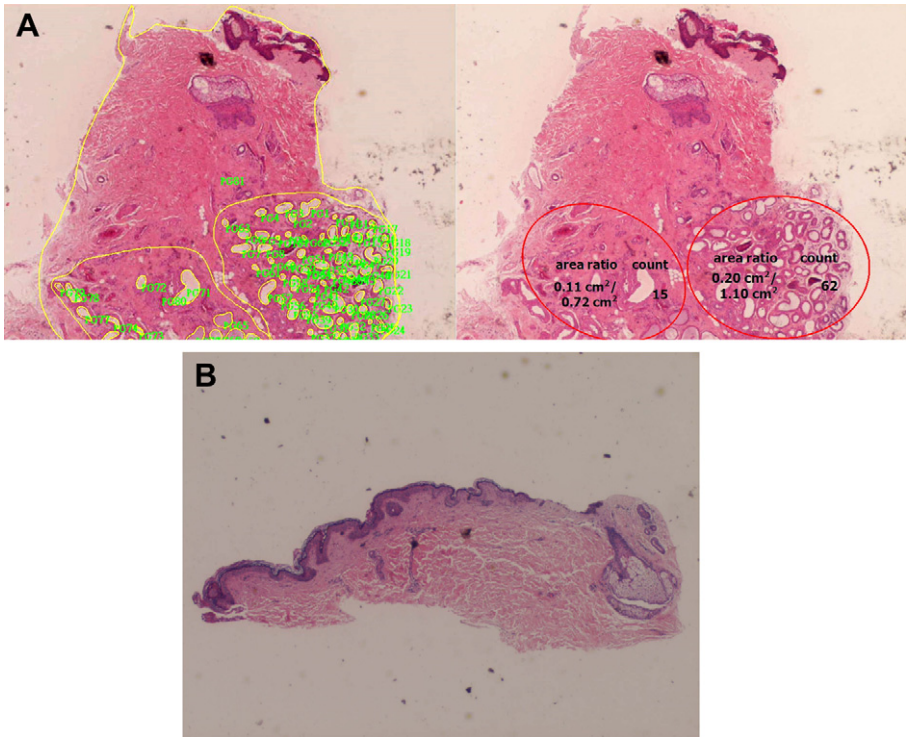

Figure 1 (A) Histopathologic image in Patient A (H&E stain). Magnification (×20) under microscope. The total area of measurement (TAM) is marked with outer yellow line. The measured area of the tissue containing the sweat glands (MSG) is marked with inner yellow line. All visible apocrine glands are labeled as PG1, PG2,... and in sequence with green mark. The sum of the measured area of the tissue consisting of apocrine glands (multiple innermost yellow circles) is designated as MAG (Left). The total counts of the apocrine glands are 77 (Right). (B) The histologic picture of the biopsy specimen taken from the contralateral axilla in Patient A demonstrated total absence of the apocrine glands post-operatively.

Table 1 Histologic analysis result.

	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	*P*-value
TAM	4.31	2.01	6.65	4.24	6.54	2.37	4.63	2.36	5.67	5.57	0.025*
MSG	1.83	0.00	4.65	0.00	3.37	0.00	0.50	0.00	3.07	0.00	0.019*
MAG	0.31	0.00	1.02	0.00	0.78	0.00	0.09	0.00	0.98	0.00	0.004*
AG	77	0	169	0	78	0	13	0	126	0	0.024*
AG/TAM	17.87	0.00	25.41	0.00	11.93	0.00	2.81	0.00	2.22	0.00	0.053
MAG/TAM	0.07	0.00	0.15	0.00	0.12	0.00	0.02	0.00	0.17	0.00	0.011*
MAG/MSG	0.17	0.00	0.22	0.00	0.23	0.00	0.18	0.00	0.32	0.00	0.001*

TAM: the total area of measurement (mm^2), MSG: the measured area of the tissue containing the sweat glands (mm^2), MAG: the measured area of the tissue consisting of apocrine glands (mm^2), AG: the amount of the apocrine glands, AG/TAM: ratio of the amount of the apocrine glands/the total area of measurement (mm^2 %), MAG/TAM: ratio of the measured area of the tissue consisting of apocrine glands/the total area of measurement (Percentage; %), MAG/MSG: ratio of the measured area of the tissue consisting of apocrine glands/the measured area of the tissue containing the sweat glands (Percentage; %), A1, B1,..., E1 indicate pre-operative data for Patient A,..., E and A2, B2,..., E2 indicate post-operative data for Patient A,..., E respectively. *$P < 0.05$, significant difference of pre- and post-operatively.

hyperhidrosis, or objective items like the postoperative complications. Too much subjective experience is involved when patients reply to the inquiries. Bias may exist in that the responders are usually inclined to please the investigator while answering the questionnaire, sometimes subconsciously.

As a contrast, here we undertook a quantitative analysis comparing histologic findings on paired specimens. With such objective evidences, the efficacy of the surgical approach can be verified more credibly.

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None.

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