Classification of contour deformities after massive weight loss: The applicability of the Pittsburgh Rating Scale in The Netherlands

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Summary *Background:* The Pittsburgh Rating Scale is the only validated classification system of skin deformities occurring after massive weight loss. The purpose of this study was to replicate the validation of the Pittsburgh Rating Scale classification and to evaluate its usefulness in the treatment of massive weight-loss patients in The Netherlands.

Methods: Thirteen trained observers applied the Pittsburgh Rating Scale to photographs of 25 patients. These photographs showed the 10 regions of the body for which the Pittsburgh Rating Scale is designed. Six of the observers were medical specialists, three were medical interns in plastic surgery and four observers were specialised nurse practitioners. As a measure of inter-rater agreement we calculated the intraclass correlation with a threshold value of 0.6 for good validity. The observers also answered 11 questions about the scale's usefulness in daily practice.

Results: In two consecutive tests the photographs of 10 regions were scored, which resulted in a total of 20 observations per patient. Sixty percent of the intraclass correlation values were below the threshold of 0.6 for good validity. The mean intraclass correlation value was 0.577.

Conclusions: The Pittsburgh Rating Scale could not be validated as a reliable classification system for skin deformities after massive weight loss. The scale however seems to be a good first step in a challenging task. There was no doubt among the observers that a good classification system would be beneficial for adequate treatment. A modified Pittsburgh Rating Scale should

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include, besides anatomical parameters, functional disability and hygienic impairment scores and perioperative risk factors.

Morbid obesity is a life-threatening condition with severe co-morbidity and reduced quality of life. Bariatric surgery is increasingly applied as a solution for this problem resulting in massive weight loss, a decrease in co-morbidity and improvement in quality of life.[1] The long-term benefits of bariatric surgery are often hampered by the excess of lax overstretched skin, which in many patients remain after significant and rapid weight loss. It causes deformation of the body with physical discomfort and hygienic problems, all of which negatively influence quality of life.[2,3] The severity of the remaining contour deformities varies per individual and is unpredictable. This variation depends on many factors such as age, gender, preoperative appearance and degree of weight loss.

The increasing demand for plastic surgery to correct these contour deformities makes it necessary to improve the understanding of these problems and to determine the most appropriate treatments. The surgical treatment options range from suction-assisted lipectomy to a total lower body lift depending on the extensiveness of the skin surplus.[4] A valid classification system for these contour deformities is an essential step in the development of a guideline for the treatment of massive weight-loss patients. Currently, there is inconsistency with the Dutch insurance companies in the indemnity of the costs of body-contouring surgery. A better classification can be helpful in preventing this inconsistency.

Most classification systems, described in the literature, only pay attention to post-labour patients or aim at only one part of the body.[5-10] The only classification system that addresses the breadth and variety of these specific deformities of the post-bariatric patient is the Pittsburgh Rating Scale (PRS).[11] This classification system was developed and validated in 2005 by the University of Pittsburgh and is meant to be applied in preoperative planning and in evaluating surgical outcomes.

The purpose of this study is to replicate the validation of the PRS classification for contour deformities and to assess its usefulness in the treatment of massive weight-loss patients.

Patients and methods

Participants

The St. Antonius Hospital in Nieuwegein (The Netherlands) is a designated centre for bariatric surgery. Around 700 interventions are done yearly. All massive weight-loss patients visiting the department of plastic and reconstructive surgery for body contouring were invited to participate in this study. Consistent with the study design of Song et al. we included 25 patients in the study. After 25 patients (20 women, 5 men) gave informed consent, inclusion was closed. Approval from the ethics committee was not required because patients were not subjected to acts or treatments and their behaviour was in no way imposed upon. Ten patients lost weight after laparoscopic adjustable gastric banding, nine patients after gastric bypass and four patients due to intensive diet. Two patients underwent laparoscopic adjusting banding followed by gastric bypass because of a disappointing result. All patients visiting the department for body-contouring surgery are photographed preoperatively in a standard manner by the department of medical photography of Antonius Hospital. Photographs were anonymised for this study by non-displaying the faces of the patients.

Data collection

The records of all patients were reviewed retrospectively for demographic data and pre weight-loss data and post weight-loss data.

The PRS is a classification system developed and validated in 2005 by the University of Pittsburgh.[11] A 10-region, four-point grading system has been designed to describe the common deformities found in each region of the body. The grading is descriptive and is illustrated with pictures as well. For each combination of grade and individual region a preferred treatment is suggested.

Thirteen observers consisting of three plastic surgeons, three plastic surgery residents (medical specialists), three medical interns at the department of plastic and reconstructive surgery and four nurse practitioners specialised in bariatric surgery (non-medical specialists) underwent personal instruction in the practical use of the PRS with example photographs of the original PRS. Consequently the observers independently completed the PRS on the photographs of the 25 patients. No time limit was given per photograph. A repeat testing with random distribution of the data set was performed by all 13 observers with a time interval of 2 weeks between both tests. Both the surgeons and the residents answered 11 questions about the usefulness and the applicability of the PRS in daily practice.

Statistical analyses

As a measure of inter-observer validity we calculated the intraclass correlation (ICC) with 95% confidence intervals with both subjects and raters considered to be random effects. This ICC can be considered equivalent to the weighted kappa.[12] Consistent with the Pittsburgh study a threshold value of 0.6 for good validity has been used.

The ICC was calculated for each region of the body for all observers. Two additional analyses were made: first, the observer group was divided into medical specialists (three plastic surgeons and three experienced residents) and non-