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Study About the Efficacy of an Aerosol Plastic Dressing in Wound Prevention After Compressive Adhesive Dressing Application in Plastic Surgery Procedures

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The use of compressive adhesive bandages is widely extended in the field of plastic, aesthetic, and reconstructive surgery, and the apparition of skin damage after its removal is a relatively frequent complication. The aim of this study was to evaluate the capacity of an aerosol plastic dressing for protecting the skin from the apparition of damage caused by adhesive dressings. A prospective, randomized, simple-blind study was performed, evaluating skin damage incidence after removal of adhesive compressive bandages in 80 subjects. The patients carried for 48 hr an adhesive compressive dressing on their abdomen placed over a layer of an aerosol plastic dressing and another bandage placed directly over the skin. A statistically significant decrease in skin damage incidence was observed in areas in which the aerosol plastic dressing was applied as a layer between the adhesive dressing and the skin. Furthermore, a reduction in symptoms associated with the use of these adhesive dressings was found. The results of this study support the use of aerosol plastic dressings as a barrier for skin protection in patients in whom an adhesive compressive dressing is applied to reduce the incidence of skin damage.

The use of adhesive compressive dressings is widely extended in the field of aesthetic and reconstructive surgery, being frequently utilized for coverage of the intervened area in abdominoplasties, breast reduction and augmentation procedures, liposuctions, and other procedures. Compressive bandages are utilized with the aim of reducing hematoma and hemorrhage incidence after surgical procedures or vascular manipulations (Epstein, Epstein, & Gutowski, 2015); to control postsurgical edema (Lowell et al., 2003) and to treat established seromas (Rogliani, Gentile, & Cervelli, 2008). The apparition of skin damage after removal of adhesive dressings is a common complication that causes blisters, erythema, skin irritation, itching, and pain (Becerra Maya et al., 2015; Esparza Imas et al., 2015).

The aim of this study was to evaluate the effect of an aerosol plastic dressing when utilized as a protective barrier prior to the application of a compressive adhesive dressing, focusing on the incidence of skin damage, pain, and itching.

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None of the authors have a financial interest in any of the products, devices, or drugs mentioned in this article. The authors report no conflicts of interest.

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DOI: 10.1097/PSN.0000000000000229

MATERIALS AND METHODS

The study was conducted from July 2017 to August 2017 in two different health care centers: "El Ventorrillo" medical center, in A Coruña, Spain; and the University and Polytechnic Hospital La Fe, in Valencia, Spain. It was developed in collaboration between general nurses from the "El Ventorrillo" medical center and nurses and plastic surgeons from the Department of Plastic Surgery of the Hospital La Fe. The study consisted of a prospective, randomized, simple-blind study conducted on 80 healthy volunteers. The intervention consisted of the application of two adhesive compressive dressings (Tensoplast) on the abdominal region of every subject, with one bandage placed vertically on either side of the abdomen. The aerosol plastic dressing was applied only on one side of the abdomen before placing the dressing. The side on which the aerosol plastic dressing was applied had been previously randomized through a computer program that assigned the right side as the intervention zone for 40 participants and the left side for the other 40 volunteers, according to an algorithm that remained unknown for the researchers in charge of the evaluation of the results. Every volunteer was evaluated 48 hr after dressing application. Inclusion criteria included people older than 18 years and able to voluntarily participate in the project. People who suffered from systemic skin conditions or who were undergoing corticoid treatment were also included in the study despite skin frailty that is caused by these conditions. The reason for their inclusion was that every subject had an intervention zone and a control zone, thus eliminating the possibilities of bias related to interpersonal variations. After dressing removal, the existence of skin damage and the apparition of symptoms such as itching or pain were assessed. Pain was evaluated through a visual analogue scale, and it was considered significant when the value was equal or higher than 4. The statistical analysis tool utilized for evaluation of our results was the 2 test. Institutional review board approval was provided from our institution. Informed consent was obtained from all patients included in this study.

Procedure

After accepting their inclusion in the study, participants were assigned an ordinal number, corresponding with the order in which they had been recruited. Following this, the researchers in charge of the experimental part of the study reviewed the computer application to check the order of the intervention and control zones in those subjects. If needed, the two abdominal zones in which the dressings would be applied were shaved with an electric shaver. A layer of 1–2 mm of Plastospray was applied in the zone indicated by the randomization algorithm, and after waiting for it to dry for 1 min, two adhesive compressive dressings (Tensoplast) measuring 15 cm in length were applied vertically over each side of the abdomen. The distal part was fixed first, sticking the rest of the bandage progressively, while more tension was applied, compressing the skin (Figure 1A). The participant was evaluated 48 hr later. During evaluation, the dressings were removed and the existence of skin damage and symptoms caused by bandage wearing were assessed (Figure 1B).

RESULTS

Eighty volunteers participated in this study, of which 44 were females and 36 males. The average age was 54 years 3 months, with a standard deviation of 8 years 2 months. All the participants attended the revision 2 days after the intervention. Forty-five percent of the patients were shaved before the application of the aerosol plastic dressing and the adhesive bandage. Relevant comorbidities related to skin conditions and healing conditioning factors are summarized in Table 1.

The results observed after removing the compressive adhesive dressing are summarized in Table 2. The only allergic reaction reported was related to the adhesive substance present in the adhesive dressing and not with the aerosol plastic dressing, which was verified after evaluation of that participant by an allergologist. Symptom

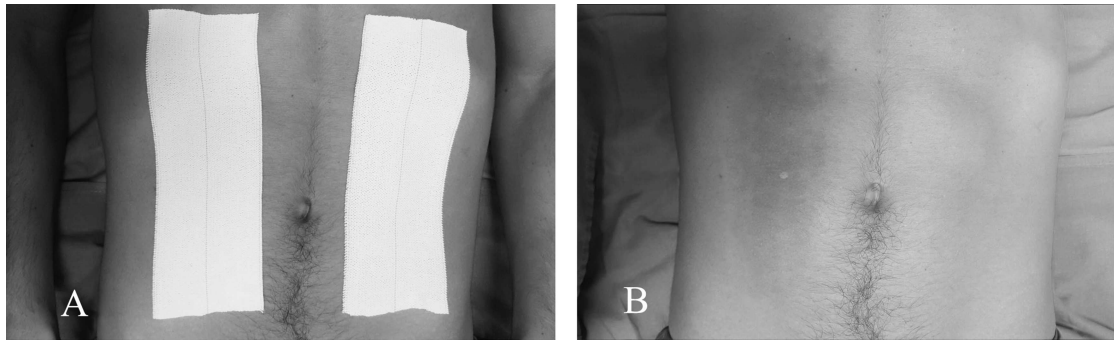

FIGURE 1. (A) Dressing placement. (B) Aspect 48 hr after removal of the dressing: Cutaneous erythema in the control zone can be observed.

TABLE 1 Subjects' Comorbidities

Comorbidities	*n*
Diabetes mellitus	18
Smoking	22
Corticoid intake	8
Psoriasis	3
Allergic dermatitis	6
Seborrheic dermatitis	1
Atopic dermatitis	4
Chemotherapy	2

incidence related to the intervention and control zones is summarized in Table 3.

DISCUSSION

The results of this study show a reduction in skin damage incidence, in the shape of either skin erythema or blisters, with the use of a layer of an aerosol plastic dressing prior to the application of a compressive adhesive dressing.

The design of this study allowed for the evaluation of the consequences in the intervention and control zones in the same individual, thus eliminating interindividual variability. This means that subjects who suffered from important cutaneous frailty (due to old age, corticoid intake, or dermatological conditions), wherein the chances of suffering skin blisters were higher, would have the same possibility of skin damage to appear either in the control zone or in the intervention zone. Therefore, the existence of differences in those cases would be justified by the absence or presence of the barrier dressing. In fact, the only patient who developed blisters in the zone protected with the aerosol plastic dressing also developed blisters in the control zone. He was one of the patients who were undergoing chemotherapy and corticoid treatment.

These results support the use of aerosol plastic dressings for skin protection before the application of adhesive compressive dressings. Another study conducted by Esparza Imas et al. (2015) showed a reduction in wound incidence after utilizing an aerosol plastic dressing as a barrier after oncological-gynecological interventions. Becerra Maya et al. (2015) also published a case–control study in which a reduction in pain was reported in the group that utilized an aerosol plastic dressing for coverage of episiotomies or vaginal wounds after birth.

TABLE 2 Lesions Observed After Dressing Removal

	Control zone	Intervention zone	*p*
No lesions	46 (57.5%)	64 (80%)	.0021
Erythema	26 (32.5%)	14 (17.5%)	.0284
Blister	7 (8.75%)	1 (1.25%)	.0309
Allergic reaction	1 (1.25%)	1 (1.25%)	1

TABLE 3 Symptoms Reported After Wearing the Adhesive Dressing for 48 hr

	Control zone	Intervention zone	*p*
No symptoms	57 (71.25%)	68 (85%)	.0354
Pruritus	16 (20%)	9 (11.25%)	.1274
Pain	7 (8.75%)	3 (3.75%)	.1892

LIMITATIONS

Despite that the design of this study guarantees that every subject has an intervention and a control zone, a better masking of the study could have reduced the possible existence of bias. The study was conducted as a simple-blind study, as the patient knew in which zone the plastic dressing had been applied, and the only professional who ignored which were the intervention and control zones was the researcher who reviewed and analyzed the results.

Furthermore, a larger number of patients would have provided results with a higher level of statistic signification, reducing the possibilities for differences detected to be justified by chance. Also, as the sample included mainly mature adults, it is possible that aerosol plastic dressings in this age range provide a more significant protective effect than it would have provided in the younger population.

CONCLUSION

In our sample, the application of an aerosol plastic dressing as a protective barrier before applying adhesive compressive dressings showed a statistically significant reduction in skin damage incidence, with reduced rates of blister, irritation, and erythema. Because of the extended use of adhesive dressings in aesthetic and reconstructive surgery for a wide range of uses, and the evidence observed in this study, the use of aerosol plastic dressings for skin protection is recommendable in every surgical intervention that would require the utilization of an adhesive compressive dressing. Notwithstanding, more and wider studies are required to confirm and reinforce the results and conclusions of this study.

ACKNOWLEDGMENT

The authors thank "ROL de enfermeria" for support and collaboration.

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Disclosure Statement: The authors and planners have disclosed that they have no financial relationships related to this article.

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DOI: 10.1097/PSN.0000000000000239