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Facial Lipoinjection: Corrective Benefits between the Simple Technique and the One Combined with Plasma Rich in Platelet

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Abstract: ***Introduction: The transfer of autologous fat tissue and bio stimulation with plasmarichin platelet(PRP)for the treatment of facial aging constitute less invasive procedures and allow an easy recovery and prompt reinsertion to daily and work activities. Objective: The aim was to identify differences between the transfer of autologous fat tissue for facial rejuvenation and the combination of this procedure with PRP, as well as to specify the level of satisfaction perceived by the patients. Material and Methods: The research was carried out in the Department of Caumatology and Plastic Surgery of "Dr. Juan Bruno ZayasAlfonso" hospital, from January 2017 to January 2019. The sample consisted of 20 femalepatients.Epidemiological, anatomical and clinical variables were studied, as well as patient'ssatisfaction. A non-parametric Mann-Whitney U test was applied. Results: Consumption of drugs and the presence of arterial hypertension prevailed. The abdomen predominated as donor area and pain followed by oedema as symptom at week of treatment. Conclusions: Significant differences were observed for facial correction between both groups. All patients expressed feeling very satisfied with the therapy received.***

Keywords: facial lipoinjection, platelets, rejuvenation, plasma rich in platelet

1. Introduction

As in other fields of Surgery, Plastic Surgery is demanded today not only in safe procedures for the patient, but at the same time, in increasingly precise and assertive results, in terms of the excellence with which the plastic surgeon achieves, with their expertise, meet patient expectations. These demands are greater compared to facial rejuvenation procedures, where the trend towards less invasive procedures that allow easy recovery and prompt reintegration to daily and work activities should also be highlighted. The growing interest in reversing facial and body aging alterations accompanies a greater concern for well-being, self-esteem and the understanding that this compromises the feelings we have about our self-image and the signals that it transmits to our peers [1, 2].

In the last 20 years, the popularity of fat grafting has increased; It is important to note that this phenomenon is accompanied by an increase in the frequency of liposuction procedures and the availability of fatty tissue [3]. But there are still many questions around the transfer of autologous fatty tissue (TAFT) by lipoinjection, such as the possible consequences in a longer period of clinical follow-up, and the theoretically better integration of fat when elements such as plasma rich in platelets (PRP) [3, 4 -11].

In our environment, we do not have statistics that objectively support the real amount of the use of TAFT and biostimulation with PRP for the treatment of facial aging, but the growing trend of its use is clear, as is that of other procedures aesthetic.

The processes of natural aging of the individual, specifically when they affect the facial region in a marked way, constitute a problem of psychological discontent and a decrease in self-esteem for many subjects who face this reality.

The Cuban population, mainly those who are living the intermediate and advanced ages of life, also share this reality, where a high magnitude of subpopulation prevails, mostly female, with these anguish and dissatisfaction typical of aging, which with accentuated interest tries to reduce or attenuate the effects of the same for aesthetic reasons, fundamentally, maintaining high demand for health services to correct these changes and facial transformations.

The considerations previously expressed show that facial aging in the patient, especially in the female sex, is a health problem, given by the poor acceptance of this physiological process by many people, and that if they do not have a coordinated, timely and effective response due to the different health care levels, it could cause serious psychological and quality of life disorders, in population contingents with urgent requirements for this type of aesthetic treatment, for which the present investigation set out to evaluate the corrective benefits of facial simple lipoinjection in facial rejuvenation and the combination of this procedure with plasmarichinplatelet.

2. Materials and Methods

A study was carried out that, according to the state of the subject and the scope of the results, classified as quasi-experimental, with a non-equivalent control group, in the Caumatology and Plastic Surgery Service, of the General Clinical-Surgical Hospital "Dr. Juan Bruno Zayas Alfonso", in the period from January 2017 to January 2019. The research was carried out in a sample of 20 patients, aged of 30 years and over old, with obvious signs of facial aging in the upper lip region, lower lip, flattening of the upper lip with alteration of the philtrum pillars, nasolabial folds (NLF) and labial commissures (LC), with or without alterations of the mandibular contour, which desired the restructuring of the face; those who were randomly assigned to two groups of 10 subjects each one, for the application of the treatment:

Group A: Simple autologous fat tissue facial lipoinjection was performed.

Group B: A facial lipoinjection of autologous fatty tissue combined with plasma rich in platelet was performed.

Exclusion criteria: Patients with diseases of the hemolymphopoietic system, local or systemic infectious diseases, collagen diseases, known neoplastic diseases; who were taking medications such as anticoagulants or non-steroidal anti-inflammatory drugs; carriers of cellular or humoral immunological deficit (referred or verified by lab tests), and pregnant women.

Clinical evaluation of the patient: The initial evaluation made it possible to determine the presence of accentuated signs of facial aging. It was recommended to perform a digital maneuver (placing the thumb and index fingers in the malar region, and the same fingers of the opposite hand on the upper lip and chin, which allowed to verify the state of the area and the point of less and greater depth of the folds; in addition, it indicated the need for less or greater amount of autologous fatty tissue throughout the depression. This region corresponds to the strongest point of facial aging (skin depression), where clinically there is the greatest need for support (critical point of aging).Complementary clinical laboratory tests were performed such as: blood count, erythrocyte sedimentation rate, coagulogram, serology for the determination of antibodies against HIV, VDRL serology and the classification of blood group and Rh factor; later the clinical history was taken.

Plasma rich in platelet was obtained from the patient's own blood, through a process that included centrifugation of a blood sample, from which it was obtained [3-6, 11, 12].

Fatty tissue was obtained from the patient himself using the Criss-Cross technique and Klein tumescence, and then, by means of a negative aspiration cannula, gently collected in 20 mL syringes, which allowed decantation to separate it from Klein's solution. The Klein solution was removed and the fat was collected in 1 mL syringes with a luer-look tip [13-15].

Fat tissue application

Group A: The Coleman Wells-Johnson® cannula of 7 cm x 1.7 mm, with a blunt tip, was placed in the 1 mL syringes and proceeded to inject it into the face at the level of the hypodermis.

Group B: Using a closed anaerobic system, to avoid contamination, it was combined with plasma rich in platelet, then the Coleman Wells-Johnson® cannula of 7 cm x 1.7 mm, with a blunt tip, was placed in the 1 mL syringes and proceeded to inject it into the face at the level of the hypodermis.

For both groups, the application was unique with evaluation at one month, at three months, six months, the patients being evaluated by a multidisciplinary team.

Percentages were calculated as summary measure for qualitative variables, and mean and standard deviation (SD) for quantitative variables, as statistics of central tendency and dispersion, respectively. To identify statistically significant differences between the selected quantitative variables, the non-parametric Wilcoxon-Mann-Whitney's U [1] test was applied to compare means between independent samples.

The research was carried out according to the ethical principles established in the Declaration of Helsinki. In addition, it had the authorization of the head of the Plastic Surgery Service as well as from the hospital director and was approved by the hospital's Investigations Committee. All patients received detailed information on the objective of the study, method, benefits and risks of the used therapy, after which they freely decided to participate in the study, being able to abandon it whenever they wished and / or if adverse reactions appeared. The patients who participated in the research expressed their informed consent in writing.

3. Results

Table 1 shows the distribution of patients according to selected epidemiological variables. All patients were female, with a mean age of 42.6 years. It can be seen that among the epidemiological factors of interest in the sample, the consumption of drugs, mainly Losartan, prevailed in three subjects (15.0%) and the presence of arterial hypertension in four patients (20.0%).

Table 1: Patients according to epidemiological variables

Variables		Number	%
Age: X̄ = 42.6 years; SD = 2.08		---	---
Sex		20	100,0
Smoking		1	5,0
Alcoholism		1	5,0
Drug consumption	Losartan	3	15,0
	Atenolol	1	5,0
	Metformin	1	5,0
Presence of diabetes mellitus		1	5,0
Presence of high blood pressure		4	20,0
Presence of varicose veins		1	5,0

Regarding the treated areas and the volume of infiltrated tissue by treatment groups, Table 2 identifies that the highest average value was held by the nasogenian region, with 12.5 cc for both treatments, (p = 1,000), followed by the malar region with 9.7 cc for treatment A and 8.0 cc for treatment B, (p = 0.090). No significant differences were found for any of the remaining areas treated according to the groups under analysis.

Table 2: Patients according to treated areas and infiltrated volume (in cc)

Treated areas	Treatment Groups				Probability
	Group A		Group B		
	X̄* X	SD* D.E	X̄	SD	
Global facial region	2,0	4,2	4,0	5,1	0,342
Chin region	0,0	0,0	0,5	1,5	0,317
Nasogenian region	12,5	2,6	12,5	2,6	1,000
Lips	3,5	4,7	1,5	2,4	0,313
Zygomatic region	0,0	0,0	0,0	0,0	1,000
Palpebral region	0,5	1,5	2,0	2,5	0,131
Mandibular region	1,0	3,1	0,5	1,5	0,942
Malar region	9,7	1,7	8,0	2,5	0,090

X̄= Medium; SD= Standard Deviation

Among the symptoms and complications in the first week after treatment, there was a predominance of pain, with six patients in group A and five in B. Other relevant symptoms and signs referred to were erythema (three patients in group A) and edema, reported by two patients in each treatment group (Table 3).

Table 3: Complications in the first postoperative week

Complications in the first postoperative week	Treatment Groups			
	Group A		Group B	
	Number	%	Number	%
Pain	6	60,0	5	50,0
Erythema	3	30,0	0	0,0
Edema	2	20,0	2	20,0

The level of evolutionary facial correction, by treatment group, is specified in Table 4, where statistically significant differences are observed in the three evaluation periods of the surgical intervention; the correction percentages being higher for the group with PRP at one month (89.0%; p = 0.003), at three months (86.5%; p = 0.001) and at six months after the therapeutic intervention, with a percentage value of 84.0%. It is significant to note that the upper average percentage magnitude reached by the patients in group A (76.0%) did not exceed the lower average percentage value of the PRP treatment group (84.0%).

Table 4: Percentage level of correction according to postoperative evolution time and treatment groups

Postoperative temporary evaluation	Treatment Groups						Probability
	Group A			Group B			
	X̄ (%)	SD	Rank Average	X̄ (%)	SD	Rank Average	
A month	76,0	9,6	6,75	89,0	4,5	14,25	0,003
At three months	59,0	14,4	5,60	86,5	4,1	15,40	0,001
At six months	62,2	13,0	5,94	84,0	5,1	13,65	0,003

The analysis of the loss of evolutionary correction, in relation to the postoperative state according to the different treatment groups is shown in Table 5. In general, statistically significant differences are observed in all the evaluation time periods between both treatment groups. The singularized analysis specifies that greater significant percentage mean values of loss of correction are appreciated for group A at one month (29.0%), at three months (37.0%) and at six months (37.7%), respectively, in relation to the group treated with PRP (Group B), whose maximum average percentage value of loss reached it at six months (16.0%; p = 0.003). It should be noted that the highest average percentage differential loss between both groups was reached after three months of evolution; this being statistically significant (p = 0.001).

Table 5: Loss of evolutionary correction in relation to postoperative status according to treatment groups

Postoperative temporary evaluation	Treatment Groups						Probability
	Group A			Group B			
	X̄ (%)	SD	Rank Average	X̄ (%)	SD	Rank Average	
A month	29,0	15,9	14,30	11,0	4,5	6,70	0,003
At three months	37,0	12,5	14,75	13,5	4,1	6,25	0,001
At six months	37,7	13,0	14,06	16,0	5,1	6,35	0,003

The results referring to the volume of implanted tissue, in the evolutionary analysis of the results of both imposed treatments, reflect non-significant differences between both groups studied (Table 6). Average implant volumes were recorded at one month and at three months of evolution only for group A, with values of 2.0 cc, (p = 0.147) and 4.0 cc, (p = 0.068), respectively. No tissue reimplantation was recorded in the PRP-treated group (Table 6).

It is important to note that there were two reoperations a month after surgery only in group A, specifically in the nasolabial area and the malar area. Similarly, three reoperations were carried out at three months in this same treatment group: one case in the nasolabial area and lips and two cases in the nasogenian area.

Table 6: Volume of evolutionary implanted tissue according to treatment groups

Postoperative temporary evaluation	Treatment groups						Probability
	Group A			Group B			
	X̄ (cc)	SD	Rank Average	X̄ (cc)	SD	Rank Average	
A month	2,0	4,2	11,50	0,0	0,0	9,50	0,147
At three months	4,0	6,6	12,00	0,0	0,0	9,00	0,068
At six months	0,00	0,00	10,00	0,0	0,0	10,00	1,000

4. Discussion

Generally, facial cosmetic surgery is more frequent in the female population, for historical and socio-cultural reasons, associated with the idiosyncrasy of each region and the laws that govern society, which is why in the present study all patients they were women, and as the main personal pathological antecedent that they suffered was arterial hypertension, the use of drugs to control this disease was another incident factor in them. However, during the review of the literature on the subject, it was found that the drugs consumed to control hypertension do not precipitate the process of senescence; but the aforementioned disease does accelerate, in a marked way, the facial aging process, because it belongs to the group of cardiovascular diseases [17], but all these patients had less than five years of diagnosis, and during this time they showed a good control of their chronic non-communicable disease, and this may not have a marked influence on this process.

As a general rule, the donor site should be selected based on improved donor body contour and accessibility, depending on the position of the patient. Although there is no evidence in favor of a donor site, because the viability of adipose tissue is equal, a higher concentration of stem cells derived from adipose tissue (ASCs) was found in the lower abdomen and on the inner thighs in one study [18, 19]. This was taken into account in the research, and that is why abdominal fat was the most used.

As evidenced in our study, for both groups of individuals, the nasogenian and malar regions were, of all the treated areas, the ones that required the greatest volume of fat in set A, as fat and PRP for set B. This was due to which were the areas most marked by aging in this population and the amount of cc was used corresponding to each group, depending on the need for correction of the injury.

The researcher Meruane [20] states that the areamost frequently treated with TAFT are the forehead, eyebrow, glabella, radix, orbital rim, cheeks, “tear trough”, middle third of the face, lips, perioral area, nasolabial fold, "marionette lines", mandibular contour and chin, among other areas; and also states, like Planas [21], that the amount of fat to be injected depends on the intuition and observation of the surgeon and can be estimated preoperatively.

According to Rodríguez Floresa [22] and other researchers [23], postoperative pain and discomfort are rare, and if they appear, they are usually mild. Itching of the lipoinfiltered regions may occur, which can be symptomatically and effectively treated by topical corticosteroid therapy.

As evidenced by the results in tables 4, 5, 6, group B patients treated with TAFT plus PRP showed a higher level of correction after the procedure was applied compared to group A, which only received TAFT, in the different evaluation periods of them. Associated with the previous comment, it should be pointed out that the group in which the combined therapy was used had lower losses in the correction of the treated lesions, and consequently, this caused that, evolutionarily, a smaller amount of tissue volume was implanted, showing at all times that the autologous fat graft combined with PRP has better results to correct the facial deteriorations produced by aging.

In theory, this could be achieved by the process of integration and survival of the fat grafts. A first theory is that of adipocyte behavior: replacement by the host, in which adipose cells are replaced by histiocytes; and the theory of cell survival, which states that histiocytes engulf the adipocyte and do not replace the graft [24]. By joining these theories, plus the beneficial effects of platelets, make the patients treated in group B show better results at the end of the study.

In group A, in which only autologous fat transfer was applied, there was a greater loss of correction and, consequently, a greater volume of evolutionary implanted tissue. In this regard, according to Del VecchyoCalcáneo [24], in an article published in 2014, he invokes that it is evident that a certain percentage of the grafted tissue is reabsorbed; up to 30.0%.

Julio Enríquez Merino and colleagues [25] also state that up to 30.0% of the graft can be reabsorbed, and overcorrection is not advised. Based on this approach and the results of previous research already presented, carried out by other colleagues [26-30], plus the deductions shown in the article that is now being discussed, it allows us to affirm that the treatment applied to patients belonging to group B presents better facial aging corrections.

The researcher Rodríguez Floresa J et al. [22], in their work, makes it clear that the survival of the autologous fat infiltrate can be increased; Several working groups have presented studies on platelet-rich plasma as an agent that enhances the viability and maintenance rate of the fatty infiltrate; and also cited that one of the most dedicated groups in this regard is that of Cervelli, whose researchers report better three-dimensional clinical results and an increase in the number of adipocyte cells in cases in which the autologous fat infiltrate is transferred with plasma rich in platelet, [19, 21-23], another reason to justify why the individuals in group B showed a better response to therapy.

All the patients seen in both treatment groups, for 100.0% of the sample, evolved favorably, which would be expected to show that they were very satisfied with the facial rejuvenation treatments received. It is necessary to highlight that even those patients who had considerable loss of fat in relation to the initial transplanted volumes, and those who did not reoperate, perceived and expressed, in a reliable and voluntary way, their satisfaction with the applied corrective techniques, demonstrating that these procedures they constitute a good alternative for subjects who present early signs of facial aging and wish to show themselves better aesthetically, psychologically and emotionally in front of society.

5. Conclusions

- The transfer of autologous fatty tissue, combined or not, with plasma rich in platelet, constituted a therapeutic alternative to correct the signs of facial aging, mainly in the subpopulation of female patients, in intermediate and

advanced ages of life, and affected due to age-specific non-communicable comorbidities.

- The use of abdominal fat is consolidated as the primary donor area to correct the accentuated stigmas of facial aging, mainly in the nasolabial region; pain being the complication to take into consideration after applying, indistinctly, the different forms of corrective treatment.
- The fat graft enriched with plasma rich in platelet stands as the alternative treatment with a preponderant reparative effect, free from complications.

Conflict of interest: The authors declare no conflict of interest.

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