Use of Phosphatidylcholine in the Treatment of Localized Fat Deposits

Results and expectations

SORIN BERBECE[1], DAN ILIESCU[2]*, VALERIU ARDELEANU[1,3], ALEXANDRU NICOLAU[1], RADU CRISTIAN JECAN[3,4,5]

[1] Dunarea de Jos University, Faculty of Medicine and Pharmacy, 47 Domneascã Str., 800008, Galati, Romania

[2] Ovidius University, Faculty of Medicine, 124 Mamaia Blv., 900470, Constana, Romania

[3] Arestetic Clinic, 78 Brailei Str., 800098, Galati, Romania

[4] University of Medicine and Pharmacy Carol Davila, 8 Eroii Sanitari Str., 050474, Bucharest, Romania

[5] Clinical Emergency Hospital Agrippa Ionescu, 7 Ion Mincu Str., 011356, Bucharest, Romania

Obesity represents a global health problem. According to the latest studies released by the World Health Organisation (WHO), 1.7 billion currently in excess of normal weight individuals, of which approx. 75% are overweight (body mass index - BMI 25 to 30). The common form of excess adipose tissue manifestation in overweight individuals is localized fat deposits with high (abdominal) or low (buttocks and thighs) disposition. Although the overweight can be corrected relatively easy by changing behavioral habits or food, a constant physical exercises program or following a diet food are not accessible to all through the efforts of will, financial and time involved. Several methods have been studied and tested over time to eliminate more or less invasive fat deposits with varying efficacy and adverse effects. Chemical lipolysis using phosphatidylcholine as the basic substance was initially used in hypercholesterolemia and its complications and was rapidly adopted in mesotherapy techniques for the treatment of fat deposits. This study reveals the results obtained using Dermastabilon on a sample of 16 patients, the time allocated to treatment and discomfort being minimal, and rapid and notable results. There were no side effects.

Keywords: localized fat deposits, mesotherapy, phosphatidylcholine, chemical lipolysis, dermastabilon

According to the studies, obesity has become one of the most important diseases of the 21st century [1]. More common in adults and children, excessive body fat accumulation is one of the leading causes of death worldwide, but can be relatively easily treated and prevented.

According to WHO (2010), 2.8 million adults die annually from obesity-related causes, so overweight and obesity have become the fifth leading cause of death worldwide. If in 2014 there were about 1.8 billion overweight people worldwide [2], of which more than 600 million obese, in 2016 WHO statistics indicate that over 2 billion overweight worldwide will be overweight. Recent health studies and programs channel their attention to early detection and prevention of obesity in children [3].

Overweight is an interaction between genetic and environmental factors. In Romania 2015, statistics showed that 24.7% of men and 24.7% of women are overweight. The common form of overweight manifestation is localized fat deposits. They have a variable mood: in predominantly *high* men, at visceral and abdominal level (android type), in women - *low* in the gluteal-femoral area (gynoid type).

Occupational type, convenience, lack of time to allocate for proper nutrition and for consistent program of physical exercises, as well as resistance to abdominal fat accumulation in diet and exercise, have led to the development of many invasive or non-invasive techniques for reducing and eliminating additional fat deposits in alternative.

The advantage of invasive liposuction is their applicability to large-scale fat deposits with immediate and obvious effects. Complications associated with surgical procedures (infections) and frequent side effects (pain, bruising, edema, contour asymmetry, skin color changes) are relatively common and increase the discomfort created by the procedure itself. Non invasive or minimally invasive procedures, despite the low net results recorded, have gained momentum due to simplicity, minimal risks and accessibility; Instillations in the fat stores of enzyme, vitamin and phosphatidylcholine combinations are practiced.

This study aims to evaluate the effects of a combination of two substances with lipolytic effect, phosphatidylcholine and deoxycholate in localized fat deposits.

Experimental part

Material and method

The study was conducted over 9 months, between 1.03.2016 - 1.12.2016 at the *Arestetic* Clinic in Galati. The sample consisted of 16 female patients aged 26 to 57 years.

Based on the evaluation, only overweight patients (according to the WHO classification - BMI 25 to 30), 10 with abdominal and 6 with thighs fatty deposits, were included in the study. Obese patients, those with hepatic / renal affections (checked by laboratory analysis: blood count, lipid balance, liver and kidney function) were excluded from treatment.

Dermastabilon product, 5 mL vials, was the product injected using 30G needles and 5 mL syringes. Instillations in fat deposits were performed following a preset administration map - 3 cm between instillations at depths between 1.5 and 2.5 cm.

In total, 3 sessions were performed per patient, with a maximum of 20 mL (4 ampoules) /patient/session.

Laboratory analyzes were repeated halfway through treatment (two days after the second session) and at the

* email: dan@anatomie.ro; Phone: 0722973928 *All authors have equal contributions*

end of treatment. Patients did not undergo any other treatment for fat deposits during the study period, and followed normal lifestyle (normal diet without additional physical exercise) to eliminate other possibilities of influencing the weight and consequently the status of fat deposits.

After each session, digital photos (frontal and sagital planes) were performed on the injected areas, and each new treatment session was preceded by questioning patients about the degree of satisfaction and possible adverse effects.

Results and discussions

Phosphatidylcholine is the most abundant phospholipid in plants and animals; is found in important proportions in egg, soy, mustard, sunflower. The human body can synthesize phosphatidylcholine from serine and methionine or ingeste by food. From the metabolism of phosphatidylcholine results in choline, fatty acids and the phosphate group; choline is subsequently included in cell membrane components as such or in the form of sphingomyelin, supporting membrane integrity [4], can be used to synthesize acetylcholine, a chemical mediator involved in nerve transmission, or can be used in fat metabolism as a methyl donor.

Phosphatidylcholine (fig.1) increases cholesterol solubility, reducing the possibility of inducing atherosclerosis. It lowers the serum level of cholesterol, helping to extract it from the tissues and inhibits platelet aggregation [5]. Overall, the action is to reduce blood cholesterol levels and mobilize them from fat stores. Due to these properties it has been used since the 1970s to treat diseases such as atheromatosis, hypercholesterolemia, gallbladder embolism, heart or liver disease caused by viruses, toxins, drugs, alcohol or pollution.

The overall effect of reducing fat deposits has determined the use of phosphatidylcholine in cosmetics.

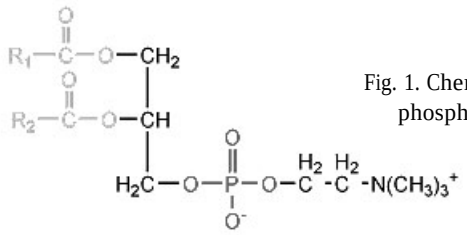

Fig. 1. Chemical formula of phosphatidycholine

Among the first signs of use are the presentation of the Italian physician Sergio Maggiori at the Paris Mesotherapy Congress - 1988, in which he detailed his own experience of using phosphatidylcholine in the treatment of xanthelasmas.

Subsequently, there have been various reports from the South American region on the use of phosphatidylcholine in the treatment of fat deposits. As a precautionary approach to the extent of substance use, in the absence of in-depth studies, the 2003 National Brazilian Public Health Organization issued a resolution banning the use of acetylcholine at national level for this purpose.

The interest subsequently manifested by more and more studies on the same topic has led to the expansion of phosphatidylcholine use for localized fat deposits and the development of more and more products in various combinations based on phosphatidylcholine. Initially, it was used separately, and then its results encouraged its association with other substances that increase the lipid-lowering effect and reducer on fat deposits or other associated processes for the same purpose or to combat adverse effects [6].

Recently launched products include Dermastabilon – 5 ml, a product from Spain containing two active ingredients - deoxycholate (fig. 2) - 1-2,5% and phosphatidylcholine – 5% the first is a biliary salt, tensioactive, able to destroy cells membrane of the adipocytes, facilitating the solubilizing action of phosphatidylcholine on fats.

In the study presented, the effects of phosphatidylcholine and deoxycholate combination were evident and immediate.

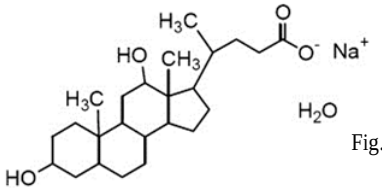

Fig. 2.Chemical formula of Deoxycholate

Patients treated with Dermastabilon showed a reduction in circumference in the abdomen on average 1.6 cm after the first session (minimum 0.6 cm and max 2.8 cm), and 0.7 cm in the thighs. These results were recorded under the conditions of an approximately equal dosage for all patients, the amount of Dermastabilon instilled being adapted to the existing adipose layer using the *administration* map.

Effects on abdominal fat			Effects on thighs fat		
Patient No.	After Ist session	After IIIrd session	Patient No.	After Ist session	After IIIrd session
1.	0.7	2.7	*1.*	0.5	1.7
2.	0.8	3.5	*2.*	1.8	2.7
3.	2.2	2.9	*3.*	0.6	2.8
4.	0.6	4.5	*4.*	0.4	1.1
5.	0.7	6.2	*5.*	0.3	1.4
6.	2.5	5.1	*6.*	1.2	2.9
7.	2.4	3.3			
8.	2.8	6.4			
9.	2.5	2.9			
10.	0.9	2.7			
Min. value	**0.6**	**2.7**		**0.3**	**1.1**
Max. value	**2.8**	**6.4**		**1.8**	**2.9**
Average	**1.6**	**4.1**		**0.8**	**2.1**

The total decrease was 4 cm on average after the third session (at least 2.7 cm, max. 6.4 cm), superior to the previous studies, which used either either phosphatidylcholine [7] or phosphatidylcholine associated with other substances [8]. However, not all studies confirmed the superior efficacy of the combination of phosphatidylcholine-deoxycholate, some of them had the same effect between separate treatment and combination therapy [9].

The cut skin measured with a special device recorded a reduction of 10-12% per session. The results are similar to other studies that highlighted the positive effects of phosphatidylcholine instillations in fat stores [10].

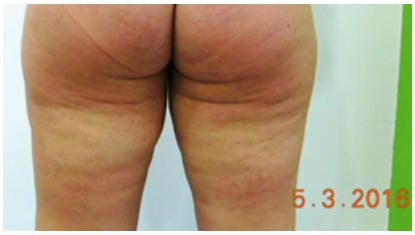

Fig. 3. Images after instilation of phosphatidylcholine on thighs: before and after (side view)

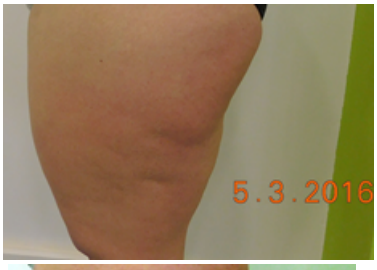

Fig. 4 .Images after instilation of phosphatidylcholine on thighs: before and after (frontal view)

In terms of adverse effects, 8 patients (50%) showed local erythema, accompanied by increased skin temperature in the treated area, and 6 of these showed slight local edema. Pain, from mild to moderate manifestations, was reported in 11 patients (68.7%), without requiring analgesics, within the first few hours of dosing. Previous studies on phosphatidylcholine or combinations of it have reported severe pain, erythema, local edema, and even hematoma [11]. Other studies have associated other types of procedures to reduce adverse effects [6]. The patients in the 16 study group were not recommended as anti-inflammatory or anti-inflammatory medication. There are reports in the literature of cases of severe dermatitis [12], major local neuromuscular disorders [13], leading to acute renal failure and impairment of liver function [14].

The visible modeling of the fat deposits has stimulated the researchers' attention to studying the cellular changes that take place due to the application of chemical lipolysis procedures. Microscopic examinations of adipose tissue following injection procedures revealed fat fibrosis, inflammatory infiltrates and microabs, including paniculitis [15].

Although there are reported incidence of non-response to treatment of over 5% in the literature [11], this was not the case during the study. An extension over a longer period of time and a sample of several patients can confirm or reverse the increased efficacy of the product used.

The study confirms the lipolytic effect of phosphatidylcholine, confirmed by previous reports [16, 17], which revealed the results obtained on samples ranging from several tens to a few hundred patients over several years. Although most of the studies conducted in recent years focus on the use of phosphatidylcholine alone or in combination with deoxycholate [18-20], there are concerns about the diversification of substances used in the treatment of localized fat deposits [21, 22], for example the use of salmeterol.

Conclusions

Chemical lipolysis is an accessible liposuction alternative, simple and easy to apply to localized fat deposits.

The action of phosphatidylcholine on adipose tissue is rapid and evident, especially in association with substances (Dermastabilon). Research into the persistence over time of the effects of treatment and recurrence of the disease in relation to invasive alternative methods should be expanded in the future.

Adverse effects and complications are rare, and of low intensity. However, extensive studies are needed to reveal the exact mechanism of action of substances in the adipose tissue and, in particular, the effects induced at the cellular level.

There are some papers published which aim to study the obesity [23-25].

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