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Intestinal Perforation as an Intraoperative Complication of Abdominal Liposuction

Ricardo Jorge Losardo[1]* and José Héctor Soria[2]

[1]Faculty of Medicine, Universidad del Salvador (USAL), Buenos Aires, Argentina
[2]Hospital de Oncología "María Curie", ciudad de Buenos Aires, Argentina

Abstract

One of the complications of abdominal liposuction is analyzed: intra-operative intestinal perforation by the cannula (instrumental). The relationship between the cannula, the abdominal wall and the small intestine is described: as the three components of this complication. The characteristics of the cannulas generally used and the surgical technique of abdominal liposuction was detailed, as well as the clinical picture caused and how to treat it.

Keywords: Lipoplasty; Liposuction; Abdominal Liposuction; Liposuction Complications; Bowel Perforation

Correspondence to: Ricardo Jorge Losardo, Faculty of Medicine, Universidad del Salvador (USAL), Buenos Aires, Argentina; E-mail: ricardo.losardo@usal.edu.ar

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Introduction

Liposuction is one of the most frequent operations in plastic surgery, which can be used for aesthetic and/or reconstructive purposes. It can be performed under local or general anesthesia and on an outpatient or inpatient basis depending on the clinical case.

Regarding the terminology, we prefer the denomination of "lipoaspiration" to that of "liposuction" in the Spanish language, since the meaning is more appropriate for the action that is carried out on the adipose tissue. Regarding the term "liposculpture" we believe that it is ambitious and has a more artistic than medical meaning since it gives the idea of a body modeling that can exceed the expectation of the result of the surgery. In this sense, we prefer the term "lipoplasty".

It consists of extracting the excess subcutaneous adipose tissue from some body areas to improve its contour and volume. This adipose tissue can also be reused as a filler and the procedure is then called "lipotransfer".

Like any surgical procedure, it can present complications, which in this case of abdominal liposuction range from minor ones such as edema, pain, and seroma, to more serious complications that can put the patient's life at risk, such as pulmonary embolism, pneumothorax, organ perforation, necrotizing fasciitis [1-3]. There is no consensus on the frequency of complications and their predisposing factors [4-7].

The objective of this work is to analyze and study the perforation of the small intestine as one of the intraoperative complications of abdominal liposuction. Also, describe the anatomical-surgical characteristics of this complication, both in the wall and the abdominal cavity; the clinical picture it causes and the treatment of the affected intestine.

Material and Method

Scientific publications on liposuction and its complications were analyzed using the PubMed.gov (US National Library of Medicine, National Institutes of Health) database, Medline, and Google Scholar. A bibliographic search was carried out from April 1, 2011, to July 31, 2021.

The following words were used for the search: "intestinal perforation after liposuction"; and in Spanish: "perforación intestinal después de lipoaspiración".

In this work, the search was carried out for the enunciated terms and the results were studied based on the contents thrown. These articles were analyzed in a complete and detailed way. In addition, a literature search in plastic surgery journals was performed to obtain additional reference information. Among these, we can mention Plastic and Reconstructive Surgery and Aesthetic Plastic Surgery.

Conceptual Framework

To understand the results obtained, it is necessary to detail some characteristics of this procedure.

Brief history of liposuction

The original liposuction technique is believed to have been invented by Giorgio Fischer an Italian surgeon in 1974. Around 1978, French surgeons Yves-Gerard Illouz and Pierre Fournier developed it [1,8]. They pioneered conventional liposuction. Since then, it has spread throughout the world and has continued to be perfected [3,5-7].

Different types of liposuctions appeared successively, depending on the instruments used, which are called:

1. Conventional,
2. Ultrasound,
3. Laser and
4. Vibrolipo [9,10].

However, conventional liposuction is still the most widely used worldwide due to its simplicity and because it does not require complex and/or sophisticated equipment or technology.

Anatomical overview

The anatomical structures from the surface (skin) to the depth (in the abdominal cavity, where the intestine is located) are:

a) Skin,

b) Subcutaneous tissue,

c) Fascial or aponeurotic plane: anterior lamina (or sheet) of the sheath of the rectus abdominis muscles,

d) Rectus abdominis muscles,

e) Posterior lamina (or leaf) of the rectus abdominis sheath,

f) Peritoneum (parietal leaf),

g) Abdominal cavity,

h) Greater omentum (or omentum major) (fatty apron that covers the intestines),

i) Intestine.

Details of the surgical technique

Liposuction can be performed in a "dry" or "tumescent" manner. In the latter case, the infiltration of the subcutaneous tissue is performed with saline solution, alone or combined (with anesthetics and/or vasoconstrictors), which allows the space between the skin and the fascia (or aponeurosis, which is the tissue of increased abdominal wall strength). That is, by increasing the thickness of the area where the cannula will move, the safety space is enlarged and thus the possibility of the cannula accidentally entering the abdominal cavity is reduced. We emphasize that this hydraulic maneuver widens the distance between the skin and the muscular fascia (or aponeurosis). It is in this space or area, which corresponds to the subcutaneous tissue, where the liposuction cannula works. In this way, it serves as a wide space to prevent it from entering the musculo-fascial area and then eventually entering the abdominal cavity. The hydraulic infiltration carried out (explained above) thus serves as protection and gives us greater security [7].

On the other hand, as another safety measure: the cannula always slides in a direction parallel to the plane of the skin and the abdominal wall. It is accompanied by a manual clamping or pinching maneuver of the subcutaneous tissue to feel the path of the cannula between the fingers of the left hand at all times, as another safety maneuver [1,4,5,11, and 12].

Cannula details (instruments)

The cannula has a handle, a body and a tip. They can be short or long, as well as straight and curved, they can have different diameters depending on the body area to be treated. They can have side holes and at the tip. The tip can be blunt or sharp. Among all these variants for the abdominal area, the straight and blunt-tip ones are preferred to reduce the risk of tissue injuries and accidental perforations. Regarding the design of these cannulas, they can be covered with a silicone material that allows smooth sliding between the tissues. These design details allow protecting nerves, vessels, fascia (or aponeurosis), etc. [7,13, and 14].

As for the handle, some have special work to allow a firmer grip, as well as a sector to rest the thumb. This ergonomic design allows better control of movement and prevents rotation of the cannula tip.

Risks of perforation. Previous surgeries and scars

When patients present pathologies and/or previous abdominal wall surgeries such as hernias and/or eventrations, scars and/or previous lipoaspiration, the risk of perforation during abdominal liposuction is present [3,5,6,12,13,15, and 16].

These situations generate various degrees of fibrosis in the abdominal wall, even more so if these processes are extensive and cover a large surface, which can accidentally change the desired direction of the cannula since in these cases the subcutaneous tissues present greater resistance [6].

Characteristics of intestinal perforation

For the intestine to have been perforated by a liposuction cannula, the following facts must be present:

Deviated or wrong trajectory of the cannula: the cannula should pierce all the structures of the abdominal wall, including the greater omentum (or greater omentum), described above. A sudden change in the direction of the cannula is required, which usually moves and moves parallel to the muscle-fascial wall, with preferably smooth movements. In addition, greater force is required to pierce all the mentioned planes; and in that case, a jump is transmitted that is received by the hand that handles the cannula.

Morphological characteristics of the perforated small intestine: in the abdominal exploration (laparotomy, laparoscopy) after the perforation, a healthy (vital) intestine is observed and any segment of it can be affected, with one or more traumatic perforations. In case of being more than one, always separated from each other by a considerable distance [12] (Figure 1 and Figure 2).

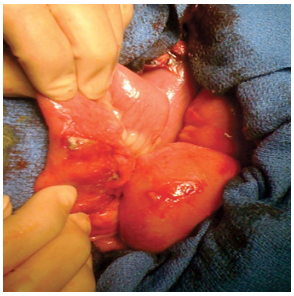

Figure 1: The holes caused by the liposuction cannula are observed in the intestine. The intestine is completely healthy in appearance [17].

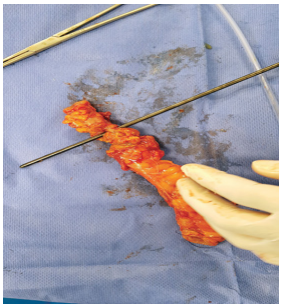

Figure 2: The portion of the resected small intestine is observed with the presence of an orifice. The gut is completely vital looking [1].

Results

The results were obtained from the keyword search in English and Spanish. Comparing them, we observe a higher number in searches carried out with keywords in English. This is because this language is the most widely used worldwide for medical publications.

In English, 13 articles were obtained for "Intestinal perforation after liposuction". In Spanish, 1 was obtained for "intestinal perforation after abdominal liposuction".

Of these 13 papers, 10 deal with "a case" of intestinal perforation by liposuction cannula; and another 3 works deal with bibliographic and/or systematic reviews on cases of intestinal perforation by cannula.

In our work, we exclusively study and analyze the complication of intestinal perforation by cannula in abdominal liposuction, in addition to explaining the dynamic mechanism of how this complication occurs, which is not described in any of the articles analyzed.

The publications, where this intraoperative accident is mentioned, are scarce and do not analyze why it occurs. They usually report a case based on personal experience [4].

From the analysis of these statistics, it appears that complications due to intestinal perforation by cannula are few concerning other complications in abdominal liposuction [5].

It is noted that the publications are made by the teams dealing with complications and not by the teams that performed the liposuctions and accidental perforations.

We have not found published works that analyze the relationship between the liposuction cannula, the anatomy of the abdominal wall and intestinal perforation, which would ultimately be the complete process, which is required for intestinal perforation to occur as a complication of abdominal liposuction. Nor have we found in these studies the treatment required for the perforated small intestine.

We have not found controlled clinical case studies, meta-analyses, laboratory research, and/or cadavers in the literature consulted that allow us to make recommendations with a greater foundation.

Discussion

In abdominal lipaspiration a series of mechanical accidents can be presented, produced by the surgeon's actions with his instruments. From the didactic point of view, we can divide them immediately and remotely. The immediate ones are manifested in the intra-operative, while the remote ones do so in the post-operative.

Among the immediate, they are, for example, vascular lesions; And in the remote, there is intestinal drilling, which went unnoticed during surgery. However, in some cases, this intestinal drilling can be contained or physiologically blocked by the body (plastron) avoiding peritonitis. When this does not happen, the signs and symptoms appear in the post-operative that express the acute or subacute clinical picture produced by intestinal drilling.

Of course, in these lipoaspirations, there can also be a series of pathophysiological (non-mechanical) complications such as thrombosis-pulmonary (TEP). In these cases, for a greater duration of surgery where other combined procedures are added, it plays an important role. This can be seen when lipaspiration is associated with other surgeries, for example, with abdominal dermolipctomy. In these cases, also the patient's clinical status collaborates with it [17].

The factors attributed to this mechanical complication, cannula drilling, are several and result from a conjunction of events that occurred in the operating room and that also includes the clinical-surgical background of patients. To the latter, we can mention the presence of umbilical hernias, eventrations, abdominal scars and fibrous adhesions caused by surgeries in the region or previous liposuctions [18].

Previous healing in the abdominal wall can hinder or hinder the cannula path in the subcutaneous tissue [17].

The thin intestine is 6 to 8 meters in length, it is mobile, in case of the instrumental lesion, it can present one or more separated holes one other and without respecting a specific area, never multiple perforations in a small segment. Keep in mind that the thin intestine moves freely and constantly in the abdominal cavity.

To make multiple intestinal perforations in the same segment, would be needed for each lesion in this mobile intestine, a new entry of the cannula from the subcutaneous tissue to the abdominal cavity, find the same portion of the small intestine and drill it again with the cannula. It is a very rare event, almost technically impossible to happen.

The intestinal drilling association between lipoaspiration and necrotizing cellulite is also described. In this case, the tip of the cannula contaminates and infects the adipose tissue, which has:

a) poor vascularization,

b) a wide surface exposed, and

c) a graceful one of bees that leaves the cannula in its path in the subcutaneous tissue.

That is, after an abdominal lipaspiration, the lipoaspirated area is weakened in the face of the possibility of eventual pollution and infection. In this case, it is infected with germs of the intestinal flora, gram-negative and anaerobes. It is common to observe signs of inflammation in the cutaneous inlet holes of the cannula, and sometimes there is an exit of intestinal content by such holes. In addition, cellulite can occur in the abdominal wall [6,7,12,19, and 20-22].

In short, instrumental accidents by lipoaspiration can be of two types:

The first group, of extreme urgency or overgrowth, manifests during surgery or in the early hours of the postoperative period. This group includes pneumothorax and hemorrhage from organ injury or large vessels. These conditions require immediate treatment to avoid a fatal outcome.

The second group, acute or subacute evolution, is intestinal perforations. In that case, exploratory laparotomy is a diagnostic and therapeutic procedure. When the intestine is healthy tissue, they can be valid and generally sufficient resources according to the cases:

a) Resective surgery and anastomosis,

b) the focus of the proximal corporal of the intestine through an ostomy and the distal corporal, or

c) the suture of the hole generated by the cannula [3,4, and 12].

Conclusions

Intestinal perforation as an intraoperative complication of abdominal liposuction, in the consulted literature is not reported in detail or analyzed. We have not found any work that analyzes the three components necessary for this complication to occur.

Knowledge of the biodynamics of intestinal perforation as an intraoperative complication of abdominal liposuction is important. Among the intervening factors, the safest type of cannula should be highlighted, determining which patients with previous abdominal pathologies are at greater risk and finally knowing that these intestinal perforations can be resolved with a suture, resection plus anastomosis and suture or ostomy. Taking into account that the injured intestinal tissue has previous normal conditions, its prognosis is good.

The idea of this work is to provide information to plastic surgeons, to understand the mechanism of production and the treatment of this accidental complication, as well as to improve the safety ranges of this surgical technique.

Declarations

The authors declare that they have no conflicts of interest, that the work has been approved by the ethics committee responsible in the workplace, and do not declare means of financing of the work carried out.

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