



Unusual Complications of Abdominal Plastic Surgery Causing Postoperative Pain of Difficult Diagnosis: An Integrative Review

Complicações não habituais da cirurgia plástica de abdome que causam dor pós-operatória de diagnóstico difícil: Uma revisão integrativa

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Abstract

Introduction Abdominal plastic surgery may cause common complications, such as hematoma, seroma, and suture dehiscence, severe complications, including sepsis and thromboembolism, and unusual complications, such as nutcracker syndrome, pyoderma gangrenosum, hiatal hernia, and esophageal motility dystonia, which can cause postoperative difficult-to-diagnose pain. This fact can lead the surgeon and their team to numerous diagnoses that often do not match the condition due to the rarity of these cases.

Materials and Methods We performed an integrative review of unusual complications of abdominal plastic surgery in the PubMed/MEDLINE and LILACS databases. Next, we compared the findings with the casuistry of one of the authors (MR) from the last 30 years.

Results The database query did not yield papers on nutcracker syndrome or esophageal motility dystonia associated with abdominoplasty. We found nine cases of pyoderma gangrenosum and three cases of hiatal hernia in the literature. In his casuistry, one of the authors (MR) had one case of each complication, and they were compared with the cases found in the literature.

Conclusion Unusual complications of abdominoplasty influence the patient's postoperative recovery and can cause pain associated with other signs and symptoms of difficult diagnosis.

Keywords

- ▶ abdominoplasty
- ▶ esophageal motility disorders
- ▶ hernia
- ▶ hiatal
- ▶ pyoderma gangrenosum
- ▶ renal nutcracker syndrome

Resumo

Introdução A cirurgia plástica abdominal está sujeita a complicações comuns, como hematoma, seroma e deiscência de suturas, a complicações graves, como sepse e tromboembolismo, e a complicações não habituais, como síndrome de quebra-nozes, pioderma gangrenoso, hérnia de hiato e distonia da motricidade do esôfago, que podem causar dor de diagnóstico difícil no pós-operatório, o que leva o cirurgião e a sua

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Palavras-chave

- ▶ abdominoplastia
- ▶ hérnia hiatal
- ▶ pioderma gangrenoso
- ▶ síndrome do quebra-nozes
- ▶ transtornos da motilidade esofágica

equipe a inúmeros diagnósticos por vezes não coincidentes com a patologia devido à raridade dos casos.

Materiais e Métodos Foi realizada uma revisão integrativa dos casos das complicações não habituais da cirurgia plástica de abdome relatados nas bases de dados PubMed/MEDLINE e LILACS, e os achados foram comparados com a casuística de um dos autores (MR) nos últimos 30 anos.

Resultados Não foram encontrados artigos de casos de síndrome de quebra-nozes e de distonia da motricidade do esôfago associados à abdominoplastia nas bases de dados. Foram encontrados nove casos de pioderma gangrenoso e três casos de hérnia de hiato. Na casuística de um dos autores (MR), havia um caso de cada uma das complicações, os quais foram comparados com os casos encontrados na literatura.

Conclusão As complicações não habituais da abdominoplastia influenciam a recuperação pós-operatória do paciente e podem dar origem à dor associada a outros sinais e sintomas de diagnóstico difícil.

Introduction

Since its description by Kelly in 1899, abdominoplasty has undergone numerous improvements, with a significant quality increase compared to procedures performed until the mid-twentieth century. With this evolution, several complications have been identified. The most common include hematoma, seroma, suture dehiscence, necrosis, and infection,¹ and the less common include nutcracker syndrome, pyoderma gangrenosum, hiatal hernia, and esophageal motor dystonia, which cause difficult-to-diagnose postoperative pain, and are the topic of the present review article.

Nutcracker syndrome results from extrinsic compression of the left renal vein due to several etiologies, and it causes renal vascular congestion. Its first description dates from 1972, and nutcracker syndrome is a diagnosis of exclusion in cases of abdominal pain potentially occurring after abdominoplasty. Moreover, it is easily confused with other diagnoses of postoperative pain and is usually confirmed by imaging tests. Its etiology ranges from anterior compression of the left renal vein by the abdominal aorta and superior mesenteric artery (t anterior nutcracker, the most common form of the disease), anterior compression by the aorta and posterior compression by the spine (posterior nutcracker), or, in rarer cases, compression by the circumaortic renal vein, lymphadenopathy, severe lordosis, or pregnancy.²

Nutcracker syndrome may present with hematuria, proteinuria, low back or abdominal pain, pelvic varicose veins, and varicoceles, the latter resulting from venous hypertension and collateralization. Doppler ultrasonography is the diagnostic test of choice since, it compares the ratio of peak systolic velocity in the compressed vessel and the hilar vein.² Treatment relies on conservative or surgical techniques, either open or endovascular.³

In 1924, Cullen was the first author to describe pyoderma gangrenosum, a condition featuring immunological, neutrophilic, and inflammatory reactions. The clinical picture

includes the formation of painful ulcers, with imprecise edges, of varying sizes and depths.^{4,5}

This rare, non-neoplastic, and non-infectious autoimmune skin disease has an incidence of 2 to 3 cases in 1 million inhabitants per year. It mainly affects the breasts and abdomen,⁶ and it presents with one or more painful purulent ulcers in intact or traumatized skin. After surgery, pyoderma gangrenosum usually appears in 2 weeks. Treatment relies on systemic corticosteroids as the first option to inhibit the immune reaction, hyperbaric oxygen therapy in patients not tolerant to the main medication, and supplementary topical treatment.⁷

By definition, a hiatal hernia is a herniation of abdominal cavity elements through the esophageal hiatus, which lies on the muscular surface of the diaphragm. Anatomically, this orifice enables the esophagus and the vagus nerve to pass into the abdomen. It is vulnerable to herniation because it directly faces the abdominal cavity and suffers pressure between this cavity and the thoracic cavity.⁸

The classification of a hiatal hernia relies on its position between the esophageal junction and the diaphragm: sliding, paraesophageal, mixed, or giant hiatal hernia.⁸ Associated symptoms often include reflux, nausea, dysphagia, and epigastric and thoracic discomfort. Treatment is surgical fundoplication.⁹

The esophageal function of food bolus transport depends on coordinated peristalsis and relaxation movements. Interruption of these movements can lead to obstructive symptoms, such as dysphagia, non-cardiac chest pain, heartburn, and regurgitation. The diagnosis of esophageal motility dystonia relies on the clinical picture, endoscopy, and supplementary diagnostic tests.¹⁰

Studies¹⁰ following up on patients after abdominal surgery, such as bariatric surgery, reported esophageal motility dystonia, demonstrating that postoperative dysphagia is a common complication resulting from esophageal dysmotility.

Table 1 Methodology used in the literature search

Subject	Query strategy in databases	Number of articles retrieved in the search
Nutcracker syndrome	<i>nutcracker syndrome AND abdominoplasty</i>	0
Pyoderma gangrenosum	<i>pyoderma gangrenosum AND abdominoplasty</i>	6
Hiatal hernia	<i>hiatal hernia AND abdominoplasty</i>	3
Esophageal motility disorders	<i>esophageal motility disorders AND abdominoplasty</i>	0

Table 2 Comparison of literature reports on nutcracker syndrome with the personal casuistry of one of the authors (MR)

	Literature reports	Author's casuistry
Number of cases	0	1
Main reported symptom	–	Tight mesogastrium pain
Type of surgery performed	–	Abdominoplasty
Treatment	–	Referral to vascular surgeon for endoprosthesis placement

Objective

The present study aimed to report rare complications of difficult-to-diagnose pain after abdominoplasty through an integrative literature review and comparison with the personal case series of one of the authors (MR) over the last 30 years.

Materials and Methods

We searched articles on the following unusual complications of abdominal plastic surgery in the LILACS and PubMed/MEDLINE databases: nutcracker syndrome, pyoderma gangrenosum, hiatal hernia, and esophageal motility dystonia, using MeSH terms in the advanced search (► **Table 1**). In addition, we analyzed the personal casuistry of one of the authors (MR) over the last 30 years.

The articles were selected after we read their titles and abstracts. The inclusion criteria were case reports or series mentioning abdominal complications. We excluded articles not directly related to plastic surgery or to the guiding questions of the current study.

Results

Nutcracker syndrome

The articles found in the literature on nutcracker syndrome were mostly case reports of patients who presented with the

condition but not in the postoperative period of abdominal plastic surgery. One of the authors (MR) had one patient with nutcracker syndrome after abdominoplasty, which caused nonspecific, difficult-to-diagnose pain► (**Table 2**).

Pyoderma gangrenosum

The database query retrieved nine reports of postabdominoplasty pyoderma gangrenosum, including four cases presented in a systematic review. This complication often occurs in the perioperative period of abdominal plastic surgery concurrent with mammoplasty► (**Table 3**). A few articles described symptoms of pyoderma gangrenosum but mentioned some perioperative signs, such as fever and erythema or bullous lesion with ulceration.

Hiatal hernia

The literature reported symptoms such as heartburn, epigastric pain, regurgitation, and dysphagia due to hiatal hernia after abdominoplasty, with dysphagia being highlighted in two cases. One of the authors (MR) had one case of this complication after abdominal plastic surgery (► **Table 4**).

Esophageal motility disorders

The literature search retrieved no articles associating esophageal motricity dystonia and abdominal plastic surgery. The reported cases of gastroesophageal reflux after

Table 3 Comparison of literature reports on pyoderma gangrenosum with the personal casuistry of one of the authors (MR)

	Literature reports	Author's casuistry
Number of cases	9	1
Main reported symptom	Pain in the groin region radiating to the lower limb, abdominal pain	Burning pain in the abdominal scar
Type of surgery performed	Abdominoplasty and mammoplasty	Abdominoplasty and liposuction
Treatment	Topical or systemic corticosteroids, debridement, and immunoglobulin	Prednisone and culture-guided antibiotic therapy

Table 4 Comparison of literature reports on hiatal hernia with the personal casuistry of one of the authors (MR)

	Literature reports	Author's casuistry
Number of cases	3	1
Main reported symptom	Heartburn, dysphagia, epigastric pain, and regurgitation	Severe epigastric pain, and dysphagia
Type of surgery performed	Abdominoplasty	Abdominoplasty without liposuction
Treatment	Nissen and Toupet fundoplication	Endoscopic fundoplication

Table 5 Comparison of literature reports on Esophageal motility disorders with the personal casuistry of one of the authors (MR)

	Literature reports	Author's casuistry
Number of cases	0	1
Main reported symptom	–	Abdominal pain, mainly in the epigastrium
Type of surgery performed	–	Post-bariatric abdominoplasty with rectus abdominis muscle plication
Treatment	–	Expectant treatment and analgesia

abdominoplasty were due to other causes, usually hiatal hernia, which can cause a secondary motility disorder.►

Table 5 shows one case of this post-abdominoplasty complication in the casuistry of one of the authors (MR).

Discussion

Nutcracker syndrome

The cases of nutcracker syndrome found in the literature were not associated with surgery; therefore, there were no articles regarding abdominoplasty, which shows that this is an uncommon presentation. The exact prevalence of the syndrome is unknown due to the different clinical pictures and the uncertainty regarding the diagnostic criteria.¹¹

The predominant presentation of nutcracker syndrome in the literature was anterior nutcracker syndrome, in which the left renal vein undergoes compression as it passes through the superior mesenteric artery and the abdominal aorta. Hematuria is the most common sign resulting from a venous wall rupture.¹¹ However, the literature revealed less usual findings, such as hypertension,¹² vomiting, mild acute abdominal pain, and malrotation of the small intestine.¹³ The personal casuistry of one of the authors (MR) presented unusually with mesogastrium pain. Computed tomography was the most commonly requested supplementary diagnostic test, enabling the visualization of the compression.

The literature reported the conservative management of nutcracker syndrome with angiotensin-converting enzyme inhibitors, such as lisinopril, and aspirin,¹¹ or surgical treatment, either endovascular or open.¹⁴

Pyoderma gangrenosum

A systematic review on pyoderma gangrenosum in Latin America¹⁵ found 232 cases, 10% of which were secondary to abdominoplasty. Brazil had the highest number of cases. Other reported associations included inflammatory diseases, such as rheumatoid arthritis and inflammatory

bowel disease, and other surgeries, such as reduction mammoplasty.¹⁵

Abdominoplasty may be a triggering factor for pyoderma gangrenosum-related pathergy, since tissue stress from surgical trauma can result in skin hyperreactivity.¹⁵ Culture of lesional secretion is usually negative, and biopsy often reveals a neutrophilic inflammatory infiltrate.¹⁶

The first-line treatment for pyoderma gangrenosum is immunosuppressive therapy with high-dose corticosteroids and cyclosporine, although the latter is less frequently used. The second and third-line treatments include immunosuppressive, immunomodulatory, and biological agents. Although there is no gold standard treatment for pyoderma gangrenosum, management can be guided by lesion extension and severity to select topical or intralesional therapy, or systemic therapy for more advanced injuries.¹⁵ The literature reported that the main treatments used systemic corticosteroids with lesion debridement if necrotic tissue was present.¹⁷ In the casuistry of one of the authors (MR) immunosuppressive therapy was applied, achieving remission of the condition.

Hiatal hernia

Ellis et al.¹⁸ (2019) reported abdominoplasty as an important risk factor for the recurrence of hiatal hernia requiring surgery. Another case reported in the literature¹⁹ addresses the evolution of hiatal hernia to Barrett's esophagus after abdominoplasty with gastroesophageal reflux symptoms.

Abdominoplasty increases muscle tone in the anterior abdominal wall, constantly increasing the pressure applied to the abdominal cavity, favoring herniation. This factor, which is aggravated by the anatomical characteristics of the region, contributes to this occurrence, since the esophagus does not fill completely the diaphragmatic hiatus, for it must expand depending on its contents. This makes the hiatus more vulnerable to the protrusion of structures into the abdominal cavity.⁸ The treatments often used for hiatal

hernia correction are Nissen (total posterior) fundoplication and Toupet (partial posterior) fundoplication.²⁰

Esophageal motility disorders

Esophageal motor dystonia is a relatively uncommon condition that usually manifests with chest pain and dysphagia.²¹ Dysphagia is common in hiatal hernia, which is reported as a potential abdominoplasty complication.²² In contrast, the database query did not yield esophageal motor disorder as a complication of abdominal plastic surgery, demonstrating the rare nature of the casuistry of one of the authors (MR).

Both complications can have similar presentations, requiring endoscopy to rule out the presence of hiatal hernia and other causes of secondary esophageal motor disorder.¹⁰ Dystonia results from several conditions, including achalasia, esophagogastric junction outlet obstruction, and peristalsis disorders.²¹

The approaches that may be established for esophageal motor dystonia include lifestyle changes and surgical treatment, especially in cases of achalasia: laparoscopic Heller myotomy (LHM) with partial fundoplication, pneumatic dilation (PD), and, most recently, peroral endoscopic myotomy (POEM).²¹ In the case that was part of the casuistry of one of the authors (MR), expectant treatment and analgesia were applied, with a good outcome of the complication.

Conclusion

Unusual complications of abdominoplasty affect the patient's postoperative recovery and may give rise to pain with other signs and symptoms not necessarily restricted to the abdominal region, generating difficult-to-diagnose conditions that the plastic surgeon must be aware of. The small number of cases in the literature associated with abdominal plastic surgery reinforces the rarity of complications and the difficulty in diagnosis and management.

Authors' Contributions

MR: conceptualization, study conception and design, resource management, performance of surgeries and/or experiments, and writing – review and editing; and STP: data analysis and/or interpretation, study conception and design, investigation, methodology, writing – original draft preparation, writing – review and editing, and visualization.

Clinical Trials

None.

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Conflict of Interests

The authors have no conflict of interests to declare.

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