ARTIGO DE REVISÃO

DOI: 10.55825.RECET.SBU.0374

COMMON INQUIRIES REGARDING LAPAROSCOPIC ADRENALECTOMY: A REVIEW OF LITERATURE

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RESUMO

INTRODUÇÃO: Nos últimos 25 anos, avanço significativo no tratamento cirúrgico de doenças da adrenal tem ocorrido. Estudos têm confirmado a efetividade da adrenalectomia laparoscópica (AL) na abordagem de tumores benignos da adrenal, como adenomas, mielolipomas, aldosteronomas, e na síndrome de Cushing. Entretanto, a adrenalectomia aberta (AO) permanece como opção preferencial para certas doenças adrenais, como feocromocitoma, carcinoma cortical adrenal (CCA), metástases, e massas grandes adrenais.

OBJETIVO: O objetivo da revisão foi levantar a literatura já existente para melhor conhecimento na aplicação de técnicas laparoscópicas para tratamento do feocromocitoma, carcinoma cortical adrenal, metástase adrenal, e grandes massas adrenais.

MATERIAIS E MÉTODOS: Uma revisão analítica de literatura foi feita utilizando as bases de dados PubMed, MEDLINE, e Cochrane Library, abordando publicações de 2000 a janeiro de 2024. Vários fatores foram acessados, incluindo tamanho do tumor, abordagem cirúrgica, evolução oncológica, taxas de recorrência, e complicações perioperatórias.

RESULTADOS: Inicialmente, 152 artigos foram identificados, e seus resumos foram revisados. Após a revisão, 65 foram analisados em detalhe, e 31 estudos foram incorporados a esta revisão.

DISCUSSÃO/CONCLUSÃO: AL é a abordagem cirúrgica mais factível para CCA em estádios iniciais, metástases, massas adrenais grandes, e feocromocitomas, particularmente quando os exames de imagem revelavam tumores encapsulados sem evidências de invasão em tecidos adjacentes ou linfonodos aumentados. A mudança para doença aberta é necessária quando a ressecção oncológica segura é incerta.

PALAVRAS-CHAVE: Adrenalectomia, laparoscopia, carcinoma, metástase, feocromocitoma.

ABSTRACT

INTRODUCTION: Over the last 25 years, there have been significant advancements in the surgical treatment of adrenal disorders. Studies have confirmed the effectiveness of laparoscopic adrenalectomy (LA) for addressing benign adrenal tumors, including adenomas, myelolipomas, aldosteronomas, and Cushing's syndrome. However, open adrenalectomy (OA) remains the preferred option for certain adrenal conditions, such as pheochromocytoma, adrenal cortical carcinoma (ACC), adrenal metastases, and large adrenal masses.

OBJECTIVE: The purpose of this review is to examine existing literature to gain insights into the application of laparoscopic techniques for treating pheochromocytoma, adrenal cortical carcinoma, adrenal metastases, and large adrenal masses.

MATERIALS AND METHODS: A thorough literature review was conducted using the PubMed, MEDLINE, and Cochrane Library databases, focusing on publications from 2000 to January 2024. The review assessed various factors, including tumor size, surgical approach, oncological outcomes, recurrence rates, and perioperative complications.

RESULTS: Initially, 152 articles were identified, and their abstracts were reviewed. Following this, 65 studies were analyzed in detail, with 31 incorporated into this review.

DISCUSSION/CONCLUSION: LA is a feasible surgical approach for early-stage ACC, adrenal metastases, large adrenal masses, and pheochromocytomas, particularly when imaging results reveal encapsulated tumors without evidence of invasion into surrounding tissues or enlarged lymph nodes. Transitioning to open surgery is necessary when a secure oncological resection is uncertain.

Keywords: adrenalectomy, laparoscopy, carcinoma, neoplasm metastasis, pheochromocytoma

INTRODUCTION

The transperitoneal laparoscopic adrenalectomy (LA) technique was first introduced by Gagner et al. in 1992 (1). This laparoscopic approach has swiftly gained popularity and has become the standard for adrenal surgeries involving all non-primary adrenal cancer conditions. LA is acknowledged as a safe, minimally invasive technique that minimizes morbidity, decreases postoperative discomfort, shortens hospital stays, accelerates recovery, and yields long-term outcomes comparable to those of open surgery (2-4).

MATERIALS AND METHODS

A thorough review was executed through the PubMed, MEDLINE, and Cochrane Library databases, concentrating on articles published between 2000 and January 2024. Evaluations of tumor size, surgical approach, oncological results, recurrence rates, and perioperative events were performed.

RESULTS

From the initial pool of 152 articles, abstracts were assessed, resulting in a detailed examination of 65 studies, with 31 included in this review.

DISCUSSION

Laparoscopic adrenalectomy for adrenal cortical carcinoma (ACC) requires careful evaluation to ensure adequate oncological resection. The laparoscopic approach may be appropriate for encapsulated adrenal tumors that do not show signs of invasion into adjacent structures or enlarged lymph nodes (5-8). Imaging techniques like computed tomography and magnetic resonance imaging are vital in determining the suitability of laparoscopic methods for adrenal tumor resections (9-12). Although laparoscopic surgery is suitable for smaller tumors without signs of invasion, it has been associated with higher local and peritoneal recurrence rates, a shorter time to recurrence, and an increased likelihood of positive margins compared to OA (5,6,9). Delman et al. (13) supports the use of LA for resecting stage I and II ACC tumors, highlighting that high-volume referral centers achieve superior oncological results compared to those performing OA. For large incidental tumors without preoperative malignancy indications, the surgical team may choose LA. However, conversion to open surgery is critical when tumor adhesion, invasion, enlarged lymph nodes, or complicated dissections are evident. In these instances, LA poses a higher risk of tumor rupture, spillage, and suboptimal oncological outcomes. The primary factor for successful patient outcomes is effective oncological resection (9-13).

The laparoscopic removal of solitary adrenal metastases is a minimally invasive procedure linked to low morbidity and outcomes similar to OA (14). The most common cancers that metastasize to the adrenal glands include lung, breast, kidney cancers, melanoma, gastrointestinal cancers, and lymphoma (15-16). Over the past twenty years, advancements in oncological treatments have enhanced survival rates and quality of life while confining recurrences to a single resectable site. The risks and complications associated with OA for solitary cancer metastases can be substantial and often overshadow the benefits, while laparoscopic methods have led to shorter operation times, decreased blood loss, and reduced morbidity. LA has demonstrated comparable rates of positive resection margins, local and overall recurrence, and disease-free survival when compared to open resection (14-19).

LA has been performed on large tumors (greater than 5 cm) in the absence of carcinoma evidence (20). In cases with confirmed or high suspicion of primary adrenal cortical carcinoma, open adrenalectomy is recommended. Conversion from laparoscopic to open techniques is advised when intraope-

rative signs of carcinoma are apparent, such as tumor adhesions, local invasion, enlarged lymph nodes, or complex dissections (20-26). Overall, outcomes for laparoscopic adrenalectomy of large tumors are similar to those of smaller tumors concerning operating room duration, length of hospital stay, and complication rates. However, tumors measuring 7.5 cm or larger represent an independent risk factor for increased conversion rates to open surgery (22). Laparoscopic adrenalectomy for tumors smaller than 5 cm has been associated with shorter operating times compared to larger tumors (20-26).

LA for pheochromocytoma has proven to be both safe and effective, despite concerns about intraoperative cardiovascular complications stemming from catecholamine release during pneumoperitoneum, manipulation of organs, and tumor resection (27,28). Pheochromocytomas typically exceed the size of other functional and nonfunctional adrenal tumors and have a significant number of arterial and venous branches, which can lead to bleeding during surgery. Their large size and vascularity complicate the resection process, especially on the left side, where they may invade renal vessels that must be meticulously identified and preserved to prevent accidental injury (29,30).

Both laparoscopic and open resections of pheochromocytomas generally entail longer operative times, heightened complication rates, increased blood loss, and lengthier hospital stays compared to other indications for adrenalectomy (27). Alpha-adrenergic blockers, such as phenoxybenzamine or doxazosin, are given for up to 14 days prior to surgery to control hypertension is highly recommended to manage blood pressure and reduce the risk of intraoperative hypertensive episodes. Beta-blockers may be added if tachycardia occurs (31). The conversion rate for LA stands at 5.5%. A retrospective analysis assessed various parameters, including tumor size, body mass index (BMI), tumor type, and laparoscopist experience. Significant predictors of conversion identified through univariate analysis include tumor size ≥ 5 cm, BMI ≥ 24 kg/m², and pheochromocytoma, with tumor size being the most critical predictor (27).

CONFLICT OF INTEREST

None declared.

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Recebido em:
26 de junho de 2025

Aceito para publicação em:
13 de janeiro de 2026

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